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Education Longitudinal Study of 2002: Base-Year to First Follow-up Data File Documentation

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Education Longitudinal Study of 2002: Base-Year to First Follow-up Data File Documentation

October 2005

Steven J. Ingels
Daniel J. Pratt
James E. Rogers
Peter H. Siegel
Ellen S. Stutts
RTI International

Jeffrey A. Owings
Project Officer
National Center for
Education Statistics

U.S. Department of Education
Margaret Spellings
Secretary

Institute of Education Sciences
Grover J. Whitehurst
Director

National Center for Education Statistics
Mark Schneider
Commissioner

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Content Contact:
Jeffrey A. Owings
(202) 502-7423
Jeffrey.Owings@ed.gov

Foreword

This manual has been produced to familiarize data users with the procedures followed for data collection and processing for the base year and first follow-up of the Education Longitudinal Study of 2002 (ELS:2002). It also provides the necessary documentation for use of the public-use data files, as they appear on the ELS:2002 base-year to first follow-up electronic codebook (ECB) (NCES 2006-346).

Analysts do not need to be sophisticated statisticians or computer programmers to use the ELS:2002 ECB. Most social scientists and policy analysts should find the dataset organized and equipped in a manner that facilitates straightforward production of statistical summaries and analyses. This manual provides extensive documentation of the content of the data files and how to access and manipulate them.

Chapter 1 serves as an introduction to ELS:2002. It includes an overview and history of the National Center for Education Statistics (NCES) program of longitudinal high school cohorts, summarizes the ELS:2002 objectives, and supplies an overview of the base-year and longitudinal study design.

Chapter 2 describes the first follow-up data collection instruments, including both the development and content of the in-school student, transfer, dropout, early graduate, homeschooled, and school administrator questionnaires, as well as the student assessment in mathematics.

The sample design and weighting procedures used both in the base-year and first follow-up studies are documented in chapter 3, as are weights, imputation, and the calculation of design effects.

Data collection schedules, training, procedures, and results are presented in chapter 4. Chapter 5 describes data preparation and processing, including the receipt control system, optical scanning, machine editing, and data file preparation. Chapter 6 describes the contents of the data files, including the data structure and analysis populations.

The appendixes include, among other topics, an introduction to the public-use ECB (appendix A), bse-year and first follow-up questionnaires (appendix B), documentation for imputed variables (appendix C), information on variables not included in the public-use files but available in restricted files for licensed users (appendix D), a glossary of terms (appendix E), student questionnaire critical items (appendix F), cross-cohort comparisons (appendix H), and a synopsis of the ELS:2002 first follow-up field test (appendix J).

Jeffrey A. Owings
Associate Commissioner
Elementary/Secondary & Libraries Studies

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Chapter 1
Introduction

1.1 Overview of the Data File Documentation

This report provides guidance and documentation for users of the public release for the combined base-year and first follow-up data of the Education Longitudinal Study of 2002 (ELS:2002). ELS:2002 is sponsored by the National Center for Education Statistics (NCES) of the Institute of Education Sciences, U.S. Department of Education. The base-year and first follow-up studies were conducted through a contract to RTI International (RTI),[1] a university-affiliated, nonprofit research organization based in North Carolina, in collaboration with its subcontractors, the Educational Testing Service of Princeton, New Jersey, and MPR Associates of Berkeley, California. This manual contains information about the purposes of ELS:2002, the base-year and first follow-up data collection instruments, the sample design, and data collection and data processing procedures. The manual provides guidance for understanding and using data from all components of the base year and first follow-up.

The ELS:2002 base-year to first follow-up dataset has been produced in both public-use and restricted-use versions (see appendix D for a summary of differences between the public and restricted electronic codebooks [ECBs]). The released data files reflect alteration or suppression of some of the original data. Such edits were imposed to minimize the risk of disclosing the identity of responding schools and individuals. Although the primary focus of this manual is the public-release version of the data as issued in ECB format, much of the information supplied is also applicable to the restricted-use ECB.

Chapter 1 addresses three main topics. First, it supplies an overview of the NCES education longitudinal studies program, thus situating ELS:2002 in the context of the earlier NCES high school cohorts studied in the 1970s, 1980s, and 1990s. Second, it introduces ELS:2002 by delineating its principal objectives. Third, it provides an overview of the base-year and first follow-up study designs. In subsequent chapters, additional topics are addressed: instrumentation (chapter 2), sample design and weighting (chapter 3), data collection methods and results (chapter 4), data preparation and processing (chapter 5), and data file contents (chapter 6). Appendixes provide additional information, including an introduction to the public-use ECB (appendix A), base-year and first follow-up questionnaires (appendix B), documentation for imputed variables (appendix C), information on variables not included in public-use files but available in restricted-use files for licensed users (appendix D), a glossary of terms (appendix E), student questionnaire critical items (appendix F), base-year and first follow-up ECBs (appendix G), cross-cohort comparisons (appendix H), standard errors and design effects (appendix I), and a synopsis of the ELS:2002 first follow-up field test (appendix J).

[1] RTI International is a trade name of Research Triangle Institute.

1.2 Historical Background

1.2.1 NCES Education High School Longitudinal Studies Program

In response to its mandate to "collect and disseminate statistics and other data related to education in the United States" and the need for policy-relevant, nationally representative longitudinal samples of elementary and secondary students, NCES instituted the National Education Longitudinal Studies program. The aim of this continuing program is to study the educational, vocational, and personal development of students at various stages in their educational careers and the personal, familial, social, institutional, and cultural factors that may affect that development.

NCES (and ELS:2002) is authorized by section 406(b) of the General Education Provision Act (20 U.S.C. 1221e) as amended by the Education Sciences Reform Act of 2002. The Education Sciences Reform Act of 2002 replaced the former Office of Educational Research and Improvement (OERI) with the Institute of Education Sciences (IES), in which NCES is now housed.

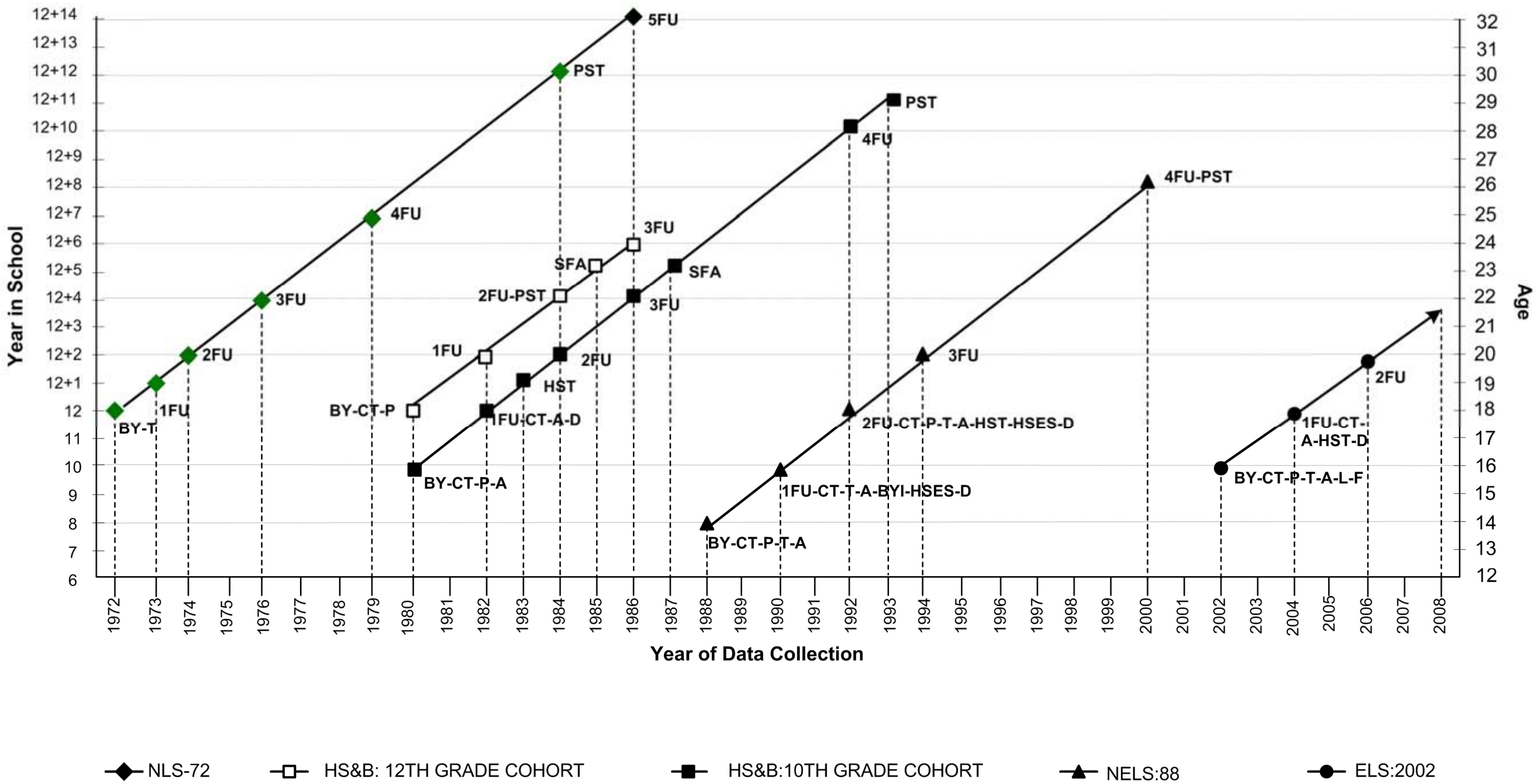
The high school longitudinal studies program consists of three completed studies: the National Longitudinal Study of the High School Class of 1972 (NLS-72), the High School and Beyond (HS&B) longitudinal study of 1980, and the National Education Longitudinal Study of 1988 (NELS:88). In addition, base-year and first follow-up data for ELS:2002, the fourth longitudinal study in the series, are now available. Taken together, these studies describe (or will describe) the educational experiences of students from four decades—the 1970s, 1980s, 1990s, and 2000s—and also provide bases for further understanding of the correlates of educational success in the United States. Figure 1 includes a temporal presentation of these four longitudinal education studies and highlights their component and comparison points. Figure 1 does not identify all future follow-up points for ELS:2002; final decisions have yet to be made concerning them. However, the general expectation is that ELS:2002 sophomores will be followed until about age 30.

1.2.2 National Longitudinal Study of the High School Class of 1972 (NLS-72)

The National Education Longitudinal Studies program began over 30 years ago with the implementation of NLS-72.[2] NLS-72 was designed to provide longitudinal data for education policymakers and researchers who link educational experiences in high school with important downstream outcomes such as labor market experiences and postsecondary education enrollment and attainment. With a national probability sample of 19,001 high school seniors from 1,061 public and religious and other private schools, the NLS-72 sample was representative of approximately 3 million high school seniors enrolled in 17,000 U.S. high schools during the spring of the 1971–72 school year. Each member of this cohort was asked to complete a student questionnaire and a cognitive test battery. In addition, administrators at the sample members'

[2] For documentation on NLS-72, see Riccobono et al. (1981) and Tourangeau et al. (1987). While recent NCES reports and user documentation may be found on the NCES website (http://nces.ed.gov), some older documentation may be unavailable. NLS-72 and older HS&B manuals may be downloaded from the International Archive of Education Data (IAED) at the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan (http://www.icpsr.umich.edu). Materials may also be obtained in microfiche or photocopy format from the Education Resources Information Center (ERIC) database (http://www.eric.ed.gov).

Figure 1. Longitudinal design for the NCES high school cohorts: 2004



NLS-72=National Longitudinal Study of the High School Class of 1972
HS&B=High School and Beyond: 1980
NELS:88=National Education Longitudinal Study of 1988
ELS:2002=Education Longitudinal Study of 2002

BY=Base Year data collection
1FU=1st follow-up data collection
2FU=2nd follow-up data collection
3FU=3rd follow-up data collection
4FU=4th follow-up data collection
5FU=5th follow-up data collection

CT=Cognitive test
P=Parent survey
T=Teacher survey
A=Adminstrator survey
L=Library/media center survey
F=Facilities checklist

HST=High School Transcript
PST=Post-Secondary Transcript
SFA=Student Financial Aid
BYI=Base Year Ineligible Study
HSES=HS Effectiveness Study
D=Dropout Survey

schools were asked to supply information about the schools' programs, resources, and grading systems, as well as survey data on each student. No parent survey was conducted. However, postsecondary education transcripts were collected from the institutions attended by students. Five follow-up surveys were completed with this student cohort, with the final data collection taking place in 1986, when the sample members were 14 years removed from scheduled high school graduation and approximately 32 years old.

A wide variety of data was collected in the NLS-72 surveys. For example, in addition to background information about the students and their families, the base-year and follow-up surveys collected data on each respondent's educational activities (e.g., schools attended, grades received, and degree of satisfaction with educational institutions). Participants were also asked about their work experiences, periods of unemployment, job satisfaction, military service, marital status, and children. Attitudinal information on self-concept, goals, community involvement, and personal evaluations of educational activities were also included in the study.

1.2.3 High School and Beyond (HS&B)

The second in the series of NCES longitudinal studies was launched in 1980. HS&B included one cohort of high school seniors comparable to the NLS-72 sample; however, the study also extended the age span and analytical range of NCES longitudinal studies by surveying a sample of high school sophomores. Base-year data collection took place in the spring term of the 1979–80 academic year with a two-stage probability sample. More than 1,000 schools served as the first-stage units, and 58,000 students within these schools were the second-stage units. Both cohorts of HS&B participants were resurveyed in 1982, 1984, and 1986; the sophomore group also was surveyed in 1992.[3] In addition, to better understand the school and home contexts for the sample members, data were collected from teachers (a teacher comment form in the base year asked for teacher perceptions of HS&B sample members), principals, and a subsample of parents. High school transcripts were collected for a subsample of sophomore cohort members. As in NLS-72, postsecondary transcripts were collected for both HS&B cohorts; however, the sophomore cohort transcripts cover a much longer time span (to 1993).

With the study design expanded to include a sophomore cohort, HS&B provided critical data on the relationships between early high school experiences and students' subsequent educational experiences in high school. For the first time, national data were available that showed students' academic growth over time and how family, community, school, and classroom factors promoted or inhibited student learning. Researchers were able to use data from the extensive battery of achievement tests within the longitudinal study to assess growth in knowledge and cognitive skills over time. Moreover, data were then available to analyze the school experiences of students who later dropped out of high school and, eventually, to investigate their later educational and occupational outcomes. These data became a rich resource

[3] For a summation of the HS&B sophomore cohort study, see Zahs et al. (1995). For further information on HS&B, see the NCES website: http://nces.ed.gov/surveys/hsb/.

for policymakers and researchers over the next decade and provided an empirical base to inform the debates of the education reform movement that began in the early 1980s.[4]

1.2.4 National Education Longitudinal Study of 1988 (NELS:88)

Much as NLS-72 captured a high school cohort of the 1970s and HS&B captured high school cohorts of the 1980s, NELS:88 was designed to study high school students of the 1990s—but with a premeasure of their achievement and status, prior to their entry into high school. NELS:88 represents an integrated system of data that tracked students from junior high or middle school through secondary and postsecondary education, labor market experiences, and marriage and family formation. Because ELS:2002 repeats so many of its innovations and design features, it will be useful to provide a detailed, round-by-round picture of NELS:88.

Data collection for NELS:88 was initiated with the 8th-grade class of 1988 in the spring term of the 1987–88 school year. Along with a student survey, NELS:88 included surveys of parents (base year and second follow-up), teachers (base year, first follow-up, and second follow-ups), and school administrators (base year, first follow-up, and second follow-up). The sample was also surveyed after scheduled high school graduation, in 1994 and 2000.[5]

1.2.4.1 NELS:88 Base Year

The NELS:88 base year (1988) successfully surveyed 24,599 students, out of some 26,432 selected 8th-graders, across 1,052 public, Catholic, and other private schools. In addition to filling out a questionnaire, students also completed assessments in four subjects (mathematics, science, reading, and social studies). The base year also surveyed one parent, two teachers, and the principal of each selected student. The base-year research instruments collected information about home, school, and individual factors that could serve as predictors for later outcomes (such as, viewed in terms of positive outcomes, graduating from high school, making a smooth transition into the workforce, or completing postsecondary education). Information collected in the base year included family income, parental education, and occupation; parental aspirations for their 8th-grader; the 8th-grader's educational and occupational aspirations and plans, school experiences, extracurricular activities, jobs and chores, television viewing, and reading; teacher perceptions of the 8th-grader's classroom performance and personal characteristics; curricular and instructional information about the classes in which teachers taught the 8th-grader; the teacher's own background and activities; and the principal's reports on the educational setting and environment of the school.

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[4] For a summary of reforms instituted between the time the HS&B cohort was in high school and the NELS:88 cohort was in middle/junior high and high school, see Rasinski et al. (1993). For a summary of state education reforms instituted during the earlier school years of the ELS:2002 cohort, see Hurst et al. (2003).

[5] The entire compass of NELS:88, from its baseline through its final follow-up in 2000, is described in Curtin et al. (2002). More detailed information about the high school surveys of NELS:88 can be found in Ingels et al. (1994). Final outcomes for NELS:88 (in 2000) are reported in Ingels et al. (2002). The most extensive documentation of the NELS:88 assessment battery is found in Rock and Pollack (1995a). The quality of NELS:88 data in the in-school rounds is examined in Kaufman and Rasinski (1991) and McLaughlin and Cohen (1997). The sample design is documented in Spencer et al. (1990). Eligibility and exclusion issues are addressed in Ingels (1996). NCES keeps an updated version of the NELS:88 bibliography on its website. The bibliography encompasses both project documentation and research articles, monographs, dissertations, and paper presentations employing NELS:88 data (see http://nces.ed.gov/surveys/nels88/Bibliography.asp).

1.2.4.2 NELS:88 First Follow-up

A first follow-up took place in 1990. In the NELS:88 first follow-up (initial data release), there are 19,260 participants (18,220 students and 1,040 dropouts) from a sample of 20,700. (There were some changes to the file in the second follow-up re-release of the 1990 data, which shows a revised sample size of 20,840). At that time, student cohort members, their teachers, and their principals were resurveyed. The first follow-up presented three major new analytic opportunities: (1) longitudinal analysis of gains in tested achievement and the correlates of achievement gains, (2) identification of high school dropouts and investigation of why some students drop out of school and others persist, and (3) cross-cohort comparison (1990 high school sophomores could be compared to sophomores in 1980).

Achievement gain. One major goal of NELS:88 was to measure students' academic growth over time and to identify the specific school (and nonschool) processes that may foster academic achievement. The first follow-up tests were tailored to students' ability as measured in the base year; more difficult test forms were assigned to students with a higher ability estimate. The first follow-up, by retesting the 8th-grade NELS:88 cohort, was able to measure cognitive gains between 8th and 10th grades in mathematics, science, reading, and social studies. In turn, these gains could be related to the data collected on home and school correlates of achievement, starting in 1988. Because NELS:88 developed hierarchical criterion-referenced proficiency scores (in reading, science, and mathematics), gain can be looked at in more than just quantitative terms—one can use the proficiency levels to locate the place on the growth continuum where the gain took place (e.g., at a lower or at a higher skill area) and, in turn, better relate gains to specific school processes and curricular sequences.[6]

Dynamics of school disengagement and dropping out. Another major goal of the first follow-up was to study the educational trajectory of those who drop out of high school and to better understand the factors that help some at-risk students persist in their education. By beginning with the 8th grade, NELS:88 was able to capture the population of early dropouts—those who left school prior to spring term of 10th grade—as well as (in the second follow-up) later dropouts (who left after spring of 10th grade) as had been studied in HS&B.

Cross-cohort comparison. A third goal of the 1990 wave was to compare NELS:88 sophomores with the earlier cohort of high school sophomores studied in HS&B. To ensure comparability of the two samples, NELS:88 "freshened" the sophomore sample by giving a chance of selection to 1990 sophomores who had not been 8th-graders in 1988 (or had not been in the United States). Thus, a nationally representative sophomore cohort was included in NELS:88 in the first follow-up (1990).

1.2.4.3 NELS:88 Second Follow-up

The second follow-up took place in the spring term of the 1991–92 school year, when most sample members were in their final semester of high school. There were 21,188 student and dropout participants. This follow-up provided a culminating measurement of learning in the course of secondary school and also collected information to facilitate investigation of the

[6] Further information about NELS:88 proficiency scores can be found in Rock and Pollack (1995a). For examples of their use in achievement gain analysis, see Rock and Pollack (1995b) and Scott et al. (1995).

transition into the labor force and postsecondary education after high school. As in the first follow-up, the sample was freshened, this time to represent the high school senior class of 1992. Trend comparisons can be made to the high school classes of 1972 and 1980 that were studied in NLS-72 and HS&B. The NELS:88 second follow-up also surveyed students who were identified as dropouts in 1990 and identified and surveyed additional students who had left school since the prior wave. In late 1992 and early 1993, high school transcripts were collected for sample members.

1.2.4.4 NELS:88 Third Follow-up

The third follow-up took place in 1994, when most sample members had completed high school. The primary goals of the 1994 round were (1) to provide data for trend comparisons with NLS-72 and HS&B, (2) to address issues of employment, (3) to address issues of postsecondary access and choice, and (4) to ascertain how many dropouts had returned to school and by what route. There were 14,915 participants.

1.2.4.5 NELS:88 Fourth Follow-up

The fourth follow-up took place in 2000, when most sample members who attended college and technical schools had completed their postsecondary education. The study data address issues of employment, family formation, and postsecondary persistence and attainment. There were 12,144 participants in the questionnaire phase of the study. In fall 2000 and early 2001, postsecondary transcripts were collected, further increasing the analytic potential of the data and the possibility of examining trends over time.

1.3 Education Longitudinal Study of 2002 (ELS:2002)

ELS:2002 represents a major longitudinal effort designed to provide trend data about critical transitions experienced by students as they proceed through high school and into postsecondary education or their careers. The 2002 sophomore cohort is being followed, initially at 2-year intervals, to collect policy-relevant data about educational processes and outcomes, especially as such data pertain to student learning, predictors of dropping out, and high school effects on students' access to, and success in, postsecondary education and the workforce.

In the spring term 2002 base year of the study, high school sophomores were surveyed and assessed in a national sample of high schools with 10th grades. Their parents, teachers, principals, and librarians were surveyed as well.

In the first of the follow-ups, base-year students who remained in their base-year schools were resurveyed and tested (in mathematics) 2 years later, along with a freshening sample that makes the study representative of spring 2004 high school seniors nationwide. Students who had transferred to a different school, had switched to a homeschool environment, graduated early, or who had dropped out were administered a questionnaire.

This section introduces ELS:2002, lists some of the major research and policy issues that the study addresses, and explains the four levels of analysis—cross-sectional, longitudinal, cross-cohort, and international comparison—that can be conducted with ELS:2002 data.

1.3.1 ELS:2002 Study Objectives

ELS:2002 is designed to monitor the transition of a national sample of young people as they progress from 10th grade through high school and on to postsecondary education or the world of work, or both.

ELS:2002 has two distinctive features. First, it is a longitudinal study, in which the same units (schools and students) are surveyed repeatedly over time. Individual students will be followed through high school and for a number of years thereafter. The base-year schools were surveyed twice, in 2002 and in 2004. Second, in the high school years, ELS:2002 is an integrated, multilevel study that involves multiple respondent populations. The respondents include students, their parents, their teachers, and their schools (from which data are collected at four levels: from the principal, the librarian, a facilities checklist, and school course catalogues and records, which will support a course offerings component in the first follow-up transcript study). Each of the two distinctive features—the longitudinal nature of the ELS:2002 design and its multilevel focus—will be explained in greater detail below.

The transition through high school and beyond into postsecondary institutions and the labor market is both complex (youth may follow many different paths) and prolonged (it takes place over a period of years). The complexity and time frame for this transition make longitudinal approaches especially appropriate. By surveying the same young people over time, it is possible to record the changes taking place in their lives. It is also possible to gather information about the ways that earlier achievements, aspirations, and experience predict what happens to the respondents later. In the baseline data collection (spring 2002), ELS:2002 measured students' tested achievement in reading and mathematics. ELS:2002 also obtained information from students about their attitudes and experiences.

These same students have been resurveyed 2 years later (in 2004), in the ELS:2002 first follow-up, to measure changes such as achievement gains in mathematics and changes in enrollment status (e.g., the situation of students who drop out of school compared with those who persist in their education).

Cohort members will be followed for a number of years thereafter so that later outcomes (e.g., their access to and persistence in higher education or their success in the labor market) can be understood in terms of their earlier aspirations, achievement, and high school situation.

ELS:2002 gathers information at multiple levels. It obtains information not only from students and their school records, but also from students' parents, teachers, and the administrators (principal and library media center director) of their schools. Data from their teachers, for example, provide information both about the student's and the teacher's backgrounds and activities. This multilevel focus supplies researchers with a comprehensive picture of the home, community, and school environments and their influences on the student.

This multiple-respondent perspective is unified by the fact that, for most purposes, the student is the basic unit of analysis.[7]

Using this multilevel and longitudinal information, the base year (2002) and first follow-up (2004) of ELS:2002 will help researchers and policymakers explore and better understand such issues as the importance of home background and parental aspirations for a child's success; the influence of different curriculum paths and special programs; the effectiveness of different high schools; and whether a school's effectiveness varies with its size, organization, climate or ethos, curriculum, academic press, or other characteristics. These data will facilitate understanding of the impact of various instructional methods and curriculum content and exposure in bringing about educational growth and achievement.

After the high school years, ELS:2002 will continue to follow its sample of students into postsecondary education or the labor market, or both. For students who continue on to higher education, researchers can use ELS:2002 to measure the effects of their high school careers on subsequent access to postsecondary institutions, their choices of institutions and programs, and as time goes on, their postsecondary persistence, attainment, and eventual entry into the labor force and adult roles. For students who go directly into the workforce (whether as dropouts or high school graduates), ELS:2002 will be able to determine how well high schools have prepared these students for the labor market and how they fare within it.

Key elements in the ELS:2002 longitudinal design are summarized by wave below.

Base Year (2002)

- Completed baseline survey of high school sophomores in spring term 2002.
- Completed cognitive tests in reading and mathematics.
- Completed survey of parents, English teachers, and mathematics teachers. Collected school administrator questionnaires.
- Included additional components for this study—a school facilities checklist and a media center (library) questionnaire.
- Established sample sizes of approximately 750 schools and over 17,000 students. Schools are the first-stage unit of selection, with sophomores randomly selected within schools.
- Oversampled Asian[8] and Hispanic students and private schools.
- Designed linkages with the Program for International Student Assessment (PISA); scored reporting linkages to the prior longitudinal studies.

[7] Base-year school administrator, library media center, and facilities data can be used to report on the nation's schools with 10th grades in the 2001–02 school year. A first follow-up course offerings file will further enrich the information available about high schools with 10th grades in 2002. However, if history is a guide, most analysts will employ the school-level data to provide further contextual information on the student.
[8] Except where indicated otherwise, the race/ethnicity variable for this report includes six categories: (1) American Indian or Alaska Native; (2) Asian or Pacific Islander, including Native Hawaiian; (3) Black, including African American; (4) Hispanic or Latino; (5) More than one race; and (6) White. All race categories exclude individuals of Hispanic or Latino origin.

First Follow-up (2004)

- Most sample members were seniors, but some were dropouts or in other grades (early graduates or retained in an earlier grade).
- Student questionnaire (different versions for students who remained in the base-year school, transferred to a new school, completed high school early, or were homeschooled), dropout questionnaire, assessment in mathematics, and school administrator questionnaire were administered.
- Returned to the same schools but separately followed transfer students and surveyed them outside of school.
- Freshened for a senior cohort.
- High school transcript component in 2004 (coursetaking records at the student level for grades 9–12) and course offerings component at the school level.

Second Follow-up (2006)

- Post-high-school follow-up with web-based instrument for self-administration, computer-assisted telephone interview (CATI), or computer-assisted personal interview (CAPI).
- Survey 2 years after scheduled high school graduation.

Further Follow-ups

- Number of (and dates for) further web/CATI/CAPI follow-ups to be determined.

1.3.2 ELS:2002 Research and Policy Issues

Apart from helping to describe the status of high school students and their schools, ELS:2002 will provide information to help address a number of key policy and research questions. The study is intended to produce a comprehensive dataset for the development and evaluation of education policy at all government levels. Part of its aim is to inform decisionmakers, education practitioners, and parents about the changes in the operation of the educational system over time and the effects of various elements of the system on the lives of the individuals who pass through it. Issues that can be addressed with data collected in the high school years include the following:

- students' academic growth in mathematics;
- the process of dropping out of high school;
- the role of family background and the home education support system in fostering students' educational success;
- the features of effective schools;
- the relationship between coursetaking choices and success in the high school years (and thereafter);

- the distribution of educational opportunities as registered in the distinctive school experiences and performance of students from various subgroups. Such subgroups include the following:
  - students in public and private high schools;
  - language minority students;
  - students with disabilities;
  - students in urban, suburban, and rural settings;
  - students in different regions of the country;
  - students from upper, middle, and lower socioeconomic status levels;
  - male and female high school students; and
  - students from different racial or ethnic groups.
- steps taken to facilitate the transition from high school to postsecondary education or the world of work.

After ELS:2002 students have completed high school, a new set of issues can be examined. These issues include the following:

- the later educational and labor market activities of high school dropouts;
- the transition of those who do not go directly on to postsecondary education or to the world of work;
- access to and choice of undergraduate and graduate educational institutions;
- persistence in attaining postsecondary educational goals;
- rate of progress through the postsecondary curriculum;
- degree attainment;
- barriers to persistence and attainment;
- entry of new postsecondary graduates into the workforce;
- social and economic rate of return on education to both the individual and society; and
- adult roles, such as family formation and civic participation.

These research and policy issues can be investigated at several distinct levels of analysis. The overall scope and design of the study provide for the four following analytical levels:

- cross-sectional profiles of the nation’s high school sophomores (2002), seniors (2004), and post-sophomore-year dropouts (2004);
- longitudinal analysis (including examination of life course changes);
- intercohort comparisons with American high school students of earlier decades; and

- international comparisons: U.S. 15-year-olds to 15-year-olds in other nations, including longitudinal outcomes for the United States that can be related to scale scores in mathematics and reading from PISA.

1.3.2.1 Cross-Sectional Profiles

Cross-sectional data permit characterization of the nation's high school sophomores in the spring term of the 2001–02 school year. Initial cross-sectional findings from the base year are available in an NCES report, *A Profile of the American High School Sophomore in 2002*.[9] Because of sample freshening, the results 2 years later provide a basis for profiling the nation's high school seniors in the spring term of the 2003–04 school year. A report on seniors is now being prepared for release.

1.3.2.2 Longitudinal Analysis

Longitudinal analysis has become possible with the release of data from the 2004 first follow-up. The primary research objectives of ELS:2002 are longitudinal in nature. The study provides the basis for within-cohort comparison by following the same individuals over time to measure achievement growth in mathematics and monitor enrollment status over the high school years. With future follow-ups, the study can also record such key outcomes as postsecondary entry and attainment, labor market experiences, and family formation. In turn, these outcomes can be related to antecedents identified in earlier rounds, including individual, home, school, and community factors.

1.3.2.3 Intercohort Comparisons

As part of an important historical series of studies that repeats a core of key items each decade, ELS:2002 offers the opportunity for the analysis of trends in areas of fundamental importance, such as patterns of coursetaking, rates of participation in extracurricular activities, academic performance, and changes in goals and aspirations. With completion of the first follow-up in 2004, researchers can now compare ELS:2002 high school seniors' experiences, attitudes, and achievement with that of NELS:88 seniors in 1992, HS&B seniors in 1980, and NLS-72 seniors in 1972. They will also be able to compare ELS:2002 dropouts in 2004 with the high school dropouts studied by HS&B in 1982 and by NELS:88 in 1992.

Upon release of ELS:2002 academic transcript data, trend comparisons can also be made with academic transcript data containing students' high school course histories and sequences, since comparable transcript studies have been conducted, starting with HS&B (1982) and including NELS:88 (1992) and the National Assessment of Educational Progress (NAEP) (1987, 1990, 1994, 1998, and 2000).

1.3.2.4 International Comparisons

A feature of ELS:2002 that expands the study's power beyond that of the predecessor studies is that it will be used to support international comparisons. Items have been included on

[9] See Ingels et al. (2005). A small, but growing, ELS:2002 bibliography can be found at http://nces.ed.gov/surveys/els2002/Bibliography.asp.

the ELS:2002 achievement tests from PISA. The Organization for Economic Cooperation and Development's (OECD's) PISA (Lemke et al. 2001) is an internationally standardized assessment, jointly developed by the 32 participating countries (including the United States) and administered to 15-year-olds in groups in their schools. PISA covers three domains: reading literacy, numeracy, and scientific literacy; ELS:2002 test results have been linked to PISA reading and mathematics scores so that the PISA scale can be used in ELS:2002 analyses. PISA aims to define each domain not merely in terms of mastery of the school curriculum, but also in terms of important knowledge and skills needed in adult life. Emphasis is placed on the mastery of processes, the understanding of concepts, and the ability to function in various situations within each domain.

1.3.3 Overview of the Base-Year Study Design[10]

The ELS:2002 base-year study was carried out in a national probability sample of 752 public, Catholic, and other private schools in the spring term of the 2001–02 school year. Of 17,591 eligible selected sophomores, 15,362 completed a base-year questionnaire, as did 13,488 parents, 7,135 teachers, 743 principals, and 718 librarians.

Seven study components comprise the base-year design: assessments of students (achievement tests in mathematics and reading); a survey of students; surveys of parents, teachers, school administrators, and librarians; and a facilities checklist (completed by survey administrators, based on their observations at the school). The student assessments measured achievement in mathematics and reading; the baseline scores can serve as a covariate or control variable for later analyses. Mathematics achievement was reassessed 2 years hence, so that achievement gain over the last 2 years of high school can be measured and related to school processes and mathematics coursetaking. The student questionnaire gathered information about the student's background, school experiences and activities, plans and goals for the future, employment and out-of-school experiences, language background, and psychological orientation toward learning.

One parent of each participating sophomore was asked to respond to a parent survey. The parent questionnaire was designed to gauge parental aspirations for their child, home background and the home education support system, the child's educational history prior to 10th grade, and parental interactions with and opinions about the student's school. For each student enrolled in English or mathematics, a teacher was also selected to participate in a teacher survey. The teacher questionnaire collected the teacher's evaluations of the student and provided information about the teacher's background and activities. The head librarian or media center director at each school was asked to complete a library media center questionnaire, which inquired into the school's library media center facility, its staffing, its technological resources, collection and expenditures, and scheduling and transactions. Finally, the facilities checklist was a brief observational form completed for each school. The form collected information about the condition of school buildings and facilities.

[10] Although this manual covers the base year as well as first follow-up of ELS:2002, much more detailed information about the base year can be found in Ingels et al. (2004).

1.3.4 Overview of the First Follow-up Study Design

The basis for the sampling frame for the first follow-up was the sample of schools and students studied in the ELS:2002 base year. There were two overlapping but conceptually different target student populations, or populations of inferential interest, for the first follow-up. One population (the ELS:2002 sophomore cohort) consists of those students who were enrolled in the 10th grade in the spring term of 2002. The other population (the ELS:2002 senior cohort) comprises those students who were enrolled in the 12th grade in the spring term of 2004. The former population includes students who dropped out of school between 10th and 12th grades, students who graduated early, students who went from a school setting to a homeschooling setting, and students who fell behind the modal grade progression of their peers (e.g., students who repeated a grade and were 11th-graders in spring 2004). Because of these two target populations and the major analytical subgroups, the full-scale sample encompasses the following types of students in the spring of 2004:

- ELS:2002 base-year student sample members enrolled (in either the 12th grade or some other grade) in the school in which they were originally sampled;
- ELS:2002 base-year sophomores who dropped out of school prior to first follow-up (2004) data collection;
- ELS:2002 base-year student respondents who finished high school early, including those who graduated from high school early, as well as those who did not graduate because they achieved alternative certification (e.g., exam-certified equivalency such as a GED);
- ELS:2002 base-year student respondents who transferred out of the school in which they were originally sampled (including homeschooled students);
- ELS:2002 base-year sample students who were deemed unable to participate directly during the base year owing to severe disability or insufficient command of the English language such that they could not complete a questionnaire; and
- students at the base-year sample school who were enrolled in the 12th grade in spring of 2004 but who were not in 10th grade in the United States during the 2001–02 school year. In spring term 2002, such students may have been out of the country, been enrolled in school in the United States in a grade other than 10th, had an extended illness or injury, been homeschooled, been institutionalized, or temporarily dropped out of school. These students comprised the first follow-up “freshening” sample.

While all groups in the sample as categorized above were eligible to complete a questionnaire, different instruments were tailored to different study populations. The guiding intuition was to provide a core of items that all sample members would respond to, supplemented by items specific to the circumstances of a particular group (such as dropouts, for example, for whom questions about their current school situation would not be relevant). In chapter 2, the various questionnaires—student, abbreviated student, transfer student, early graduate, homeschool, out-of-school (dropout), and new student supplement—are described at length.

For some classifications of the sample, a first follow-up test score in mathematics has either been collected (students still in the base-year school) or imputed (students who have transferred to a new school). For other categories of sample members, such as dropouts, early graduates, and the homeschooled, a test score has neither been collected nor imputed. (It should also be noted that missing base-year test score data have been imputed for base-year nonrespondents who became respondents in the first follow-up.)

For all classifications of sample members, information about student coursetaking (covering all years of high school and including the sequence in which courses were taken and grades earned) will be collected late in 2004 and early 2005 through the high school transcript component of the ELS:2002 first follow-up study.

At the school level, the first follow-up has extended information about base-year schools through administration of a school administrator questionnaire. In addition, information about school course offerings will be collected in the first follow-up transcript study. Finally, further information about participating schools at the time of the first follow-up survey can be obtained (on the restricted file only) by linking (via the NCES identification code [NCESID]) to the Common Core of Data (CCD) or Private School Study (PSS), and, via zip codes, to 2000 Census data. The NCES school district database and its Census data also are accessible on the restricted-use file by means of the standard NCES school ID.

Chapter 2
Instrumentation

2.1 Introduction

The base-year (2002) data collection instruments for the Education Longitudinal Study of 2002 (ELS:2002) consisted of five separate questionnaires (student, parent, teacher, school administrator, and library media center), two achievement tests (assessments in reading and mathematics), and a school observation form (facilities checklist).

The first follow-up (2004) data collection instruments comprised seven questionnaires and an achievement test in mathematics. The first follow-up questionnaires included a student questionnaire, a transfer student questionnaire, a new participant student questionnaire (NPSQ), a homeschool student questionnaire, an early graduate questionnaire, a dropout (not currently in school) questionnaire, and a school administrator questionnaire. A new participant supplement (NPS) (repeating questions from the base year) and an abbreviated version of the student questionnaire were also offered.[11] The base-year and first follow-up questionnaires can be found as portable document format (PDF) files on the NCES ELS:2002 website (http://nces.ed.gov/surveys/els2002/).

2.1.1 Instrument Development Process and Procedures

In general, the development and review process for each questionnaire consisted of the following steps:

1. *Sharing of draft data elements.* Draft elements of the questionnaires were shared with other government agencies, policy groups, and interested parties.
2. *Technical review panel (TRP) review.* The ELS:2002 TRP, a specially appointed, independent group of substantive, methodological, and technical experts, reviewed the questionnaires.
3. *National Center for Education Statistics (NCES) review.* The questionnaires underwent interdivisional review at NCES.
4. *Questionnaire revision.* The survey instruments were revised based on reviewer comments.
5. *Writing of justification.* A justification was written for the data elements, noting issue areas, constructs to be measured within each, and items that would be used to measure each construct.
6. *Office of Management and Budget (OMB) review.* The federal OMB reviewed the instruments.
7. *Questionnaire revision.* The questionnaires were revised based on OMB comments.

[11] In fact, the new participant student questionnaire is simply the new participant supplement and abbreviated first follow-up student questionnaire, joined together to create one booklet, for convenience of administration.

8. *Field testing and revision.* The instruments were field tested and revised based on field test results.

Specific assessment items for the base-year mathematics and reading tests and first follow-up mathematics test were typically not subject to these reviews, but the larger assessment framework and goals and the results (as seen in overall item statistics from the field test) were an integral element within the review process and, in particular, the deliberations of the TRP.

The field testing of school enlistment and data collection and processing procedures, questionnaires, and assessments was an especially important step in the development of the full-scale base-year and first follow-up studies. Field test instruments were evaluated in a number of ways. For the questionnaires, field test analyses included evaluation of item nonresponse, examination of test-retest reliabilities, calculation of scale reliabilities, and examination of correlations between theoretically related measures. For the achievement tests in mathematics and reading, item parameters were estimated for both 10th and 12th grade in the base-year field test. Both classical and Item Response Theory (IRT) techniques were employed to determine the most appropriate items for inclusion in the final (base-year main study) forms of the two tests. Psychometric analyses included various measures of item difficulty and discrimination, investigation of reliability and factor structure, and analysis of differential item functioning. In the first follow-up field test, similar classical and IRT psychometric analyses were conducted but with a slightly different end in terms of final format: adaptiveness was ensured through a two-stage test in the base year, whereas the test designed for the first follow-up main study based assignment of form on the prior round ability estimate (as had been done in the National Education Longitudinal Study of 1988 [NELS:88]). The base-year field test report is available from NCES (Burns et al. 2003). Findings of the first follow-up field test are summarized in appendix J of this report.

2.1.2 Instrument Development Goals and Constraints

Since the primary research objectives of ELS:2002 are longitudinal in nature, the first priority was to select the items that would prove most useful in predicting future outcomes as measured in future survey waves, or that would represent near-term (2004) outcomes predicted by base-year (2002) variables.

The second priority was to obtain needed cross-sectional data, whenever consistent with the longitudinal objectives, particularly data that could be used for intercohort comparison with past studies or linkage to certain current data collection efforts. Wherever possible, all ELS:2002 instruments were designed to provide continuity and consistency with the earlier education longitudinal studies of high school cohorts. Where appropriate, ELS:2002 drew from the National Longitudinal Study of the High School Class of 1972 (NLS-72), the High School and Beyond (HS&B) longitudinal study, and, most particularly, NELS:88. In addition, questionnaire and test items were in some cases drawn from other NCES programs, such as the National Assessment of Educational Progress (NAEP) (especially for the assessments), the Program for International Student Assessment (PISA) (for both assessments and psychological scales related to orientation toward learning), the Schools and Staffing Survey (SASS) (particularly but not exclusively for items related to the library media center questionnaire), or the Early Childhood Longitudinal Study Kindergarten Cohort (ECLS-K) (from which was borrowed the concept of a facilities checklist). Continuity with ELS:2002's historical predecessors and with other NCES survey and assessment programs was pursued to ensure a common standard of measurement that would permit comparisons and increase the usefulness of the ELS:2002 data. Apart from the intercohort or cross-study comparisons that can be sustained through use of the questionnaire and transcript data, ELS:2002 provides score linkages with the testing programs of PISA, HS&B, and NELS:88.

Although maintaining trend items to support intercohort comparisons was a major aim of instrument development, there was also a need to provide new items to address new areas of policy concern and to reflect recent advances in theory. For example, in the base year in particular, educational technology items were developed to reflect the fact that computers have become a major factor in learning in recent years. Psychological scales that reflect recent work in self-efficacy theory and related areas were also added.

Another consideration in the development of the ELS:2002 instruments was the need to obtain factual information from the best source among the various respondent populations. (This was especially an issue for the base year, in which both parents and students were surveyed.) In some cases, the decision to use the best source resulted in a longer wait to secure the information (e.g., the 2002 student questionnaire was not used to collect information on courses taken or grades, and the 2004 questionnaire was used for this purpose only minimally; academic transcripts are a more reliable source of this information, and they were collected in 2005, after most students had completed high school). In most cases, information has been collected from one source only. However, in a few instances, a particular datum for which there was more than one acceptable source in terms of data quality was deemed to be of such importance that some redundancy between instruments seemed an acceptable price to pay. For example, whereas parents are the best source of information about highest parental educational attainment, the importance of this item was such that it was asked on both the base-year student and parent questionnaires to increase the number of sample members for whom this information would be available (and was asked again, of new participants, in the first follow-up).[12]

Finally, some changes in the law regarding questionnaire content that could be asked of students in a school setting under conditions of implied consent had to be taken into account. Specifically, the Protection of Pupil Rights Amendment (PPRA) proscribes collection of information in the following seven areas when minor students are required to participate in a survey, unless prior written parental consent has been obtained:

1. political affiliations or beliefs of the student or the student's parent;
2. mental and psychological problems of the student or the student's family;
3. sexual behavior or attitudes;

[12] In their analysis of NELS:88 base-year (8th-grade) student and parent reports of parental education, Kaufman and Rasinski (1991) found that, although the number of precise matches between student and parent report was only moderate, validity coefficients were relatively high (father = 0.82, mother = 0.76). McLaughlin and Cohen (1997), in a reanalysis of NELS:88 parent and student data, found the percent matching to be only 55.8 percent on father's education and 56.5 percent on mother's education. Nevertheless, they report polychoric correlations of 0.87 for father's education and 0.84 for mother's, indicating a high degree of convergence between student and parent reports. Student reports increase in quality with age. For high school seniors in HS&B, Fetters, Stowe, and Owings (1984) show validity coefficients of 0.89 for father's education (compared to the 0.82 recorded for 8th-graders by Kaufman and Rasinski [1991]) and 0.85 for mother's education (versus 0.76 for 8th-graders in NELS:88).

4. illegal, antisocial, self-incriminating, or demeaning behavior;
5. critical appraisals of other individuals with whom respondents have close family relationships;
6. legally recognized privileged or analogous relationships, such as those of lawyers, physicians, and ministers; and
7. income.

In addition, when the PPRA was amended in the *No Child Left Behind Act of 2001*, an eighth area was added to the list:

8. religious practices, affiliations, or beliefs of the student or student's parent.

A number of topic areas covered in prior studies, such as HS&B and NELS:88, were therefore excluded from the ELS:2002 base-year and first follow-up student questionnaires, including all items on use of tobacco, alcohol, and drugs and past and present illegal, sexual, or antisocial behaviors, as well as psychological problems and appraisals of family members. A few additional items retained on the base-year student questionnaire that later raised PPRA concerns were suppressed from the final dataset (this fact accounts for the several gaps in the questionnaire and variable name number sequences for the base-year student survey).

Basic elements that are or will be encompassed in the ELS:2002 research instruments can be classified in three broad categories:

- background information (normally collected in the base year only, except for respondents first entering the sample in a later round);
- process information (information about possible influences on the student in the home, school, and community environment, as he or she moves through secondary school and beyond into the world of postsecondary education and the adult workforce); and
- outcome information (the eventual outcomes of the transition process, including later educational attainment and labor market status). The base-year questionnaires are rich in background and process items. The first follow-up questionnaires inquire both into process and outcomes, while also establishing a new baseline for examining the transition out of high school.[13] The focus of the final waves of the study will be outcome data.

[13] An example of a first follow-up item that did not appear on the base-year student questionnaire and was intended to help chart the transition from high school to postsecondary enrollment is F1S52, which asks about the importance of various factors in choosing a postsecondary institution. An example of a new item designed to measure an outcome would be F1S14, which inquires into academic progress as judged by whether the student has remained in modal sequence and is now in 12th grade. An example of a repeated measure would be the educational expectation and life values questions. Ultimately, these plans and expectations can be related to future educational, occupational, and social outcomes. Since these items were asked in the base year, are re-asked in the first follow-up, and will be re-asked again in future follow-ups, they help provide a basis for examining the stability of values and goals over time. Finally, because most of these items have been used with the prior NCES longitudinal high school cohorts, they provide a basis for comparing the goals and values of sophomores in 2002 and seniors in 2004 with earlier cohorts, including high school seniors in 1972, 1980, 1982, and 1992.

2.2 Base-Year and First Follow-up Questionnaires

2.2.1 Base-Year Questionnaires

2.2.1.1 Student Questionnaire

The ELS:2002 base-year student questionnaire was typically self-administered. Sophomore sample members normally completed the questionnaire in a group administration in their schools. A small number of students were surveyed outside of school, with a shortened version of the questionnaire in a computer-assisted telephone interview (CATI). Assessments in reading and mathematics were given at the same time (i.e., during the group administration), in a two-stage process in which the first stage was a routing test. The full questionnaire was available only in English, although a shortened Spanish version was also produced.

The student questionnaire was divided into seven sections: (1) locating information, (2) school experiences and activities, (3) plans for the future, (4) non-English language use, (5) money and work, (6) family, and (7) beliefs and opinions about self.

2.2.1.2 Base-Year Parent Questionnaire

The parent questionnaire was to be completed by the parent or guardian most familiar with the sophomore's school situation and experience. Guided by this definition of the preferred respondent, the parent survey respondent was self-selected.

The parent questionnaire was available in both English and Spanish. Both a hardcopy version and an electronic CATI version[14] were produced. The parent questionnaire addressed the following five topic areas: (1) family background, (2) their child's school life, (3) their child's family life, (4) their opinions about their child's school, and (5) their aspirations and plans for their child's future.

2.2.1.3 Base-Year Teacher Questionnaire

The teacher questionnaire was to be completed by the English teacher and the mathematics teacher of each ELS:2002 sophomore. The teacher questionnaire was designed to illuminate questions of the quality, equality, and diversity of educational opportunity by obtaining information in two content areas:

- *Teacher evaluations of students.* The teacher's assessment of the student's school-related behavior and academic performance and educational and career plans and goals. Respondents completed this section with respect to the sample members they instructed in a particular subject.

[14] The approach to parent telephone interviews in the ELS:2002 base year differed from that followed in NELS:88. In NELS:88, to minimize the possibility of mode of administration effects, the parent was asked to read along in the hardcopy questionnaire as the questions were read over the telephone. The interview was not computer assisted. In ELS:2002, the decision was made to take advantage of the logical consistency editing and other features of CATI, and considerable effort was made to constrain the hardcopy questionnaire to items and formats compatible with a CATI administration. ELS:2002 parents were not interviewed over the telephone with the hardcopy questionnaire in hand. This difference accounts for some variations between the NELS:88 and ELS:2002 parent survey instruments.

- *Teacher background.* Information about the teacher's background and activities (e.g., academic training, subject areas of instruction, years of teaching experience, and participation in professional growth activities).

2.2.1.4 Base-Year School Administrator Questionnaire

The base-year school administrator questionnaire collected information on the school in six areas: (1) school characteristics, (2) student characteristics, (3) teaching staff characteristics, (4) school policies and programs, (5) technology, and (6) school governance and climate. The school administrator data can be used contextually, as an extension of the student data, when the student is the fundamental unit of analysis. At the same time, the ELS:2002 base-year school sample is nationally representative and can stand alone as a basis for generalizing to the nation's regular high schools with sophomores in the 2001–02 school year.

2.2.1.5 Library Media Center Questionnaire

For the school library media center component, the school librarian, media center director, or school administrator supplied information about library media center size, organization, and staffing; technology resources and electronic services; extent of library and media holdings, including both collections and expenditures; and levels of facility utilization, including scheduling for use by students and teachers. Finally, the questionnaire also supplied information about the library media center's use in supporting the school's curriculum, that is, how library media center staff collaborate with and support teachers to help them plan and deliver instruction. Information in the library media center questionnaire can be used as contextual data with the student as the unit of analysis or to generalize to libraries within all regular high schools with 10th grades in the United States in the 2001–02 school year.

2.2.1.6 School Facilities Checklist

Instrumentation for the facilities component comprised a checklist to be completed by the survey administrator. The survey administrator was asked to observe a number of conditions at the school, including the condition of the hallways, main entrance, lavatories, classrooms, parking lots, and surrounding neighborhood. Of special interest were indicators of security (metal detectors, fire alarms, exterior lights, fencing, security cameras, etc.) and maintenance and order (trash, graffiti, clean walls and floors, noise level, degree of loitering, etc.). Information gathered in the facilities checklist can be used as contextual data with the student as the unit of analysis, or data can be used at the school level to generalize to all regular high schools with 10th grades in the United States in the 2001–02 school year.

2.2.2 First Follow-up Questionnaires

2.2.2.1 Introduction

Although assessments will be discussed separately in section 2.3, it is useful, as a point of entry into the first follow-up instrumentation, to consider the fact of test availability in conjunction with the main sample populations for which questionnaires were designed. As table 1 makes clear, not all groups were tested in the first follow-up, nor were test scores imputed for all groups.

Table 1. Assessment availability status, by sample group: 2004

Group (status in 2004)	Base year	First follow-up
2002 sophomores in core (base-year) schools in 2004	Tested[1]	Tested[2]
2002 sophomores in transfer schools in 2004	Tested[1]	Imputed
2004 freshened seniors	Unavailable	Tested[2]
2002 sophomores: 2004 dropouts	Tested[1]	Unavailable
2002 sophomores: 2004 early graduates	Tested[1]	Unavailable
2002 sophomores: homeschooled in 2004	Tested[1]	Imputed

[1] Imputed for base-year nonrespondents.

[2] Imputed for first follow-up participant test noncompleters.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

The following questionnaires were employed in the ELS:2002 first follow-up: student questionnaire, dropout questionnaire, early graduate questionnaire, transfer student questionnaire, homeschool student questionnaire, and NPSQ. A school administrator questionnaire was also offered. For the ELS:2002 data user, it is necessary to specify which items are common to various questionnaires and which are unique, and how each questionnaire group relates to the analytic populations of interest.

For example, one important analysis population is high school seniors in 2004. These individuals will have completed student, new participant, or transfer student questionnaires, but not dropout or early graduate questionnaires. Even within any of these three questionnaire groupings, only a subset of students will in fact be members of the senior cohort. Another possible population for analysis (particularly for the examination of school effects) consists of students who remained in their base-year school between 2002 and 2004. (In examining this group, one may also wish to take into account the movers who transferred to a new school.)

A further important analytic population is the broader sophomore cohort panel. The base-year to first follow-up combined data file provides a basis for examining the 2002 high school sophomore cohort 2 years later. In determining 2004 outcomes for 2002 sophomores, a comprehensive picture of the cohort's situation can be obtained only by looking at the range of situations represented in the first follow-up questionnaires. Some members of the cohort will have remained in the base-year school and will have completed the student questionnaire. Others will have transferred to a new school and will have completed a transfer student questionnaire. Some will be in a homeschool situation, whereas others may be dropouts or early graduates. One particular subset of the completers of the NPSQ, 12th-grade freshened students, would need to be excluded from investigations of sophomore cohort outcomes in 2004. Although analysis populations are properly selected through flags or universe variables, it is also important for the analyst to know which data elements are shared in common across various questionnaire completion groups. Table 2 provides a crosswalk that shows shared and unique items across the first follow-up questionnaires. (Note that the NPSQ is not included on the crosswalk because its coverage is equivalent to that of the NPS plus the abbreviated student questionnaire.)

Table 2. Crosswalk: First follow-up questionnaire type, by shared and nonshared items: 2004

Question	Student questionnaire	Abbreviated student questionnaire	Transfer	Home-school	Early graduate	Drop-out	New participant supplement	Base-year student or parent questionnaire
What grade are you in	14	14	18	14				
What diploma/certificate	15	15	19	15	19			
Science coursework	16	16	20	16	29	27		
Math coursework	17	17	21	17	30	28		
Confidence in math	18							
Calculators/computers in math	19							
Computer use in math classes	20							
College entrance tests	21	18	22	18				
How studied for college tests	22							
Talent Search	23							
Years participated in Talent Search, etc.	24							
Victimization	25							
Extracurricular activities	26	19	23	20	31			
Time spent on extracurriculars	27	20	24	21	32			
Does school have library	28	21	25					
How often uses school library	29	22	26					
How often uses public library	30	23	27	22	33	49		
Hours on homework	31	24	28	23				
Hours on math homework	32							
Additional reading	33	25	29	24	34	50		
Hours watching TV	34	26	30	25	35	51		
Hours playing video games	35	27	31	26	36	52		
Computer use for schoolwork/other	36	28	32	27	37	53		
Computer use at various locations	37	29	33	28	38	54		
Computer use for fun, school, learn things	38							

See notes at end of table.

Table 2. Crosswalk: First follow-up questionnaire type, by shared and nonshared items: 2004—Continued

Question	Student questionnaire	Abbreviated student questionnaire	Transfer	Home-school	Early graduate	Drop-out	New participant supplement	Base-year student or parent questionnaire
Activities outside of school	39	30	34	29	39	55		
Life values	40	31	35	30	40	56		
How will spend summer	41							
How far in school thinks will get	42	32	36	31	41	57		
How far mother and father wants to go	43	33	37	32	42	58		
Most important thing right after high school	44	34	38	33				
Plan to go to school right after high school	45	35	39	34				
Reasons decided not to go right after high school	46	36	40	35				
Plan to continue education in future	47	37	41	36	44			
Where went for info on college entrance	48							
Type of school will most likely attend	49	38	42	37	45			
To how many schools applied	50	39	43	38	46			
Two most likely schools	51	40	44	39	47			
Importance of school characteristics	52	41	45	40	48			
Plan to work right after high school	53	42	46	41				
Full-time job lined up	54	43	47	42				
Who helped select jobs	55							
Job expects after high school	56	44	48	43				
Job expects at age 30	57	45	49	44	56	66		
How much education for job at age 30	58	46	50	45	57	67		
Ever worked for pay	59	47	51	46				
Hours per week	60	48	52	47				
Hours on weekend	61							
Volunteered in past 2 years	62	49	53	48	58	68		

See notes at end of table.

Table 2. Crosswalk: First follow-up questionnaire type, by shared and nonshared items: 2004—Continued

Question	Student questionnaire	Abbreviated student questionnaire	Transfer	Home-school	Early graduate	Drop-out	New participant supplement	Base-year student or parent questionnaire
Types of volunteer organizations	63							
How often discuss with parents	64	50	54	49				
Friends' plans for after high school	65	51	55	50	59	69		
When began going to this school			15					
Reasons for transferring			16					
Agreement w/ statements re school/teachers			17					
Participated in any school-sponsored activities?				19[1]				
Name of school last attended					18	18		
When last attended high school					20	19		
What grade were you in then					21	20		
How earned GED					24	42		
Why decided to complete GED					25	43		
Earned GED in what state					26	44		
When did you graduate/receive equivalency					27	45		
Why decided to graduate/complete early					28			
Enrolled in postsecondary education since leaving high school					43			
How many jobs since high school					49	59		
Current/most recent job					50	60		
When started this job					51	61		
Still have job					52	62		
When did you leave job					53	63		
How much do you earn					54	64		
Hours per week					55	65		

See notes at end of table.

Table 2. Crosswalk: First follow-up questionnaire type, by shared and nonshared items: 2004—Continued

Question	Student questionnaire	Abbreviated student questionnaire	Transfer	Home-school	Early graduate	Drop-out	New participant supplement	Base-year student or parent questionnaire
Did you pass that grade						21		
Before last left, ever leave						22		
When left for first time						23		
When returned to school						24		
Attended high school in 2002–03						25		
How many school days missed						26		
Reasons for leaving school					22	29		
Good decision					23	30		
What people at school did						31		
What parents did						32		
Things that happened in past 2 years						33		
Ever in alternative program						34		
When entered most recent alternative program						35		
Still enrolled						36		
When left						37		
Who referred to alternative program						38		
Services received from alternative program						39		
How many alternative programs participated in						40		
Plan to get a GED?						41		
Currently taking a GED class						46		
Plan to go back to high school/take GED class						47		
When expects to get GED						48		
Date of birth							1	DOBIRTHP
Sex							2	SEX

See notes at end of table.

Table 2. Crosswalk: First follow-up questionnaire type, by shared and nonshared items: 2004—Continued

Question	Student questionnaire	Abbreviated student questionnaire	Transfer	Home-school	Early graduate	Drop-out	New participant supplement	Base-year student or parent questionnaire
Student is Hispanic							3	BYS15
Student's Hispanic subdivision							4	HISPANIC
Race							5	RACE
Student's Asian subdivision							6	ASIAN
English is student's native language							7	STLANG
Student's native language							8	HOMELANG
English skills							9	BYS70a-d
Enrolled in any U.S. school in spring term of 2002							10	
Ever held back a grade							11	BYP46
Grades repeated							12	BYP48a-k
Lives in household at least half of time							13	BYFCOMP
Mother/female guardian's work							14	OCCMOTH
Father/male guardian's work							15	OCCFATH
Parents' education							16	PARED
Family has items in home							17	BYS84a-j

[1] The sole purpose of this item was to reduce the length of the questionnaire for certain respondents by routing them around the set of dependent items. Therefore, this item is not included in the data file.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

2.2.2.2 Questionnaire Assignment and Content

First follow-up student questionnaire assignment and content. The student questionnaire was administered to sophomore cohort members who had remained in their base-year school as well as to a freshening sample of 12th-graders in those same schools. Students who completed the student questionnaire also were normally eligible for the first follow-up mathematics assessment. Some students were administered an abbreviated version of the questionnaire (these cases are flagged on the data file). The questionnaire was primarily self-administered in in-school survey sessions, and secondarily, for some students, out of school through CATI or occasionally through mail or field interviews.

Some alterations were required to adapt the paper-and-pencil questionnaire to CATI. Generally, the wording of the paper-and-pencil questions was made more conversational for the telephone interview to facilitate the interviewer-respondent interaction. On occasion, adaptations were made to account for the fact that those interviewed by telephone did not have the benefit of seeing the entire question with all of its elements at once. For example, students were asked to report how much coursework they had taken in various subject areas. Respondents who completed the paper-and-pencil form were able to see the full range of mathematics courses listed more or less in the sequence in which they are taught. In this context, it was clear to respondents that "general math" referred to a basic math course as opposed to a catchall category. However, without the visual cues, telephone respondents may have misinterpreted general math to include all math courses. Therefore, for the telephone interview, general math was moved to the end of the list of math courses. Similar adaptations were required for the other telephone-administered questionnaires as well (transfer student, dropout, and so on). Generally, CATI telephone data collection took place subsequent to in-school data collection. Also, there was more ambiguity about the status (dropout, early graduate, transfer, homeschooled, and so on) of sample members interviewed outside the school setting. For this reason, the CATI interview included a series of screening questions to ensure that the proper questionnaire was administered. Such a screener was also used for field cases subject to in-person interview.

The student questionnaire comprised eight content modules. *Part I* of the questionnaire requested contact information in support of the longitudinal design.

Part II covered the student's school experiences and activities. Data generated from this section provide information about extracurricular participation, computer use in English and math, the transition process from sophomore year to upper-level secondary school, and the relationship of curricular programs and coursetaking to educational achievement and persistence. Some of these data may be viewed as outcomes, influenced by factors studied in the base year, and others as predictors of outcomes in future rounds.

Part III, "How You Spend Your Time," inquired about time usage on homework, TV viewing, video and computer games, computers, nonschool reading, library utilization, and other activities. *Part IV* focused on plans and expectations for the future. It included questions that elicited information about students' educational and life goals and values. *Part V*, on education after high school, contained items on postsecondary planning steps and choice criteria. *Part VI* dealt with plans for work after high school. *Part VII* inquired about working for pay, including hours worked per week. Finally, *Part VIII* consisted of items on community, family, and friends.

First follow-up dropout questionnaire assignment and content. Dropouts were defined as sophomore cohort members who were out of school in the spring term of 2004, who had not received a high school diploma or General Educational Development (GED) credentials, and who had missed 4 or more consecutive weeks not due to accident or illness. Students who had a dropout episode but who had been in school for at least 2 weeks at the time of their school's survey day were administered the student questionnaire. The dropout questionnaire was administered in multiple modalities—self-administration, in-person interviewer administration, and over the telephone by means of CATI.

There was considerable overlap between the student and dropout questionnaires. *Part I* collected locating information for longitudinal follow-up. *Part II* contained items on school experiences and activities. Dropouts were asked questions about the school they last attended and their participation in alternative educational programs. In addition, they were asked to supply their specific reasons for leaving school prior to graduation. They were asked as well about plans to get a GED or return to high school. *Part III* covered time use (reading, library patronage, television, videogames, computer use, and so on). *Part IV* asked about plans and expectations for the future. *Part V* provided information to identify the type and amount of work that dropouts were engaged in. It gathered information about students' work status and history, how much they earned, and how many hours they worked. *Part VI* asked about volunteer work or community college and the educational behaviors of friends.

Early graduate questionnaire assignment and content. Early graduates were interviewed outside the school setting, in multiple data collection modalities but most commonly by telephone. Early graduates were defined as sophomore cohort members who had graduated from high school or received a GED on or before March 15, 2004. The approach to early graduates differs somewhat across the several NCES high school cohort studies. In HS&B, the group that was captured was high school completers who finished early (i.e., prior to March 1, 1982). In NELS:88 and ELS:2002, an additional group is included, those who completed by alternative means (e.g., GED) prior to their classmates who were in the modal graduation sequence. In both HS&B and NELS:88, early graduates completed supplementary questions in addition to the full student questionnaire (answering from the vantage point of their recent high school experience). In ELS:2002, early graduates completed only a subset of the items on the student questionnaire, complemented by additional items pertaining to their situation. More specifically, early graduates were asked with whom they consulted when deciding to graduate early, the basis for that decision, and the means by which they did so. They also provided a history of their work and educational experiences since leaving high school.

Transfer student questionnaire assignment and content. Sophomore cohort members who had transferred out of their base-year school to a new school received the transfer student questionnaire. Transfer students were asked a subset of items from the student questionnaire, covering the following topics: school experiences and activities; time use; plans and expectations for the future; education after high school; work after high school; and community, family, and friends. In addition, transfer students were asked when they transferred and their reasons for doing so. Transfer students did not complete a cognitive test, but their test scores have been imputed. Thus, test scores are available for all classes of senior cohort members—sophomore cohort members who were seniors 2 years later regardless of whether they were "movers" or "stayers" and freshened seniors.

Homeschool student questionnaire assignment and content. ELS:2002 does not provide a representative sample of homeschooled high school students. (In the base year, all study sophomores were selected from regular U.S. high schools.) Instead, homeschooled students in ELS:2002 generalize only to sophomores in regular high schools in spring term 2002 who were in a homeschool situation 2 years later. The primary motive for administering a separate questionnaire to this subset of the sophomore cohort was that neither the transfer student questionnaire items nor the dropout items fully fit their situation.

Homeschooled students were asked about their schooling activities and status, including their grade, coursework completed in sciences and math, and steps taken toward college; how they spend their time; their plans and expectations for the future, including education and work after high school; work experiences; and community, family, and friends.

New participant supplement questionnaire (NPSQ) assignment and content; NPS. There are essentially three categories of students who are ELS:2002 new participants in the first follow-up. One class is high school seniors who entered the study through the freshening sample. A second class of new participants is that of base-year nonrespondents who completed a questionnaire in the first follow-up. The third and final class is that of sophomore cohort members who were ineligible in 2002 because of inability to complete a questionnaire, but who were reclassified as capable of completing a questionnaire in 2004. (An example might be an English language learner who was not proficient in English in 2002 but, with 2 additional years of instruction, had reached a level of English proficiency sufficient to deal with the ELS:2002 first follow-up questionnaire.) While the first of these three classes is by definition a student, the second and third groups include both students and out-of-school members of the sophomore cohort (such as dropouts and early graduates).

Any student new to the study at any of the core (base-year) schools was administered the NPSQ. However, transfer students and out-of-school cohort members were administered the relevant questionnaire and a NPS containing the key base-year items. For example, any student new to the study who had transferred to a new school was administered the transfer student questionnaire and a NPS. Any new respondent who was out of school, however, such as a dropout or early graduate, was administered the appropriate out-of-school questionnaire, as well as a NPS. Table 3 summarizes, for all new participants, use of the NPS and NPSQ, as well as base-year and first follow-up assessment status.

The NPSQ gathered information that had been collected (for other students) in the base year on new participants' demographic characteristics, parental education and occupation, and language use. These items are identical to those on the NPS. In addition, a subset of items included on the student questionnaire was also posed to new participants. These items (which are identical in content to the abbreviated student questionnaire) relate to topics such as school experiences and activities; time use; plans and expectations for the future; education and work after high school; and work, community, family, and friendship experiences. In contrast, the NPS gathered the key base-year variables that also were included on the NPSQ.

Table 3. Base-year key variables and test data available, by type of first follow-up new participants: 2004

Group of first follow-up new participants	Source of base-year standard classification variables	Availability of base-year reading and math scores	Availability of first follow-up math scores
Sophomore cohort members in core (base-year) schools in 2004	NPSQ	Imputed	Tested
Sophomore cohort members in new schools in 2004	NPS	Imputed	Imputed
Sophomore cohort members out of school in 2004: dropouts	NPS	Imputed	Unavailable
Sophomore cohort members out of school in 2004: early graduates	NPS	Imputed	Unavailable
Freshened 2004 seniors	NPSQ	Unavailable	Tested
Sophomore cohort members homeschooled in 2004	NPS	Imputed	Unavailable

NOTE: NPSQ = New Participant Supplement Questionnaire. NPS = New Participant Supplement; this instrument contains only the key base-year items.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

School administrator questionnaire content and content linkages. The school administrator questionnaire collected information on the school in four areas: school characteristics, structure, and policies; student characteristics and programs; teacher and library staff characteristics; and principal reports on the school environment. It should be noted that many school-level variables of analytic interest also pose high risk of disclosure of school identities. For this reason, a number of analysis variables have been limited to the restricted-use file or may be accessed through a link provided only on the restricted-use file.[15]

It should also be noted that school-level data are not nationally representative of American high schools in 2004, since the first follow-up sample did not factor in "births" of new schools and "deaths" of existing schools between 2002 and 2004. First follow-up school data, however, do provide a statistical portrait of a nationally representative sample of American high schools with 10th grades in 2002 (2 years later).

[15] An example of the latter is the link to the NCES Common Core of Data (CCD) and Private School Survey (PSS) provided via the NCES identification code (NCESID). An analyst with a restricted-use license could import into the analysis such variables as, for example, *grade span* (highest grade and lowest grade of school for any of the relevant academic years); *percent minority*; proportion *free lunch qualifiers*; *enrollment*; grade 9 enrollment (2000–01), grade 10 enrollment (2001–02), grade 11 enrollment (2002–03), grade 12 enrollment (2003–04); *metropolitan status* (urbanicity): locale code; *student/teacher ratio; FTEs:* total number full-time classroom teachers; *student enrollment:* overall*; school type* (regular, vocational, special education, other), and so on. A further example of such a restricted-use link is to school zip code, which permits locale variables to be imported from the 2000 decennial Census.

2.3 Base-Year to First Follow-up Cognitive Test Battery

2.3.1 Base-Year Reading and Mathematics Assessments

The purpose of the ELS:2002 assessment battery is to provide measures of student achievement in reading and mathematics that can be related to student background variables and educational processes, for individuals and for population subgroups. The reading and mathematics tests must provide accurate measurement of the status of individuals at a given point in time. The mathematics test must provide accurate measurement of their cognitive growth over time. Assessment data in ELS:2002 will be used to study factors that contribute to individual and subgroup differences in achievement.

2.3.1.1 Test Design and Format

Test specifications for ELS:2002 were adapted from frameworks used for NELS:88. Math tests contained items in arithmetic, algebra, geometry, data/probability, and advanced topics and were divided into process categories of skill/knowledge, understanding/ comprehension, and problem solving. Through inclusion of PISA items, the ELS:2002 math tests placed a somewhat greater emphasis on practical applications and problem solving than did the NELS:88 test forms. Reading tests consisted of reading passages of one paragraph to one page in length, followed by three to six questions based on each passage. The reading passages included literary material as well as topics in the natural and social sciences. Several passages required interpretation of graphs. Questions were categorized as reproduction of detail, comprehension, or inference/evaluation. The test questions were selected from previous assessments: NELS:88, NAEP, and PISA. Most, but not all, were multiple choice. The number of items in each stage of the test is indicated in table 4.

Table 4. Number of items in each ELS:2002 base-year test form for assessing achievement in mathematics and reading, by test form: 2002

Form	Mathematics	Reading
Routing test	15	14
Second stage tests		
Form X (low difficulty)	25	16
Form Y (middle difficulty)	27	17
Form Z (high difficulty)	27	15
Form V (single stage: limited time, mathematics only)	23	†

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

2.3.2 First Follow-up Assessment

This section describes the development and format of the ELS:2002 first follow-up mathematics assessment, scoring procedures, score descriptions, and summary statistics. It includes a discussion of links (through equating or concordance) with other studies (NELS:88 and PISA:2000).

The purpose of the ELS:2002 assessments is to provide measures of student achievement in reading and mathematics that can be related to student background variables and educational processes, for individuals and for population subgroups. Reading[16] and mathematics assessments were conducted in the sophomore base year; in the first follow-up, only a mathematics test was administered. Assessment data in ELS:2002 will be used to study factors associated with individual and subgroup differences in achievement. The reading and mathematics tests must provide accurate measurement of the status of individuals at a given point in time and, for mathematics, must provide accurate measurement of their cognitive growth over time.

2.3.2.1 Test Design and Format

As with the base-year test design, the specifications for the ELS:2002 first follow-up math test were adapted from frameworks used for NELS:88. Mathematics tests contained items in arithmetic, algebra, geometry, data/probability, and advanced topics and were divided into process categories of skill/knowledge, understanding/comprehension, and problem solving. However, like the base-year test, the ELS:2002 mathematics tests placed a greater emphasis on practical applications and problem solving than did the NELS:88 tests. The test questions were selected from previous assessments: NELS:88, NAEP, and PISA. Items were field tested[17] one year prior to the 10th- and 12th-grade surveys, and some items were modified based on field test results. Final forms were assembled based on psychometric characteristics and coverage of framework categories. In the base year, about 10 percent of math questions were open ended; all of the 12th-grade mathematics questions were presented in multiple-choice format.

The ELS:2002 assessments were designed to maximize the accuracy of measurement that could be achieved in a limited amount of testing time, while minimizing floor and ceiling effects, by matching sets of test questions to initial estimates of students' achievement. (For definitions of floor effects, ceiling effects, and other technical terms, see the glossary in appendix E.) In the base year, this was accomplished by means of a two-stage test. In 10th grade, all students received a short multiple-choice routing test, scored immediately by survey administrators who then assigned each student to a low, middle, or high difficulty second-stage form, depending on the student's number of correct answers in the routing test. In the 12th-grade administration, students were assigned to an appropriate test form based on their performance in 10th grade. Cut points for the 12th-grade low, middle, and high forms were calculated by pooling information from the field tests for 10th and 12th grades in 2001, the 12th-grade field test in 2003, and the 10th-grade national sample. Item and ability parameters were estimated on a common scale. Growth trajectories for longitudinal participants in the 2001 and 2003 field tests were calculated, and the resulting regression parameters were applied to the 10th-grade national sample. Test forms were designed to match the projected achievement levels of the lowest and highest 25 percent, and the middle 50 percent, of the base-year sample 2 years later. An additional test form with a broad range of item difficulty was assembled for administration to follow-up participants who were new to the sample or who had not received a math score in 10th grade. Additions to and deletions from the base-year sample resulted in 23 percent, 42 percent, and 26 percent of the follow-up sample taking the low, middle, and high difficulty forms, respectively, with the

[16] Please refer to base-year documentation (Ingels et al. 2004, NCES 2004–405) for additional information on the 10th-grade reading test.
[17] For more details about the field tests, see Burns et al. (2003) (NCES 2003–03) and appendix J of this manual.

remaining 10 percent taking the broad-band form. Each of the four test forms contained 32 multiple-choice items.

2.3.2.2 Scoring Procedures

Eleven test records were deleted because tests were incomplete (fewer than 10 items answered) and six more because regular response patterns (e.g., all answers were "A," or "ABCABCABC...," etc.) indicated lack of motivation to answer questions to the best of the student's ability.

The scores used to describe students' performance on the direct cognitive assessment are broad-based measures that report performance as a whole. The scores are based on IRT, which uses patterns of correct, incorrect, and omitted answers to obtain ability estimates that are comparable across different test forms.[18] In estimating a student's ability, IRT also accounts for each test question's difficulty, discriminating ability, and a guessing factor.

IRT has several advantages over raw number-right scoring. By using the overall pattern of right and wrong responses to estimate ability, IRT can compensate for the possibility of a low-ability student guessing several difficult items correctly. If answers on several easy items are wrong, a correct difficult item is assumed, in effect, to have been guessed. Omitted items are also less likely to cause distortion of scores, as long as enough items have been answered right and wrong to establish a consistent pattern. Unlike raw number-right scoring, which necessarily treats omitted items as if they had been answered incorrectly, IRT procedures use the pattern of responses to estimate the probability of correct responses for all test questions. Finally, IRT scoring makes it possible to compare scores obtained from test forms of different difficulty. The common items present in overlapping forms and in overlapping administrations (10th grade and 12th grade) allow test scores to be placed on the same scale.

In the first follow-up survey, IRT procedures were used to estimate longitudinal gains in achievement over time by using common items present in both the 10th- and 12th-grade forms. Items were pooled from both the 10th- and 12th-grade administrations and anchored to the IRT scale of the NELS:88 survey of 1988–92. Item parameters were fixed at NELS:88 values for the items that had been taken from the NELS:88 test battery and to base-year values for non-NELS:88 items. In each case, the fit of the follow-up item response data to the fixed parameters was evaluated, and parameters for common items whose current performance did not fit previous patterns were reestimated, along with non-NELS:88 items new to the follow-up tests.

2.3.2.3 Score Descriptions and Summary Statistics

Several different types of scores that can be used to describe students' performance on the cognitive assessment are described in detail below. IRT-estimated number-right scores measure students' performance on the whole item pool. NELS:88-equated number-right scores estimate how a student would have performed on the 1992 mathematics scale of NELS:88. Standardized scores (T-scores) report students' performance relative to their peers. Quartile scores divide the estimated population distributions for convenience in analyzing relationships of cognitive skills with other variables. NELS:88-equated proficiency probabilities estimate the

[18] For an account of Item Response Theory, see Hambleton (1989) or Hambleton, Swaminathan, and Rogers (1991).

probability that a given student would have demonstrated proficiency for each of the five mathematics levels defined for the NELS:88 survey in 1992.[19]

IRT-estimated number right. These scores are estimates of the number of items students would have answered correctly if they had responded to all of the 85 questions in the mathematics item pool (i.e., all items that appeared on any of the mathematics forms) in the 10th- and 12th-grade administrations combined. The ability estimates and item parameters derived from the IRT calibration can be used to calculate each student's probability of a correct answer for each of the items in the pool. These probabilities are summed to produce the IRT-estimated number-right scores. These scores are not integers because they are sums of probabilities, not counts of right and wrong answers.

It is important to note that the item pool for base-year and first follow-up mathematics forms combined differs from the sophomore-only pool used to report scale scores in the base year. The combined sophomore forms contained a total of 72 items, with 13 additional, harder items added in 12th grade to extend the range of the scale. To place base-year and first follow-up scores on the same scale so that gains over time can be measured, the base-year IRT-estimated number-right scores have been replaced with scores on the new 85-item combined scale. Table 5 shows variable names, descriptions, and summary statistics for the IRT-estimated number-right scores in the new metric that applies to both rounds of the survey. First follow-up statistics are reported both for all first follow-up participants and for the subset of students who were in 12th grade at the time of the survey. The samples include all students with test scores, as well as imputed scores for students who were not tested. (For a discussion of imputation in ELS:2002, see chapter 3 of this manual). The reliability of the test scores is a function of the variance of repeated estimates of the IRT ability parameter (within-variance), compared with the variability of the whole sample. For the combined base-year and first follow-up mathematics tests, the reliability was 0.92. This applies to all scores derived from the IRT estimation, including the standardized and quartile scores.

Table 5. Item Response Theory (IRT)-estimated number-right mathematics scores in 85-item metric: 2004

Variable name	Description	Range	Weighted mean	Weighted standard deviation
BYTXMIR2	Mathematics IRT-estimated number right, base year, reestimated on longitudinal scale	0-85	42.2	14.0
F1TXMIR2	Mathematics IRT-estimated number right, longitudinal scale, all first follow-up participants	0-85	48.3	15.1
F1TXMIR2	Mathematics IRT-estimated number right, longitudinal scale, first follow-up participants who were in 12th grade	0-85	48.6	15.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

[19] For further information on the NELS:88 proficiency levels, see Rock and Pollack (1995a), *Psychometric Report for the NELS:88 Base Year Through Second Follow-up* (NCES 95–382). For examples of the use of the NELS:88-equated probability proficiency scores in the context of cross-sectional estimation of status in ELS:2002, see chapter 5 of Ingels et al. (2005), *A Profile of the American High School Sophomore in 2002* (NCES 2005–338). For examples of longitudinal use of the probability of proficiency scores (in NELS:88), see chapter 4 of Scott et al. (1995), *Two Years Later: Cognitive Gains and School Transitions of NELS:88 Eighth Graders* (NCES 95–436).

Standardized scores (T-scores). T-scores provide norm-referenced measurements of achievement; that is, estimates of achievement level relative to the population as a whole. A high mean T-score for a particular subgroup indicates that the group's performance is high in comparison with other groups. It does not represent mastery of a particular set of skills, only that the subgroup's mastery level is greater than a comparison group. In other words, T-scores provide information on status compared to students' peers, whereas the IRT-estimated number-right scores represent status with respect to achievement on a particular criterion set of test items. The T-scores can only provide an indicator of the extent to which an individual or a subgroup ranks higher or lower than the national average. The standardized score reported in the database (F1TXMSTD) is a transformation of the IRT theta (ability) estimate, rescaled to a mean of 50 and standard deviation of 10.

Quartile scores. Quartile scores (BYTXMQU) divide the sample into four equal groups, based on the weighted distribution of mathematics scores. Quartile 1 corresponds to the lowest achieving quarter of the population, quartile 4 to the highest.

2.3.2.4 Links to Other Surveys

Scores for ELS:2002 first follow-up are reported on scales that permit comparisons with mathematics data for NELS:88 12th-graders in 1992. In addition, ELS:2002 base-year mathematics scores were linked to the 2003 PISA mathematics scale. (In the base year, ELS:2002 reading scores were put on the PISA [2000] literacy scale; for details see Ingels et al. [2004], NCES 2004–405.) The link to the NELS:88 scales represents a "true" equating. This means that the tests may be considered interchangeable or, in other words, a score on one exam should be equivalent to a score on the other exam. Several conditions must be met for equating two tests. Most important, the tests must measure the same content. Similarity of format, length, reliability, and subgroup performance also supports the interpretation of interchangeable scores.

PISA concordance. The ELS:2002 and PISA mathematics tests did not share enough items to permit common-item equating, so score scales were linked by means of *equipercentile equating* (see Ingels et al. [2004] for a description of the reading equating with PISA). If two exams measuring the same construct are given to two samples from the same population, the score corresponding to a certain percentile on one exam may be considered to be equivalent to the score on the other exam that represents the same percentile of the population. ELS:2002 and PISA test instruments, scoring methods, and populations differed in several respects that affect the equating procedures and interpretation of linked scores.

The most important difference between PISA and ELS:2002 is the definition of the population sampled in each case. Equipercentile equating assumes that the two samples being equated come from the same population. However, important differences exist between PISA and ELS:2002 (see table 6). The PISA population was based on age (students born in 1987), whereas ELS:2002's population was based on grade (high school sophomores). Although the spring term administration dates for PISA and ELS:2002 overlapped, the range of PISA dates was later in the school year, suggesting the possibility of higher scores due to additional weeks or months of schooling.

Table 6. ELS:2002 and Program for International Student Assessment: Spring 2003 (PISA:spring 2003), by sample characteristics: 2002 and 2003

ELS:2002 sample	PISA:spring 2003 sample
10th-graders only	Different grades
Different ages; modal age = 15	Ages 15.25 to 16.25 years
Testing began in January 2002	Testing began in April 2003
14,543 tested	3,983 tested

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002); and Program for International Student Assessment (PISA).

Because of these differences, subsamples of each group were used to compute equivalent percentiles (see table 7). Transformations were computed based on the 10th-graders from each survey who were within a specified range of ages and testing dates. The resulting transformation was then applied to all ELS:2002 students. To make the PISA sample more nearly equivalent to the ELS:2002 sample, only PISA 10th-graders were used in the equating subsample. To make the ELS:2002 sample more nearly equivalent to the PISA sample, only ELS:2002 students between the ages of 15.25 years and 16.25 years (the approximate age range for PISA examinees) were used. ELS:2002 students who were tested before March 15 or after May 31 were deleted from the equating sample. The restricted samples were intended to be representative of 10th-graders between the ages of 15.25 and 16.25 years.

Table 7. ELS:2002 and Program for International Student Assessment: Spring 2003 (PISA:spring 2003) equating sample: 2002 and 2003

ELS:2002 equating sample	PISA:spring 2003 equating sample
10th-graders only	10th-graders only
15.25- to 16.25-year-olds	15.25- to 16.25-year-olds
Exams offered from March 15 to May 31	Exams offered from April 1 to May 31
Equating sample N = 2,743	Equating sample N = 2,400

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002); and Program for International Student Assessment (PISA).

The equipercentile equating was carried out using five-moment smoothing of the weighted frequency distributions. Plots of the equipercentile-equated scores showed extreme deviations in the tails of the distribution from a trend line based on linear approximation. These deviations are probably due to the methodology employed in PISA scoring: the PISA scores are transformations of normally distributed IRT ability estimates, which, if no shrinkage is imposed, tend to have long tails. The ELS:2002 scores, which are sums of probabilities, do not. As a result, the equipercentile conversion becomes distorted in the tails of the distributions. Throughout most of the score range, a quarter point difference in ELS:2002 math scale corresponds to a difference of 2 to 3 points in the PISA metric. But, in the extreme tails of the distribution, a quarter point difference in ELS:2002 math score corresponds to a difference of 5 to 10 points or more in the PISA metric. For this reason, the equipercentile equating was carried out without the data in the top and bottom tails of each distribution. Then the equipercentile transformation was used to link the scores for the middle 90 percent of the students, and the remaining scores were linked based on the linear approximation of the equating transformation. The cutoff points for using equipercentile versus linear transformation were selected such that the ELS:2002 to PISA link would be monotonic. Table 8 shows the linking methods for implementing PISA:spring 2003 math scales in ELS:2002.

Table 8. Linking methods for implementing Program for International Student Assessment: Spring 2003 (PISA:spring 2003) math scales in ELS:2002: 2002 and 2003

ELS:2002 scale score range	Equating method	Weighted percent of data
12.60–22.05	Linear approximation	10.0
22.06–51.81	Equipercentile transformation	76.0
51.82–68.90	Linear approximation	14.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002); and Program for International Student Assessment (PISA).

Data users should keep in mind that the differences between the ELS:2002 and PISA:spring 2003 tests, scoring methods, and populations mean that the link reported here cannot be considered to be a true equating. Although procedures were carried out to compensate for population differences and scoring methods, no claim is made that the scores may be treated as equivalent. It is more appropriate to refer to this link as a concordance: the PISA-scale score represents the score level achieved by students of the same percentile rank in two populations that were matched as closely as possible given the differences described above.

NELS:88-equated scores. Equating the ELS:2002 scale scores to the NELS:88 scale scores was completed through common-item or *anchor equating*. The ELS:2002 and NELS:88 mathematics tests shared 44 math items. These common items provided the link that made it possible to obtain ELS:2002 student ability estimates on the NELS:88 ability scale. (The ELS:2002 data for 12 additional math items did not fit the NELS:88 IRT parameters, so these items were not treated as common items for the purpose of equating.) Parameters for the common items were fixed at their NELS:88 values, resulting in ability estimates consistent with the NELS:88 metric.

The NELS:88-equated IRT-estimated number-right scores for mathematics are estimates of the number of items students would have answered correctly had they taken the NELS:88 exam and responded to all items in the mathematics items pool. The NELS:88 item pool contained 81 mathematics items in all test forms administered in grades 8, 10, and 12. Table 9 shows mathematics scores for ELS:2002 students, reported on the NELS:88 score scale.

Proficiency probability scores. The criterion-referenced NELS:88-equated proficiency probability scores are based on clusters of items that mark different levels on the mathematics scale. Clusters of four items were identified in the NELS:88 tests that marked five hierarchical levels in mathematics:

1. simple arithmetical operations on whole numbers;
2. simple operations with decimals, fractions, powers, and roots;
3. simple problem solving requiring the understanding of low-level mathematical concepts;
4. understanding of intermediate-level mathematical concepts and/or multistep solutions to word problems; and

5. complex multistep word problems and/or advanced mathematical material.

The proficiency levels are hierarchical in the sense that mastery of a higher level typically implies proficiency at lower levels. In NELS:88, students were judged to be proficient if three of the four items in a cluster were answered correctly. The NELS:88-equated proficiency probabilities were computed using IRT-estimated item parameters calibrated in NELS:88. Each proficiency probability represents the probability that a student would pass a given proficiency level defined as above in the NELS:88 sample.

Table 9 shows variable names, descriptions, and summary statistics for the NELS:88-equated proficiency probability scores.

Table 9. ELS:2002 Item Response Theory (IRT) National Education Longitudinal Study of 1988 (NELS:88)-equated estimated number-right score and proficiency probability scores: 2004

Variable name	Description	Range	Weighted mean	Weighted standard deviation
F1NELS2M	Mathematics—NELS-equated estimated number right (1992 scale)	0–81	50.10	14.20
F1TX1MPP	Mathematics—level 1	0–1	.96	.12
F1TX2MPP	Mathematics—level 2	0–1	.78	.37
F1TX3MPP	Mathematics—level 3	0–1	.62	.45
F1TX4MPP	Mathematics—level 4	0–1	.35	.41
F1TX5MPP	Mathematics—level 5	0–1	.04	.14

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Choosing the appropriate score for analysis. The IRT-estimated number-right, standardized scores (T-scores), proficiency, and quartile scores are all derived from the IRT model and are based on all of the student's responses to the mathematics assessment. That is, the pattern of right and wrong answers, as well as the characteristics of the assessment items themselves, are used to estimate a point on an ability continuum, and this ability estimate, theta, then provides the basis for criterion-referenced and norm-referenced scores. The choice of the most appropriate score for analysis purposes should be driven by the context in which it is to be used.

The *IRT-estimated number-right scores* are overall, criterion-referenced measures of status at a point in time. The criterion is the set of skills defined by the framework and represented by the assessment item pool. These scores are useful in identifying cross-sectional differences among subgroups in overall achievement level. They provide a summary measure of achievement useful for correlational analysis with status variables, such as demographics, school type, or behavioral measures, and may be used in multivariate models as well. These scores may also be used as longitudinal measures of overall growth. However, gains made at different points on the score scale have qualitatively different interpretations. For example, students who made 5-point gains by mastering arithmetical operations are learning very different lessons from those gaining 5 points at the high end of the scale by learning more advanced mathematics. Although the gains in number of scale score points may be the same, the interpretation, and the relationship with other factors such as coursework, can be expected to be quite different. Comparison of gain in scale score points is most meaningful for groups that started with similar initial status.

The standardized scores (T-scores) are also overall measures of status at a point in time, but they are norm-referenced rather than criterion-referenced. They do not answer the question, "What skills do students have?" but rather, "How do they compare with their peers?" The transformation to a familiar metric with a mean of 50 and standard deviation of 10 facilitates comparisons in standard deviation units. For example, an individual with a T-score of 65 (or a subgroup with a mean of 65) has demonstrated achievement one and one-half standard deviations above the national average for 12th-graders, whereas a score of 45 would correspond to half a standard deviation below the norm. These numbers do not indicate whether students have mastered a particular body of material, but rather what their standing is relative to others.

Quartile scores are convenient normative scores for the user who wishes to focus on analysis of background or process variables separately for students at different achievement levels. For example, one might want to compare the school experiences or educational aspirations of students in the lowest mathematics quartile with those of students in the highest quartile group.

NELS:88-equated estimated number-right and *proficiency probability scores* may be used in a number of ways. Because they are calibrated on the NELS:88 scale, they may be used for cross-sectional comparisons of students' mathematics achievement in 2004 compared with their counterparts in 1992. The NELS:88-equated number-right scores reflect performance on the whole pool of 81 NELS:88 mathematics items, whereas the proficiency probability scores are criterion-referenced scores that target a specific set of skills. The mean of a proficiency probability score aggregated over a subgroup of students is analogous to an estimate of the percentage of students in the subgroup who have displayed mastery of the particular skill. The proficiency probability scores are particularly useful as measures of gain, because they can be used to relate specific treatments (such as selected coursework) to changes that occur at different points along the score scale. For example, two groups may have similar gains in total scale score points, but for one group, gain may take place at an upper skill level, and for another, at a lower skill level. One would expect to see a relationship between gains in probability of proficiency at a particular level and curriculum exposure, such as taking mathematics courses relevant to the skills being mastered.

Chapter 3
Sample Design, Weighting, Design Effects, and Data Quality

3.1 Introduction

This chapter describes the Education Longitudinal Study of 2002 (ELS:2002) base-year and first follow-up sample designs, weighting, standard errors and design effects, imputation, disclosure analysis and protections, and unit and item nonresponse bias analyses. This section provides an overview of each of these subjects, and the details are provided in later sections of the chapter.

3.1.1 Base-Year Sample Design

The ELS:2002 base-year sample design comprises two primary target populations—schools with 10th grades and sophomores in those schools—in the spring term of the 2001–02 school year. ELS:2002 used a two-stage sample selection process. First, schools were selected. These schools were then asked to provide sophomore enrollment lists. A full discussion of the sample design and response rates is presented in this chapter and in chapter 4.

Schools and students are the study's basic units of analysis. School-level data reflect a school administrator questionnaire, a library media center questionnaire, a facilities checklist, and the aggregation of student data to the school level. Student-level data consist of student questionnaire and assessment data and reports from students' teachers and parents. (School-level data, however, can also be reported at the student level and serve as contextual data for students.)

3.1.2 First Follow-up Sample Design

The basis for the sampling frame for the first follow-up was the sample of schools and students used in the ELS:2002 base-year sample. There are two slightly different target populations for the follow-up. One population consists of those students who were enrolled in the 10th grade in 2002. The other population consists of those students who were enrolled in the 12th grade in 2004. The former population includes students who dropped out of school between 10th and 12th grades, and such students are a major analytical subgroup. Note that in the first follow-up, a student is defined as a member of the student sample, that is, an ELS:2002 spring 2002 sophomore or a freshened first follow-up spring 2004 12th-grader.[20]

3.1.3 Weighting

The general purpose of the weighting scheme was to compensate for unequal probabilities of selection of students into the base-year sample and freshened students into the first follow-up sample and to adjust for the fact that not all students selected into the sample

[20] In spring term 2002, such students may have been out of the country, been enrolled in school in the United States in a grade other than 10th, had an extended illness or injury, been homeschooled, been institutionalized, or temporarily dropped out of school. These students comprised the first follow-up "freshening sample." Freshening ensures that a nationally representative sample of high school seniors was selected.

actually participated. Four sets of weights were computed subsequent to first follow-up data collection:

- A cross-sectional weight for the expanded sample that includes the students who completed a questionnaire in the first follow-up or were incapable of completing the questionnaire. (This weight is on the restricted-use file only.)
- A cross-sectional first follow-up weight for sample members who completed a questionnaire in the first follow-up.
- A first follow-up panel weight (longitudinal weight) for the expanded sample that includes sample members who completed a questionnaire in both the base year and first follow-up, including those with base-year imputed data, or who were questionnaire incapable. (This weight is on the restricted-use file only.)
- A first follow-up panel weight for sample members who completed a questionnaire in both the base year and first follow-up, including those with base-year imputed data.

Student weights were adjusted for nonresponse, and these adjustments were designed to significantly reduce or eliminate nonresponse bias for data elements known for most respondents and nonrespondents. In addition, student weights were poststratified to base-year weighted totals. Weighting is discussed in detail in section 3.4.

3.1.4 Standard Errors and Design Effects

The variance estimation procedure had to take into account the complex sample design, including stratification and clustering. One common procedure for estimating variances of survey statistics is the Taylor series linearization procedure. This 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. For stratified multistage surveys, the Taylor series procedure requires analysis strata and analysis primary sampling units (PSUs). Therefore, analysis strata and analysis PSUs were created in the base year and used again in the first follow-up. The impact of the departures of the ELS:2002 complex sample design from a simple random sample design on the precision of sample estimates can be measured by the design effect. Appendix I presents standard errors and design effects for 30 means and proportions based on the ELS:2002 student data for the sample (as a whole and for selected subgroups).

3.1.5 Imputation

The imputation procedures used for the first follow-up study include logical imputation, weighted sequential hot deck procedure, and a multiple imputation procedure. Eighteen variables were selected for imputation. Fourteen of the variables were key demographic and family background variables that were also chosen for imputation in the base year. These key variables were imputed (when not provided by respondents in the new participant supplement data) for first follow-up respondents who were one of the following: base-year nonrespondents, 12th-grade freshened sample members, or base-year questionnaire eligible students (who were part of the base-year expanded sample only but became first follow-up eligible respondents). Additionally, the 10th-grade student ability estimates for mathematics and reading were imputed for the base-year nonrespondents who became first follow-up respondents since they were included in the spring 2002 sophomore cohort. These ability estimates had been imputed, if missing, in the base year for base-year respondents.

Two first follow-up variables were imputed, as applicable, when the data were missing. Student enrollment status as of spring 2004 was imputed for the first follow-up respondents if enrollment status was not provided by the sample school. The first follow-up mathematics ability estimate was imputed, if missing, for first follow-up respondents who were considered in-school students: students at the base-year school or at another (transfer) school as of spring 2004. (Sample members who dropped out, finished high school early, or were being homeschooled as of spring 2004 were not defined as in-school students, so no ability estimates were determined for them.) Only students at the base-year schools were tested—ability estimates were imputed for all transfer student respondents.

With the exception of the ability estimates, all variables chosen for imputation had less than 15 percent missing data. Imputation is discussed in detail in section 3.6.

3.1.6 Disclosure Risk Analysis and Protection

Because of the paramount importance of protecting the confidentiality of NCES data containing information about specific individuals, ELS:2002 first follow-up data were subject to various procedures to minimize disclosure. As a first step, all ELS:2002 data files (school and student) were reviewed to identify high-risk variables. As a second step, a technique called "data swapping" was carried out, both for school-level data and for student-level data. The swapping was conducted independently from the base-year swapping. As a final step, the ELS:2002 data underwent a disclosure risk analysis. In this analysis, school characteristics information available on the data files was compared with information on publicly available universe files of schools. Disclosure avoidance procedures are discussed in detail in section 3.7.

3.1.7 Data Quality: Student and Item Nonresponse Bias Analyses

The overall weighted student response rate was 88.7 percent, although the response rate for certain domains was below 85 percent. Student unit nonresponse bias analyses were performed. The bias due to nonresponse prior to computing weights and after computing weights was estimated based on the data collected from both respondents and nonrespondents, as well as frame data. An item nonresponse bias analysis was also performed for all questionnaire variables in which response fell below 85 percent. Details of the bias analyses are given in section 3.8.

3.2 Base-Year Sample Design

The sample design for ELS:2002 is similar in many respects to the designs used in the three prior studies of the National Education Longitudinal Studies Program: the National Longitudinal Study of the High School Class of 1972 (NLS-72), the High School and Beyond (HS&B) longitudinal study, and the National Education Longitudinal Study of 1988 (NELS:88). ELS:2002 is different from NELS:88 in that the ELS:2002 base-year sample students are 10th-graders rather than 8th-graders. As in NELS:88, Hispanics and Asians were oversampled in

ELS:2002. However, for ELS:2002, counts of Hispanics and Asians were obtained from the Common Core of Data (CCD) and the Private School Survey (PSS) to set the initial oversampling rates.

ELS:2002 used a two-stage sample selection process. First, schools were selected with probability proportional to size (PPS), and school contacting resulted in 1,221 eligible public, Catholic, and other private schools from a population of approximately 27,000 schools containing sophomores. Of the eligible schools, 752 participated in the study. These schools were then asked to provide sophomore enrollment lists. In the second stage of sample selection, approximately 26 students per school were selected from these lists. Additional information on the base-year sample design can be found in the base-year data file user's manual (Ingels et al. 2004), chapter 3 and appendix J.

The target population of schools for the ELS:2002 base year consisted of regular public schools, including state Department of Education schools and charter schools, and Catholic and other private schools that contained 10th grades and were in the United States (the 50 states and the District of Columbia).

The sampling frame of schools was constructed with the intent to match the target population. However, selected schools were determined to be ineligible if they did not meet the definition of the target population. Responding schools were those schools that had a survey day (i.e., data collection occurred for students in the school).[21] Of the 1,268 sampled schools, there were 1,221 eligible schools and 752 responding schools (67.8 percent weighted response rate).

A subset of most but not all responding schools also completed a school administrator questionnaire and a library or media center questionnaire (98.5 percent and 95.9 percent weighted response rates, respectively). Most nonresponding schools or their districts provided some basic information about school characteristics, so that the differences between responding and nonresponding schools could be better understood, analyzed, and adjusted. Additionally, the RTI field staff completed a facilities checklist for each responding school (100 percent response rate).

The target population of students for the full-scale ELS:2002 consisted of spring-term sophomores in 2002 (excluding foreign exchange students) enrolled in schools in the school target population. The sampling frames of students within schools were constructed with the intent to match the target population. However, selected students were determined to be ineligible if they did not meet the definition of the target population. Of the 19,218 sampled schools, there were 17,591 eligible students and 15,362 participants (87.3 percent weighted response rate).

The ELS:2002 survey instruments comprised two assessments (reading and mathematics) and a student questionnaire. Participation in ELS:2002 was defined by questionnaire completion. Although most students were asked to complete the assessment battery in addition to the questionnaire, there were some cases in which a student completed the questionnaire but

[21] One eligible school had no eligible students selected in the sample. This school was considered a responding school.

did not complete the assessments. Guidelines were provided to schools to assist them in determining whether students would be able to complete the ELS:2002 survey instruments.

Students who could not (by virtue of limited English proficiency or physical or mental disability) complete the ELS:2002 survey instruments (including the questionnaire and the tests) were part of the expanded sample of 2002 sophomores who will be followed in the study and whose eligibility status was reassessed 2 years hence. There were 163 such students. To obtain additional information about their home background and school experiences, contextual data were collected from the base-year parent, teacher, and school administrator surveys.

The student sample was selected, when possible, in the fall or early winter so that sample teachers could be identified and materials could be prepared well in advance of Survey Day. However, selecting the sample in advance meant that some students transferred into the sample schools and others left between the time of sample selection and Survey Day. To address this issue, sample updating was conducted closer to the time of data collection. Complete enrollment lists were collected at both the time of initial sampling and the time of the sample update.

One parent of the sample student and English and mathematics teachers of the sample student were also included in the base-year sample. A full discussion of the sample design and response rates is presented in the ELS:2002 base-year data file user's manual (Ingels et al. 2004).

3.3 First Follow-up Sample Design

As described in section 3.1.2, there are two target populations for the ELS:2002 first follow-up. Because of these two target populations and the major analytical subgroups, the sample included the following types of students:

- ELS:2002 base-year student respondents who were currently enrolled in either the 12th grade or some other grade in the school in which they were originally sampled. All such students were included in the follow-up sample.
- ELS:2002 base-year student respondents who finished high school early, including those who graduated from high school early, as well as those who did not graduate because they had alternative certification (e.g., exam-certified equivalency such as the General Educational Development [GED] credential). All such students were included in the follow-up sample.
- ELS:2002 base-year sample students who were deemed unable to participate during the base year owing to disability or insufficient command of the English language. All such students were included in the follow-up sample.
- ELS:2002 base-year student respondents who dropped out of school prior to data collection in the 12th grade. All such students were included in the follow-up sample.
- ELS:2002 base-year student respondents who transferred out of the school in which they were originally sampled. All such students were included in the follow-up sample.

- Nonrespondents (including those who did not have parental consent) of the ELS:2002 base-year full-scale sample who were at the base-year school, finished high school early, or transferred. Such students are discussed in section 3.3.2.
- Students at the base-year sample school who were currently enrolled in the 12th grade but who were not in 10th grade in the United States during the 2002 school year. During 2002 such students may have been out of the country, been enrolled in school in the United States in a grade other than 10th, had an extended illness or injury, been institutionalized, been homeschooled, or temporarily dropped out of school. Such students are discussed in section 3.3.3.

If a base-year school split into two or more schools, many of the ELS base-year sample members moved en masse to a new school, and they were followed to the destination school. These schools can be thought of as additional base-year schools in a new form. Specifically, a necessary condition of adding a new school in the first follow-up was that it arose from a situation such as the splitting of an original base-year school, thus resulting in a large transfer of base-year sample members (usually to one school, but potentially to more). Four base-year schools split, and five new schools were spawned from these four schools. At these new schools, as well as at the original base-year schools, students were tested and interviewed. Additionally, student freshening was done, and the administrator questionnaire was administered.

3.3.1 Eligibility

All spring-term 2002 sophomores in eligible schools, except for foreign exchange students, were eligible for the base-year study and were assumed eligible again in the first follow-up. Additionally, all spring-term 2004 seniors in eligible schools, except for foreign exchange students, were eligible for the first follow-up. Some base-year students were out of scope for this round, but they may be eligible again in future rounds. Reasons for being out of scope included being institutionalized or out of the country. Also, some base-year students died between the base year and the first follow-up.

Several categories of students who were ineligible for HS&B and NELS:88 were eligible for ELS:2002 (though it did not mean that such students were necessarily tested or that they completed questionnaires). In NELS:88, the following categories of students were deemed ineligible:

- students with disabilities (including students with physical or mental disabilities, or serious emotional disturbance, and who normally had an assigned Individual Education Program [IEP]) whose degree of disability was deemed by school officials to make it impractical or inadvisable to assess them; and
- students whose command of the English language was insufficient, in the judgment of school officials, for understanding the survey materials and who therefore could not validly be assessed in English.

In ELS:2002, the treatment of these categories of students was addressed as discussed below.

3.3.1.1 Schools Given Clear Criteria for Including/Excluding Students

Students were not excluded categorically (e.g., just because they received special education services, had IEPs, or received bilingual education or English as a second language services), but rather on a case-by-case (individual) basis. The guiding assumption was that many students with IEPs or limited English proficiency (LEP) would be able to participate, and schools were asked, if unsure, to include the student. Although both questionnaire and assessment data were sought, the minimum case of participation was completion of the student questionnaire. Hence, some students who could not be assessed could nevertheless participate (i.e., complete the questionnaire).

In addition, the ELS:2002 assessments were more accessible to many students who formerly (as in NELS:88) might have been excluded, because unlike NELS:88, ELS:2002 offered various testing accommodations. Schools and parents were urged to permit the study to survey and test students under these special conditions.

The suggested criterion for exclusion of students from survey instrument completion on language grounds followed the current practice for the National Assessment of Educational Progress (NAEP) students. Students were regarded as capable of taking part in the survey session (test and questionnaire administration) if they had received academic instruction primarily in English for at least 3 years or had received academic instruction in English for less than 3 years, but school staff judged or determined that they were capable of participating. In terms of exclusion from taking the instruments on disability grounds, it was suggested that only if the student's IEP specifically recommended against their participation in assessment programs should they be excluded, and then only from the tests if questionnaire-level participation were possible. Moreover, if their IEP stated that they could be assessed if accommodations were provided, then their participation became a question of whether the school could supply the particular accommodation. The specific accommodations offered by schools are explained below.

3.3.1.2 Accommodations Offered to Increase Participation

To the extent possible, given practical and monetary constraints, accommodations were offered to increase the number of participants. All tests taken under conditions of special accommodations were flagged on the data file (F1TXACC is the accommodation indicator), and the nature of the accommodation was noted.

In theory, many kinds of accommodations were possible. There were accommodations of test presentation, response, setting, and allotted testing time. In addition to accommodations for the assessments, special measures were employed to facilitate questionnaire completion (e.g., in some instances, ELS:2002 students were administered the student questionnaire by survey staff, if self-administration was not possible for them).

One type of accommodation offered is alternative test presentation (e.g., on mathematics tests, one might read problems aloud, have someone sign the directions using American Sign Language, use a taped version of the test, provide a braille or large-print edition of the test, or supply magnifying equipment). Although the study could not, for example, provide braille translations, when a school could assist in providing a presentational accommodation (as with magnifying equipment or an aide who translated directions into American Sign Language), this alternative was deemed an acceptable accommodation.

A second type of accommodation sometimes offered is alternative means of test responses (e.g., responses made in braille or American Sign Language or produced using a keyboard or specially designed writing tool). However, ELS:2002 was not able to provide special accommodations for responding.

A third type of accommodation sometimes offered is providing an alternative setting. For example, an emotionally disturbed student might not be a good candidate for a group administration but might be able to be assessed alone. ELS:2002 made this type of accommodation available where possible or permissible by the school.

A fourth possible kind of accommodation is in timing or length of administration. There were two options for proceeding: (1) give extra time or (2) keep testing time constant in minutes tested but give more breaks. Table 10 lists the counts for students excluded from survey instrument completion and students accommodated.

Table 10. Number of students excluded and accommodated: 2004

Excluded or accommodated	Number
Number of students excluded	100
Mental or physical disability	90
Language barrier (LEP/NEP)[1]	10
Number of students accommodated	48

[1] LEP = limited English proficient; NEP = non-English proficient.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

3.3.1.3 Questionnaire Eligibility Status Changes in the First Follow-up

The questionnaire eligibility status for some students changed between the base year and first follow-up. As shown in table 11, there were 16 students eligible for the questionnaire in the base year who were questionnaire ineligible in the first follow-up. Of these 16 students, 14 were base-year respondents, and 2 were base-year nonrespondents. Also shown in table 11 is that, of the 163 base-year questionnaire ineligible students, 105 were questionnaire eligible in the first follow-up, 57 were still questionnaire ineligible in the first follow-up, and 1 was deceased.

Table 11. Change in questionnaire eligibility status between base year and first follow-up: 2004

Base-year eligibility status	First follow-up questionnaire eligibility	Count
Questionnaire eligible	Questionnaire ineligible	16
Respondent	Questionnaire ineligible	14
Nonrespondent	Questionnaire ineligible	2
Questionnaire ineligible	Questionnaire eligible	105
Questionnaire ineligible	Questionnaire ineligible	57
Questionnaire ineligible	Deceased	1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

3.3.1.4 Records and Contextual Data Gathered for Students Unable to be Surveyed or Validly Assessed

High school transcripts have been collected for students unable to be surveyed or validly assessed. School-level data, such as school administrator survey responses in the base year and first follow-up, have been linked to these students. Contextual or expanded sample cross-sectional and panel weights—as contrasted to the student questionnaire completion weights—have been created and are included on the restricted-use data file. See section 3.4 for a description of these weights and their uses.

3.3.2 Subsampling

A base-year nonrespondent student was defined as a student that was selected in the base year and did not complete a student questionnaire or portion of the questionnaire. Many of these students were enrolled in the same school during the follow-up. For the first follow-up, a subsample of 1,000 nonrespondent students was selected from the 2,229 base-year nonrespondents. Initially, a subsample of 1,620 nonrespondents was selected. All nonresponding students were included with certainty (i.e., probability equal to one), except for White students in public schools who were randomly subsampled. Then, to help the response rate and to conserve resources, the subsample of 1,620 was randomly subsampled across all student types to 1,000 nonrespondents. See table 12 for a summary of the nonrespondent subsample.

Table 12. Base-year nonrespondent subsample, by school sector and student type: 2004

School sector and student type	Base-year nonrespondents	Initial subsample	Final subsample
Public	1,843	1,234	764
All other races[1]	1,006	397	246
Asian	289	289	179
Black or African American	286	286	177
Hispanic or Latino	262	262	162
Catholic	193	193	119
All other races[1]	169	169	105
Asian	5	5	3
Black or African American	4	4	2
Hispanic or Latino	15	15	9
Other private	193	193	117
All other races[1]	161	161	98
Asian	18	18	11
Black or African American	14	14	8
Hispanic or Latino	#	#	#

[#] Rounds to zero.

[1] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

3.3.3 Student Sample Freshening

Because part of the target population consists of those students who were enrolled in the 12th grade in the spring of 2004, the first follow-up included students at the base-year sample school who were enrolled in the 12th grade in the spring of 2004 but who were not in the 10th grade in the United States during the spring of 2002. During this time, such students may have been out of the country or may have been enrolled in school in the United States in a grade other than 10th (either at the sampled school or at some other school). In addition, some students may have reenrolled, although in spring 2002 they were temporarily out of school, owing to illness, injury, institutionalization, homeschooling, or school dropout.

Student freshening was limited to the base-year sample schools and the five new schools added due to school splits because all sample students were identified at these schools regardless of their status 2 years later, and they could be linked to potential freshened students. Freshened lists were not obtained from transfer schools. Therefore, a small number of freshening eligible students from "new" schools that were not on the 2002 school sampling frame did not have a chance of selection.

In October 2003, each sample school was asked to provide an electronic or hard copy listing of all their 12th-grade students enrolled in the 2003–04 school year. This requested listing was similar to the listing requested in the base year. The information requested for each eligible student included the following:

- student ID number;
- Social Security number;
- full name;
- sex; and
- race/ethnicity.

The race/ethnicity variable was used to stratify the students.

The sample school was given instructions for submitting the electronic and hardcopy lists. The electronic lists were requested to be a column formatted or comma delimited ASCII file or an Excel file. Schools were able to provide the electronic lists by sending them in an e-mail, providing a diskette or CD-ROM containing the file, or uploading the file to the ELS:2002 website. If the school could not provide an electronic list, then it was requested that the hardcopy lists were sorted in alphabetical order within race/ethnicity strata to facilitate stratified sampling. As shown in table 13, of the 615 enrollment lists received, 46.7 percent sent in electronic lists, 49.1 percent sent in hardcopy lists, and 4.2 percent sent in both types. The students from these 615 schools were selected such that the sample would be representative (i.e., linked to a representative sample of students in a representative sample of schools), as described in the following paragraphs. However, estimates based on respondents could potentially be biased due to nonresponse or excluding "new" schools. Nonresponse bias analysis was not conducted for the freshening nonresponse. However, nonresponse adjustment factors were computed to account for potential bias due to the school-level freshening nonresponse (see weighting section). Any bias due to excluding "new" schools is likely to be small due to the small number of freshening-eligible students. Approximately 130 schools did not send a freshened list, either because they refused to provide the list or because they indicated they had no freshening eligible students. Also, about 20 schools either sent in lists too late or sent lists that were incomplete and could not be used.

Table 13. Number of 12th-grade student lists provided by schools, by type: 2004

Type of list received	Frequency[1]	Percent
Total	615	100.00
Both electronic and hardcopy	26	4.23
Electronic copy	287	46.67
Hardcopy	302	49.11

[1] The counts include all schools that sent in a 12th-grade student list, but three of these schools sent in a list that was not sufficient to use for freshening.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

Quality assurance (QA) checks were performed on all lists received. Any list that was unreadable immediately failed the QA checks. Additionally, any list that did not allow the students to be stratified failed the QA checks, unless the original sophomore list also did not contain race/ethnicity. To verify that the school provided a complete list of eligible students, the school's count of 12th-grade students from the most recent CCD (for public schools) and PSS (for private/Catholic schools) databases were compared with the counts (overall and within strata) of 12th-graders from the list provided. If any of the counts of 12th-graders for total students or by the race/ethnicity strata on the provided list were more than 25 percent lower or higher than the counts from the CCD data, then the list failed the QA checks, unless the provided count was greater than zero and the absolute difference was less than 50. However, if the provided count of Hispanics, Asians, or Blacks was zero and the original list count was less than five, the count did not fail the QA checks.

Table 14 shows that of the lists received, 512 passed all QA checks, 16 lists failed the QA check regarding student counts, 74 failed the QA check regarding identification of race stratum, 2 lists were unreadable, 4 lists had insufficient documentation, and 4 lists had multiple or other problems.

Table 14. Types of problems encountered with student lists: 2004

Type of problem	Frequency	Percent
Total	612	100.00
None	512	83.66
Unreadable file or list	2	0.33
Count out of bounds	16	2.61
Cannot identify strata	74	12.09
Insufficient documentation	4	0.65
Multiple problems	1	0.16
Other problems	3	0.49

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

Schools that failed the QA checks were contacted to resolve the discrepancy. When it was determined that the initial list provided by the school was not satisfactory, a replacement list was requested. If the school confirmed that the provided list was correct or if the school sent a replacement list, then the freshening process was initiated. If the school refused to send a replacement list, then the freshening process was initiated, when possible.

If both the original and new enrollment lists were electronic, they were sorted alphabetically within stratum (as the original list was sorted for sample selection) to facilitate the comparison of the original and new lists. If one of the lists was electronic and one was hard copy, then the electronic list was sorted alphabetically within stratum and printed for the freshening process. If both of the lists were hard copy, then the lists were used as is in the freshening process.

The freshening process began by identifying the base-year sample students on the new list. If the student immediately following each sampled base-year student within the race/ethnicity strata on the new list was not on the original list, then that student was selected as a potential addition to the sample. Whenever a potential new sample student was identified, the next student on the list was examined to determine whether that student was on the original list. If this next student was not on the original list, then that student was a potential addition to the sample. This process was continued until reaching a student who was on the original list. Then, this process was repeated with the next base-year sample student on the list.[22]

Next, the school was contacted to determine the eligibility of the freshened students. Any student identified as eligible by the school was selected into the sample.

Table 15 shows that 2,712 freshened students were included in the first follow-up sample. Of these 2,712 students, 238 (8.8 percent) were found to be eligible for inclusion in the study, and 2,474 students (91.2 percent) were found to be ineligible. Of the 238 eligible freshened students, 31 were questionnaire ineligible. Eligibility was determined for all freshened students. The high ineligibility rate was expected because the freshening procedure selected 12th-grade students who were not on the sophomore list without information on their status in the 10th grade. Many of these sampled students were sophomores at other regular U.S. schools in the spring of 2002 who transferred to a sample school, which contributed to the high ineligibility rate. The number of freshened students was approximately 0.39 students per school (238 students out of 612 schools that sent usable 12th-grade enrollment lists).

Table 15. Number of freshened sample members, by eligibility: 2004

Freshened eligibility status	Count	Percent
Total	2,712	100.00
Eligible	207	7.63
Questionnaire ineligible	31	1.14
Ineligible	2,474	91.22

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002” and “First Follow-up, 2004.”

[22] This process is also known as the half-open interval rule.

3.4 Calculation of Weights and Results of Weighting

3.4.1 Analysis Populations

The sample design for ELS:2002 supports a number of analyses, which in turn permit accurate inferences to be made to three major groups or target populations. Within these populations are important analytical domains.

Population A: Spring 2002 sophomores

Domains:

- spring 2002 sophomores capable of completing the student questionnaire
- all spring 2002 sophomores including those capable and not capable of completing the questionnaire
- spring 2002 sophomores in base-year school in spring 2004
- spring 2002 sophomores in a different school in spring 2004 (transfers)
- spring 2002 sophomores who were dropouts in spring 2004
- spring 2002 sophomores who graduated or achieved equivalency early, that is, prior to March 15, 2004
- spring 2002 sophomores who were homeschooled in spring 2004[23]
- spring 2002 White sophomores
- spring 2002 Black sophomores
- spring 2002 Hispanic sophomores
- spring 2002 Asian sophomores
- spring 2002 public school sophomores
- spring 2002 private school sophomores

Population B: Spring 2004 12th-grade students

Domains:

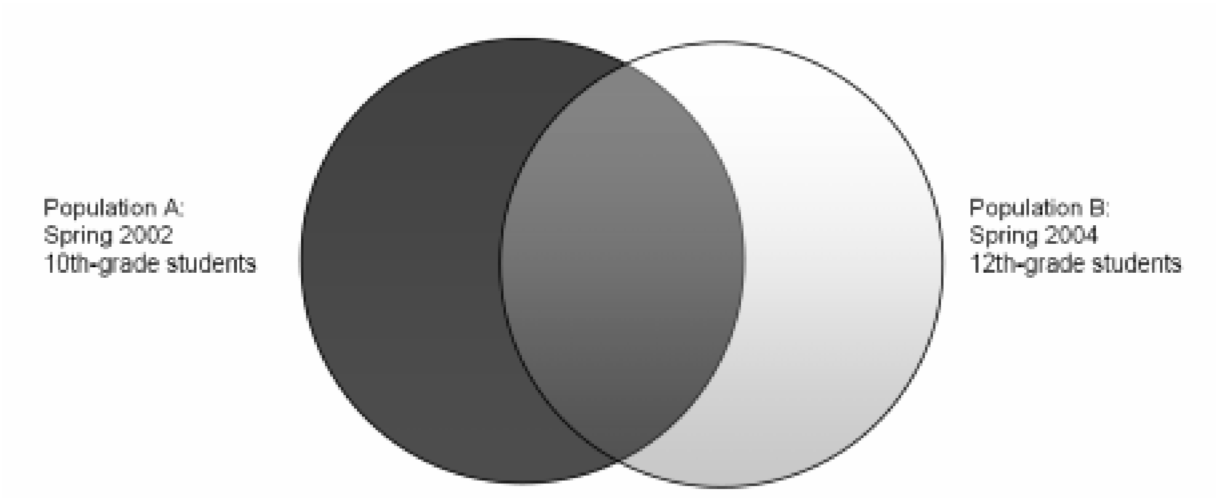
- spring 2004 12th-grade students capable of completing the student questionnaire
- all spring 2004 12th-grade students including those capable and not capable of completing the questionnaire
- spring 2004 12th-grade students who were graduating high school seniors in spring 2004

[23] Although conceptually spring 2002 sophomores who were homeschooled in 2004 may be thought of as an analysis population, they were not designed to be so and were therefore not subject to minimum sample size requirements. The group is of limited analytic utility owing both to the low sample size and to the narrowness of the population definition. The compelling practical reason for distinguishing this group was so that they could be administered only those items consonant with their unique situation as out-of-school students.

- spring 2004 White 12th-grade students
- spring 2004 Black 12th-grade students
- spring 2004 Hispanic 12th-grade students
- spring 2004 Asian 12th-grade students
- spring 2004 public school 12th-grade students
- spring 2004 private school 12th-grade students

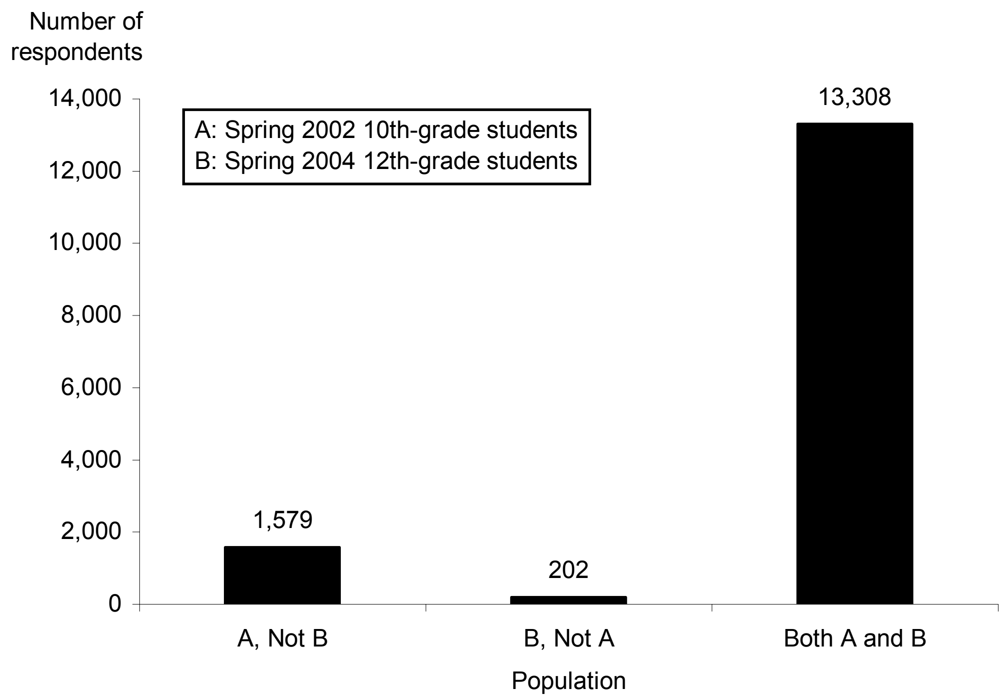
Figure 2 helps illustrate that, whereas some students are in only population A or population B, many students are in both populations—that is, both a spring 2002 sophomore and a spring 2004 12th-grade student. Figure 3 further illustrates the overlap between the two populations.

Figure 2. Student analysis populations, by year: 2004



SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002” and “First Follow-up, 2004.”

Figure 3. Student analysis population respondent counts, by year: 2004



SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002” and “First Follow-up, 2004.”

Population C: Spring 2002 10th-grade schools

Domains:

- control
- urbanicity
- region

Analytic uses of these three populations, and the weighting required to support the analyses, are discussed in sections 3.4.2 (student level) and 3.4.3 (school level).

3.4.2 Uses of Student-Level Data; Student Weights

3.4.2.1 Population A: Spring 2002 Sophomores

This population can be employed in both cross-sectional and longitudinal analyses. (Note to the user: The expanded weights [BYEXPWT and F1XPNLWT] are only available on the restricted-use file.) Weights for cross-sectional analyses were created in the base year. BYSTUWT can be used for cross-cohort comparisons of students capable of completing the questionnaire (on an intercohort time-lag basis employing the sophomore classes of 1980 and 1990). BYEXPWT generalizes to the entire population, including both students capable and incapable of completing the questionnaire.

The weight F1PNLWT was created for all persons who completed a questionnaire or a sufficient portion of a questionnaire, both in the base year and the first follow-up. Also, base-year data were imputed when not available from the new participant supplement (NPS) for first follow-up respondents, and these cases also have F1PNLWT. The panel weight can be used for both intracohort (across rounds of ELS:2002) and intercohort (longitudinal comparative analysis) purposes. An example of using a panel weight for intracohort analysis is to take a cohort of sophomores, look at their enrollment 2 years later, and determine what proportion have dropped out. An example of using a panel weight for intercohort analysis is to compute math gains between sophomore and senior years using the ELS:2002 panel weight and also for the NELS:88 panel weight and then comparing the gain between sophomore and senior year for the two cohorts. Missing test data were imputed, so a version of the panel weight adjusted for test nonresponse was unnecessary. The weight F1XPNLWT was created for the expanded sample of students capable and not capable of completing the questionnaire. See section 3.4.4 for more details.

Base-year nonrespondents who responded in the first follow-up are considered to be part of this population, but there is no base-year weight (BYSTUWT or BYEXPWT) for them. The NPS ensured that the standard classification variables collected in the base year were also available for this group. However, key variables were imputed for base-year nonrespondents who were first follow-up respondents (see section 3.6), so that these students could be analyzed as part of the sophomore panel using F1PNLWT and/or F1XPNLWT. BYSTUWT and BYEXPWT were not recomputed.

Transcripts will provide continuous data covering grades 9 through 12 for students who remained in school and were in the modal grade sequence (or a lesser range of data for students who dropped out or fell behind the modal progression). A cross-sectional 2004 transcript weight (F1TRSCWT) will be produced, encompassing cases that meet the following conditions, for sample members for whom a transcript has been obtained: (a) member of the 10th-grade or the 12th-grade cohort who was a student questionnaire completer in the base year, first follow-up, or both; or (b) member of the questionnaire-incapable expanded sample. This weight will generalize to the analysis population of spring 2002 sophomores by subsetting the sample through the use of a flag (G10COHRT). In addition, a transcript panel weight (F1TRPWT) will be produced for all individuals who have a transcript in 2004 and who are regular or expanded sample participants in both 2002 and 2004, including base-year nonrespondents with imputed data. See section 3.4.4 for more details.

3.4.2.2 Population B: Spring 2004 12th-Grade Students

This population can also be employed in both cross-sectional and longitudinal analyses. (Note to the user: The expanded weight [F1EXPWT] is only available on the restricted-use file.) The longitudinal analyses will be conducted after further rounds of the study. Weights for cross-sectional (including cross-cohort) analyses (F1QWT) were created for students capable of completing the questionnaire. This weight should be used in conjunction with a flag (G12COHRT) that identifies the sample member as part of the senior cohort. F1EXPWT will generalize to the entire population, including students capable and incapable of completing the questionnaire. See section 3.4.4 for more details.

Note that generalizations about the mathematics achievement of the 2004 senior class involve imputation for the transfer students and other seniors who were not tested (see section 3.6).

The cross-sectional transcript weight described above will also generalize to the analysis population of spring 2004 12th-graders by subsetting the sample through the use of a flag (G12COHRT). See section 3.4.4 for more details.

3.4.3 Uses of School-Level Data; School-Level Weights

This population of spring 2002 10th-grade schools can be employed in cross-sectional analyses and potentially in longitudinal analyses. Weights for cross-sectional analyses were created in the base year. BYSCHWT can be used for spring 2002 10th-grade schools.

The first follow-up school data can be analyzed using the student weight. That is, the school data can be analyzed in relation to student characteristics (i.e., the administrator data are linked to student data, with the student as the fundamental unit of analysis).

Although it is not possible to produce a cross-sectional 2004 school weight because the first follow-up school sample is not nationally representative of American high schools in 2004, the base-year school weight can be used for longitudinal analyses treating the base-year schools as a panel. Although there are multiple data points for analysis, the weight maintains generalizability only to schools in 2002.

3.4.4 Weights

Four sets of weights were computed:

- A cross-sectional weight for the expanded sample that includes sample numbers who completed all or a sufficient portion of the questionnaire in the first follow-up, the base-year students who were still incapable of completing the questionnaire 2 years later, base-year students who were newly incapable of completing the questionnaire, and freshened students who were incapable of completing the questionnaire (F1EXPWT). This weight is only available on the restricted-use file.
- A cross-sectional first follow-up weight for sample members who completed all or a sufficient portion of the questionnaire in the first follow-up (F1QWT).
- A first follow-up panel weight (longitudinal weight) for the expanded sample that includes students who fully or partially completed a questionnaire in both the base year and first follow-up, students who fully or partially completed a questionnaire in the first follow-up and had base-year data imputed if not on the NPS (see section 3.6), and students who were questionnaire incapable in the base year and/or the first follow-up (F1XPNLWT). This expanded sample panel weight is only available on the restricted-use file.
- A first follow-up panel weight for sample members who fully or partially completed a questionnaire in both the base year and first follow-up or who fully or partially

completed a questionnaire in the first follow-up and had base-year data imputed if not on the NPS (F1PNLWT).

Also, two weights (only available on the restricted-use file) will be computed and documented later:

- a cross-sectional transcript weight for sample members for whom transcript data have been collected and who either fully or partially completed a questionnaire in the first follow-up or were members of the expanded sample (F1TRSCWT); and
- a panel transcript weight for sample members for whom transcript data have been collected and who either fully or partially completed a questionnaire in both the base year and first follow-up, fully or partially completed a questionnaire in the first follow-up and had base-year data imputed if not on the NPS, or were members of the expanded sample (F1TRPWT).

Additionally, there are two flags that can be used in analyses to identify members of the sophomore and senior cohorts:

- a flag indicating a member of the sophomore cohort, that is, spring 2002 sophomore (G10COHRT); and
- a flag indicating a member of the senior cohort, that is, spring 2004 12th-grader (G12COHRT).

Table 16 illustrates the relationship among the first four weights listed above plus the base-year weights, universe flags, populations described in section 3.4.1, and respondents. Below, the weighting procedures are described for the first four of these weights. The procedures for calculating F1QWT differ somewhat for base-year sample students and first follow-up freshened sample students.

3.4.4.1 F1EXPWT for Base-Year Sample Students

The expanded sample cross-sectional weight was computed for the expanded sample that includes students who fully or partially completed the questionnaire and students incapable of completing the questionnaire.[24] In addition to the expanded sample students identified in the base year, such students could be those who were base-year nonrespondents, became disabled between the base year and first follow-up, or were misclassified in the base year.

With a few exceptions, base-year eligible sample students remained eligible for the first follow-up sample. Students who died were out of scope for the first follow-up. Students who left the country, were unavailable for the duration of the study (e.g., in military boot camp), or were institutionalized were temporarily out of scope for the first follow-up, although they may be eligible in future rounds.

[24] The expanded sample weights and the full expanded sample are available on the restricted-use file but not on the public-use file.

Table 16. Relationship among weights, populations, respondents, and universe flags: 2004

Weight[1]	Universe flag	Population	Respondent
BYSTUWT	G10COHRT	Spring 2002 sophomore	Fully or partially completed questionnaire in 2002
BYEXPWT	G10COHRT	Spring 2002 sophomore	Fully or partially completed questionnaire in 2002 or incapable of completing a questionnaire
F1PNLWT	G10COHRT	Spring 2002 sophomore	Fully or partially completed questionnaire in 2002 and 2004 (base-year data may be imputed)
F1XPNLWT	G10COHRT	Spring 2002 sophomore	Fully or partially completed questionnaire in 2002 and 2004 (base-year data may be imputed) or incapable of completing a questionnaire in 2002 or 2004
F1QWT	G10COHRT	Spring 2002 sophomore	Fully or partially completed questionnaire in 2004
	G12COHRT	Spring 2004 12th-grader	
F1EXPWT	G10COHRT	Spring 2002 sophomore	Fully or partially completed questionnaire in 2004 or incapable of completing a questionnaire in 2004
	G12COHRT	Spring 2004 12th-grader	

[1] The expanded sample weights and the full expanded sample are available on the restricted-use file but not on the public-use file.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

First, the student-level design weight (F1DWT) was calculated as equal to the base-year design weight multiplied by the reciprocal of the student's probability to be included in the first follow-up. All base-year eligible sample students have a base-year design weight (BYDWT) that accounts for the base-year school probability of selection (adjusted for nonresponse) and for the base-year student probability of selection within the sample school. This base-year design weight is not adjusted for base-year student nonresponse. The student's probability of selection in the first follow-up is 1.0 for base-year respondents and base-year questionnaire-incapable students and less than 1.0 for base-year nonrespondents. This weight is used because all base-year respondents are in the first follow-up sample, and 1,000 out of 2,229 base-year nonrespondents were subsampled to be included in the first follow-up sample. Different subsampling rates were used for the various school types and student types. Note that hostile refusals—those who requested to be removed from the study for all rounds—had a positive probability of selection but were always treated as first follow-up nonrespondents. The formula for F1DWT for student i is

$$\mathrm{F1DWT}_i = \mathrm{BYDWT}_i * (1 / P_{1i}),$$

where P_{1i} is the probability of selection for student i for the first follow-up sample.

In the base year, all nonresponding students were assumed to be eligible. Adjusting the weights of base-year nonrespondents to compensate for the small portion of students who were actually ineligible was considered. However, in CATI, only nine ineligible students were identified, so it was assumed that all of the nonrespondents were eligible. If the assumption was made that some nonrespondents were ineligible, the adjustment would be negligible. In the first follow-up, some of these nonrespondents still had unknown eligibility, including some for whom the name was unknown. Again, they were assumed to be eligible, as they were in the base year.

Next, generalized exponential models (GEM) (Folsom and Singh 2000) were used. The GEM approach is a general version of weighting adjustments and was based on a generalization of Deville and Särndal's logit model (Deville and Särndal 1992). GEM is not a competing method to weighting classes or logistic regression; rather, it is a method employed to do weight adjustments with a choice of optional features to employ. It is a formalization of weighting procedures such as nonresponse adjustment, poststratification, and weight trimming. GEM controls at the margins as opposed to controlling at the cell level, as weighting class adjustments. This approach allows more variables to be considered. GEM is designed so that the sum of the unadjusted weights for all eligible units equals the sum of the adjusted weights for respondents. GEM also constrains the nonresponse adjustment factors to be greater than or equal to one.

The questionnaire-incapable students are generally included as part of the expanded set of cases, but a small number of hostile refusals were treated as nonrespondents. Therefore, a simple weighting class nonresponse adjustment was performed. The classes were formed by school type, given the small number of questionnaire-ineligible students. This nonresponse adjustment factor is WTADJ1, and these students have a second nonresponse adjustment factor (WTADJ2) equal to one (see below). For questionnaire-capable students, a first follow-up respondent is defined as a student who completed the questionnaire or a significant portion of the questionnaire. The variables used in the nonresponse weight adjustment were those available for most respondents and nonrespondents that are described in section 3.8.

The student nonresponse was performed in two stages—refusal and other nonresponse—because the predictors of response propensity were potentially different at each stage. The nonresponse models reduce the bias due to nonresponse for the model predictor variables and related variables. Therefore, using these two stages of nonresponse adjustment achieved greater reduction in nonresponse bias to the extent that different variables were significant predictors of response propensity at each stage.

For data known for most but not all students, data collected from responding students and weighted hot deck imputation were used so that data are available for all eligible sample students. These variables were main effects in the models. They were also used in Automatic Interaction Detection (AID) analyses (with response as the dependent variable) to determine important interactions for the nonresponse adjustment models. The outcomes of these first models were nonresponse adjustment factors (WTADJ1 and WTADJ2). The unequal weighting effects (UWEs) and maximum adjustment factors were monitored to ensure reasonable values.

Next, the GEM approach was used to poststratify the nonresponse adjusted weights—that is, F1DWT * WTADJ1 * WTADJ2—to meet overall and marginal totals of the base-year expanded sample weights (BYEXPWT). The full expanded sample was included in this adjustment, and the control totals were the base-year expanded weight sums, because students can potentially move in and out of being questionnaire incapable (i.e., being questionnaire capable or questionnaire incapable is not static). The variables used in poststratification were school type and student race/ethnicity. This adjustment ensures that the first follow-up weight sums are equal to the base-year weight sums for these variables. GEM generated a poststratification adjustment factor (WTADJ3).

Extreme weights occur in the ELS:2002 data due to small probabilities of sample selection or due to weight adjustments. These extreme weights (either very small or very large) can significantly increase the variance of estimates. One way to account for this and decrease the variance is to trim and smooth extreme weights within prespecified domains. Note that trimming weights has the potential to increase bias. However, the increase in bias is often offset by the decrease in variance due to weight trimming. As a result, this reduces the mean square error (MSE) of an estimate, defined as variance plus bias squared.

The innovation introduced in GEM is the ability to incorporate specific lower and upper bounds. An important application of this feature is to identify at each adjustment step an initial set of cases with extreme weights and to use specific bounds to exercise control over the final adjusted weights. Thus, there is built-in control for extreme weights in GEM.

GEM uses the median +/– X * IQR, where X is any number, typically between 2 and 3, and IQR is the interquartile range. There are also different points in the weight adjustment process during which weight trimming can occur. GEM has options to make adjustments for extreme weights as part of the nonresponse and as part of the poststratification. GEM adjusted for ELS:2002 extreme weights during both nonresponse adjustments, as well as during the poststratification. For GEM, a variable or set of variables is identified to be used to identify extreme weights within each level of the variable(s), and the variables race and school type were chosen. Prior to running GEM, the unweighted and weighted percentage of extreme weights was examined for all four levels of race crossed with the three levels of school type using various values to multiply by the IQR (2.0, 2.1, 2.2,…4.0), and the value of 2.5 was chosen.

The final student weight for the expanded sample student i is the product of the first follow-up design weight, the nonresponse adjustment factors, and the poststratification factor, such that

$$\mathrm{F1EXPWT}_i = \mathrm{F1DWT}_i * \mathrm{WTADJ1}_i * \mathrm{WTADJ2}_i * \mathrm{WTADJ3}_i.$$

3.4.4.2 F1EXPWT for First Follow-up Freshened Sample Students

The expanded sample cross-sectional weight was computed for eligible freshened sample students who fully or partially completed the questionnaire or who were incapable of completing the questionnaire. These sample students were not in the base-year population (i.e., not in 10th grade in the United States in spring 2002). During 2002, such students may have been out of the country, been enrolled in school in the United States in a grade other than 10th, had an extended illness or injury, been institutionalized, been homeschooled, or temporarily dropped out of school. A 12th-grade enrollment list was requested from each base-year school or from the new school if the base-year school was closed, split, or did not enroll 12th-graders. Students were identified who were on the 12th-grade enrollment list but not on the sophomore list. Each of these students was linked to a student on the sophomore enrollment list, and they were selected for the freshened sample if the linked sophomore had been selected for the base-year sample.

The first follow-up design weight (F1DWT) for each freshened sample student is therefore equal to the base-year design weight of the linked sophomore.

After the freshened sample students were selected, the schools were asked to identify those that were eligible for freshening (i.e., those that were not in the base-year population). Of 2,702 sampled freshened students, 425 (16 percent) were determined by the school to be eligible. Freshened eligibility was determined by the school for all freshened students. However, more than 150 of these freshened students determined by the school to be eligible were later determined during the student interview to be ineligible. There were no nonresponding freshened students with undetermined eligibility.

In the first follow-up, 612 schools sent a 12th-grade enrollment list that was sufficient for selecting freshened students. This number includes new schools that were added as a result of base-year schools that split. Another 13 schools did not send a 12th-grade enrollment list because they either did not have any 12th-graders that were new to the school since spring 2002 or they did not enroll 12th-graders. Therefore, 127 of the 752 base-year participating schools did not provide a freshened list.

The freshened student weights were adjusted upward to account for the school nonresponse to freshening. Weighting classes were formed from the variables school type and school metropolitan status. Each class had a minimum of 30 eligible freshened students. First, the average number of eligible freshened students per school that sent in a 12th-grade list was calculated. Next, this average was multiplied by the number of schools that did not send in a list. Then, this number was added to the eligible freshened students, and this sum was divided by the number of eligible freshened students. The result is the weight adjustment factor $WTADJ1_j$ for weighting class j:

$$WTADJ1_j = ((Avg_j * NR_j) + FE_j) / FE_j,$$

where:

Avg_j is the average number of eligible freshened students per school that sent in a 12th-grade list in weighting class j;

NR_j is the number of schools in weighting class j that did not respond to the request to send in a 12th-grade list; and

FE_j is the number of eligible freshened students in weighting class j.

The nonresponse adjustment for the freshened sample students was done together with the nonresponse adjustment for the base-year sample students because of the small number of eligible freshened students. A flag for freshened students was included in the nonresponse models. The outcomes of the nonresponse models were nonresponse adjustment factors (WTADJ2 and WTADJ3).

Table 17 presents the final predictor variables used in the first-stage student nonresponse adjustment model, which includes both base-year and freshened sample students. This table also includes the average weight adjustment factors resulting from these variables: 3.73 percent unweighted and 14.30 percent weighted of the students were identified as having extreme weights. The first stage of nonresponse adjustment factors met the following constraints:

- minimum: 0.10
- median: 1.08
- maximum: 2.12

Table 18 presents the final predictor variables used in the second-stage student nonresponse adjustment model, which includes both base-year and freshened sample students. This table includes the average weight adjustment factors resulting from these variables: 3.13 percent unweighted and 8.93 percent weighted of the students were identified as having extreme weights. The second stage of nonresponse adjustment factors met the following constraints:

- minimum: 0.09
- median: 1.05
- maximum: 2.35

Table 17. Average weight adjustment factors used to adjust cross-sectional weights for refusal, by selected characteristics: 2004

Model predictor variables[1]	Number of responding students and "other" nonresponding students[2]	Weighted response rate	Average weight adjustment factor
Total	15,608	94.97	1.11
School sector			
Public	12,262	95.07	1.11
Catholic	1,929	94.63	1.07
Other private	1,417	92.89	1.20
School urbanicity			
Urban	5,325	94.56	1.13
Suburban	7,449	94.79	1.10
Rural	2,834	96.05	1.09
10th-grade enrollment			
0–99	3,033	96.26	1.11
100–249	3,971	95.71	1.08
250–499	4,992	94.69	1.12
≥ 500	3,612	94.22	1.12

See notes at end of table.

Table 17. Average weight adjustment factors used to adjust cross-sectional weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding students and "other" nonresponding students[2]	Weighted response rate	Average weight adjustment factor
Type of grades within school			
K–12, PreK–10th, 1st–12th, PreK/1st–9th/12th and PreK–12 schools	1,021	95.97	1.21
Middle grades but no elementary	1,638	95.14	1.08
Only high school	12,949	94.90	1.10
Number of grades within the school			
4	11,906	95.03	1.10
> or < 4	3,702	94.73	1.13
Number of days in school year			
Less than 180 days	4,055	95.49	1.10
180 days	8,642	95.10	1.11
More than 180 days	2,911	93.88	1.13
Minutes per class period			
≤ 45	3,733	94.65	1.11
46–50	3,346	94.59	1.11
51–80	4,168	94.85	1.13
≥ 81	4,361	95.56	1.09
Class periods per day			
1–4	4,504	95.60	1.09
5–6	3,849	94.33	1.12
7	4,215	94.63	1.11
8–9	3,040	95.33	1.11
IEP[3] percentage			
≤ 5 percent	6,042	94.77	1.11
6–10 percent	4,023	94.88	1.10
11–15 percent	3,450	95.29	1.10
> 15 percent	2,093	94.93	1.14
LEP[4] percentage			
0 percent	6,722	95.73	1.10
1 percent	3,053	94.24	1.11
2–5 percent	2,631	94.44	1.11
≥ 6 percent	3,202	95.01	1.13

See notes at end of table.

Table 17. Average weight adjustment factors used to adjust cross-sectional weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding students and "other" nonresponding students[2]	Weighted response rate	Average weight adjustment factor
Free or reduced-price lunch			
0 percent	2,753	92.89	1.11
1–10 percent	3,484	93.72	1.12
11–30 percent	4,693	95.45	1.11
≥ 31 percent	4,678	95.95	1.09
Number of full-time teachers			
1–40	4,033	96.00	1.09
41–70	3,938	95.13	1.09
71–100	4,038	94.70	1.13
> 100	3,599	94.48	1.12
Number of part-time teachers			
0–1	4,545	95.17	1.10
2–3	4,467	95.48	1.11
4–6	3,768	94.11	1.12
≥ 7	2,828	94.85	1.11
Full-time teachers certified			
0–90 percent	4,016	95.63	1.11
91–99 percent	2,755	94.46	1.11
100 percent	8,837	94.97	1.11
School coeducational status			
Coeducational school	14,814	95.00	1.11
All-female school	366	91.82	1.08
All-male school	428	95.08	1.06
Total enrollment			
0–600 students	3,672	96.45	1.09
601–1,200 students	4,652	94.68	1.11
1,201–1,800 students	3,563	94.70	1.10
> 1,800 students	3,721	94.59	1.13

See notes at end of table.

Table 17. Average weight adjustment factors used to adjust cross-sectional weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding students and "other" nonresponding students[2]	Weighted response rate	Average weight adjustment factor
Census region			
Northeast	2,881	94.65	1.12
Midwest	3,903	95.04	1.10
South	5,629	95.79	1.08
West	3,195	93.94	1.16
All other races 10th-grade enrollment			
≤ 80 percent	7,821	95.09	1.11
> 80 percent	7,787	94.84	1.11
Asian 10th-grade enrollment			
≤ 2 percent	6,034	95.25	1.09
> 2 percent	9,574	94.80	1.12
Black or African American 10th-grade enrollment			
≤ 4 percent	5,279	94.50	1.11
> 4 percent	10,329	95.21	1.11
Hispanic or Latino 10th-grade enrollment			
≤ 3 percent	5,993	94.63	1.10
> 3 percent	9,615	95.17	1.11
CHAID[5] segments			
CHAID segment 1 = 1–40 full-time teachers; public school; ≤ 2 percent Asian 10th-grade enrollment	1,323	94.41	1.12
CHAID segment 2 = 1–40 full-time teachers; public school; > 2 percent Asian 10th-grade enrollment	405	87.90	1.15
CHAID segment 3 = 1–40 full-time teachers; Catholic and other private schools; race = Hispanic or other	751	96.00	1.09
CHAID segment 4 = 1–40 full-time teachers; Catholic and other private schools; race = Asian or Black	1,119	94.26	1.10
CHAID segment 5 = 41–70 full-time teachers; 0–6 part-time teachers; 1–6 class periods	599	90.59	1.16
CHAID segment 6 = 41–70 full-time teachers; 0–6 part-time teachers; 7–9 class periods	1,055	94.61	1.11
CHAID segment 7 = 41–70 full-time teachers; ≥ 7 part-time teachers; ≤ 180 school days	985	92.90	1.15
CHAID segment 8 = 41–70 full-time teachers; ≥ 7 part-time teachers; > 180 school days	1,052	98.62	1.07

See notes at end of table.

Table 17. Average weight adjustment factors used to adjust cross-sectional weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding students and "other" nonresponding students[2]	Weighted response rate	Average weight adjustment factor
CHAID[5] segments—Continued			
CHAID segment 9 = > 70 full-time teachers; 0–1 part-time teachers; ≤ 80 percent other 10th-grade enrollment	1,747	97.40	1.05
CHAID segment 10 = > 70 full-time teachers; 0–1 part-time teachers; > 80 percent other 10th-grade enrollment	2,546	96.47	1.10
CHAID segment 11 = > 70 full-time teachers; ≥ 2 part-time teachers; ≤ 45 minutes per class	1,966	95.18	1.11
CHAID segment 12 = > 70 full-time teachers; ≥ 2 part-time teachers; 46–80 minutes per class	197	98.37	1.15
CHAID segment 13 = > 70 full-time teachers; ≥ 2 part-time teachers; ≥ 81 minutes per class	645	91.04	1.16
CHAID segment 14 = 11+ percent free or reduced-price lunch; in-school out-of-grade enrollment status; 1,801+ total enrollment	526	95.86	1.14
CHAID segment 15 = 11+ percent free or reduced-price lunch; out-of-school enrollment status; race = Asian, White, or other	325	86.98	1.21
CHAID segment 16 = 11+ percent free or reduced-price lunch; out-of-school enrollment status; race = Black, Hispanic, Indian, or Pacific Islander	367	94.06	1.10
Sex			
Male	7,811	95.16	1.11
Female	7,797	94.77	1.10
Race/ethnicity[6]			
All other races	9,517	94.56	1.13
Asian	1,744	94.80	1.09
Black or African American	2,345	95.88	1.08
Hispanic or Latino	2,002	95.90	1.06
Freshened status			
Freshened	186	88.75	1.16
Enrollment status			
In school, in grade (in grade 12)	12,842	95.67	1.10
In school, out of grade (in grade 10 or 11, ungraded, or graduated early)	1,892	93.33	1.15
Out of school (dropout or homeschooled)	874	90.20	1.17

See notes at end of table.

Table 17. Average weight adjustment factors used to adjust cross-sectional weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding students and "other" nonresponding students[2]	Weighted response rate	Average weight adjustment factor
School sector and race/ethnicity			
Public schools, All other races	6,882	94.68	1.13
Public schools, Asian	1,589	94.59	1.10
Public schools, Black or African American	2,076	95.96	1.07
Public schools, Hispanic or Latino	1,715	95.89	1.07
Catholic schools, All other races	1,464	94.77	1.07
Catholic schools, Asian	77	98.06	1.02
Catholic schools, Black or African American	175	92.37	1.09
Catholic schools, Hispanic or Latino	213	93.85	1.02
Other private school, All other races	1,171	91.86	1.21
Other private schools, Asian	78	96.49	1.04
Other private schools, Black or African American	94	94.35	1.30
Other private schools, Hispanic or Latino	74	98.37	1.01

[1] Model predictor variables had a value of 0 or 1. Some of the listed model predictor variables were not actually in the model because they served as reference groups. For each group of variables, one of the categories (predictor variable) was used as a reference group.

[2] "Other" nonresponding students are students who were nonrespondents but did not explicitly refuse. Responding students are grouped with the "other" nonrespondents for the first nonresponse adjustment that adjusts for refusals.

[3] IEP = Individualized Education Program.

[4] LEP = limited English proficient.

[5] CHAID = chi-squared automatic interaction detection.

[6] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

Table 18. Average weight adjustment factors used to adjust cross-sectional weights for other nonresponse, by selected characteristics: 2004

Model predictor variables[1]	Number of responding students	Weighted response rate	Average weight adjustment factor
Total	14,884	94.83	1.06
School sector			
Public	11,604	94.63	1.07
Catholic	1,899	98.69	1.02
Other private	1,381	95.38	1.06
School urbanicity			
Urban	5,020	93.12	1.08
Suburban	7,140	95.42	1.06
Rural	2,724	95.98	1.05
10th-grade enrollment			
0–99	2,922	95.77	1.06
100–249	3,847	96.45	1.04
250–499	4,760	95.01	1.07
≥ 500	3,355	93.00	1.09
Type of grades within school			
K–12, PreK–10th, 1st–12th, PreK/1st–9th/12th and PreK–12 schools	995	96.05	1.06
Middle grades but no elementary	1,570	95.29	1.05
Only high school	12,319	94.72	1.07
Number of grades within the school			
4	11,330	94.72	1.07
> or < 4	3,554	95.28	1.06
Number of days in school year			
Less than 180 days	3,897	95.24	1.05
180 days	8,228	94.74	1.07
More than 180 days	2,759	94.58	1.07
Minutes per class period			
≤ 45	3,574	95.12	1.06
46–50	3,203	95.52	1.06
51–80	3,970	94.65	1.07
≥ 81	4,137	94.33	1.07

See notes at end of table.

Table 18. Average weight adjustment factors used to adjust cross-sectional weights for other nonresponse, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding students	Weighted response rate	Average weight adjustment factor
Class periods per day			
1–4	4,277	94.59	1.07
5–6	3,654	94.66	1.07
7	4,029	94.65	1.06
8–9	2,924	95.80	1.06
IEP[2] percentage			
≤ 5 percent	5,848	95.76	1.05
6–10 percent	3,811	94.64	1.07
11–15 percent	3,260	94.52	1.08
> 15 percent	1,965	94.12	1.09
LEP[3] percentage			
0 percent	6,501	96.08	1.05
1 percent	2,932	95.96	1.05
2–5 percent	2,476	93.57	1.08
≥ 6 percent	2,975	92.99	1.09
Free or reduced-price lunch			
0 percent	2,691	97.07	1.04
1–10 percent	3,372	96.46	1.05
11–30 percent	4,447	94.61	1.07
≥ 31 percent	4,374	93.27	1.09
Number of full-time teachers			
1–40	3,886	96.16	1.05
41–70	3,812	96.56	1.05
71–100	3,810	94.16	1.08
> 100	3,376	93.29	1.08
Number of part-time teachers			
0–1	4,273	93.69	1.07
2–3	4,287	95.35	1.06
4–6	3,608	95.22	1.06
≥ 7	2,716	95.54	1.06

See notes at end of table.

Table 18. Average weight adjustment factors used to adjust cross-sectional weights for other nonresponse, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding students	Weighted response rate	Average weight adjustment factor
Full-time teachers certified			
0–90 percent	3,846	94.32	1.06
91–99 percent	2,606	93.92	1.08
100 percent	8,432	95.26	1.06
School coeducational status			
Coeducational school	14,100	94.74	1.07
All-female school	362	98.80	1.01
All-male school	422	99.16	1.01
Total enrollment			
0–600 students	3,546	96.14	1.05
601–1,200 students	4,490	96.13	1.05
1,201–1,800 students	3,371	94.14	1.07
> 1,800 students	3,477	93.44	1.09
Census region			
Northeast	2,751	95.33	1.06
Midwest	3,723	95.03	1.06
South	5,375	94.62	1.06
West	3,035	94.56	1.08
All other races 10th-grade enrollment			
≤ 80 percent	7,349	93.41	1.08
> 80 percent	7,535	96.36	1.05
Asian 10th-grade enrollment			
≤ 2 percent	5,747	94.48	1.06
> 2 percent	9,137	95.05	1.06
Black or African American 10th-grade enrollment			
≤ 4 percent	5,100	96.09	1.05
> 4 percent	9,784	94.18	1.07
Hispanic or Latino 10th-grade enrollment			
≤ 3 percent	5,773	96.01	1.05
> 3 percent	9,111	94.13	1.07

See notes at end of table.

Table 18. Average weight adjustment factors used to adjust cross-sectional weights for other nonresponse, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding students	Weighted response rate	Average weight adjustment factor
CHAID[4] segments			
CHAID segment 1 = ≤ 80 percent Other 10th-grade enrollment; race = American Indian or Alaska Native, Hispanic, race specified, or White; in school, in grade	3,193	97.58	1.05
CHAID segment 2 = ≤ 80 percent Other 10th-grade enrollment; race = American Indian or Alaska Native, Hispanic, race specified, or White; in school, out of grade	512	91.90	1.13
CHAID segment 3 = ≤ 80 percent Other 10th-grade enrollment; race = American Indian or Alaska Native, Hispanic, race specified, or White; out of school	158	80.14	1.23
CHAID segment 4 = ≤ 80 percent Other 10th-grade enrollment; race = Asian, Black or African American, Hispanic, no race specified, Multiracial, or Native Hawaiian/Pacific Islander; in school, in grade	2,550	94.74	1.06
CHAID segment 5 = ≤ 80 percent Other 10th-grade enrollment; race = Asian, Black or African American, Hispanic, no race specified, Multiracial, or Native Hawaiian/Pacific Islander; in school, out of grade	641	85.99	1.17
CHAID segment 7 = > 80 percent Other 10th-grade enrollment; in school, in grade; ≤ 2 percent Asian 10th-grade enrollment	2,803	96.99	1.04
CHAID segment 10 = > 80 percent Other 10th-grade enrollment; in school, out of grade; 5 or more class periods per day	389	94.08	1.08
CHAID segment 11 = > 80 percent Other 10th-grade enrollment; out of school; 0 percent LEP students	135	78.16	1.29
CHAID segment 12 = > 80 percent Other 10th-grade enrollment; out of school; 1 percent LEP students	60	93.14	1.08
Sex			
Male	7,432	94.76	1.07
Female	7,452	94.91	1.06
Race/ethnicity[5]			
All other races	9,196	96.28	1.05
Asian	1,658	94.51	1.07
Black or African American	2,182	92.39	1.09
Hispanic or Latino	1,848	90.92	1.10
Freshened status			
Freshened	171	90.15	1.13

See notes at end of table.

Table 18. Average weight adjustment factors used to adjust cross-sectional weights for other nonresponse, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding students	Weighted response rate	Average weight adjustment factor
Enrollment status			
In school, in grade (in grade 12)	12,476	97.02	1.04
In school, out of grade (in grade 10 or 11, ungraded, or graduated early)	1,697	89.14	1.14
Out of school (dropout or homeschooled)	711	79.91	1.25
School sector and race/ethnicity			
Public schools, All other races	6,598	96.03	1.06
Public schools, Asian	1,510	94.43	1.07
Public schools, Black or African American	1,924	92.30	1.09
Public schools, Hispanic or Latino	1,572	91.12	1.10
Catholic schools, All other races	1,448	99.05	1.01
Catholic schools, Asian	73	96.00	1.04
Catholic schools, Black or African American	171	97.66	1.03
Catholic schools, Hispanic or Latino	207	97.07	1.03
Other private school, All other races	1,150	98.08	1.04
Other private schools, Asian	75	94.99	1.07
Other private schools, Black or African American	87	92.20	1.12
Other private schools, Hispanic or Latino	69	77.53	1.31

[1] Model predictor variables had a value of 0 or 1. Some of the listed model predictor variables were not actually in the model because they served as reference groups. For each group of variables, one of the categories (predictor variable) was used as a reference group.
[2] IEP = Individualized Education Program.
[3] LEP = limited English proficient.
[4] CHAID = chi-squared automatic interaction detection.
[5] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

The freshened students were not included with the base-year sample students in the poststratification because, as in the base year, there are no reliable external counts of 12th-graders to use for control totals. Table 19 presents the poststratification control totals and the average weight adjustment factors for base-year students needed to achieve these totals: 2.00 percent unweighted and 6.00 percent weighted of the students were identified as having extreme weights. The base-year student poststratification met the following constraints:

- minimum: 0.07
- median: 1.01
- maximum: 1.04

Table 19. Average weight adjustment factors for poststratifying cross-sectional weights to control totals, by selected characteristics: 2004

Model variable[1]	Control total[2]	Average weight adjustment factor
Total	3,474,053	1.00
Census region		
Northeast	641,468	1.00
Midwest	841,308	1.00
South	1,193,807	1.00
West	797,471	1.00
School sector		
Public	3,210,979	1.00
Catholic	146,214	1.00
Other private	116,860	1.01
Sex		
Male	1,760,242	1.01
Female	1,713,810	1.00
Race/ethnicity[3]		
All other races	2,311,679	1.00
Asian	134,793	1.00
Black or African American	557,835	1.00
Hispanic or Latino	469,746	1.00

[1] Model variables had a value of 0 or 1.
[2] The control totals were the base-year expanded weight sums (i.e., 10th-graders in spring 2002); 12th-grade freshened students were not included in the poststratification.
[3] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

The final student weight for freshened student i is the product of the first follow-up design weight, the school nonresponse to freshening factor, and the nonresponse adjustment factors, such that

$$F1EXPWT_i = F1DWT_i * WTADJ1_i * WTADJ2_i * WTADJ3_i.$$

Table 20 shows the statistical properties of F1EXPWT.

3.4.4.3 F1QWT

For sample students who fully or partially completed the first follow-up questionnaire, F1QWT = F1EXPWT. F1QWT is equal to F1EXPWT for sample students who fully or partially completed the questionnaire because such students are a subset of the expanded sample that includes students who fully or partially completed the questionnaire and students incapable of completing the questionnaire. Table 20 also shows the statistical properties of F1QWT.

Table 20. Statistical properties of cross-sectional weights: 2004

Weight	F1QWT	F1EXPWT
Mean	232.29	232.36
Variance	26,283.59	26,249.80
Standard deviation	162.12	162.02
Coefficient of variation (x 100)	69.79	69.73
Minimum	1.77	1.77
Maximum	1,427.47	1,427.47
Skewness	1.21	1.21
Kurtosis	2.41	2.41
Sum	3,481,853.86	3,506,024.17
Number of cases	14,989	15,089

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002” and “First Follow-up, 2004.”

3.4.4.4 F1XPNLWT

The panel weight was computed for the expanded sample students who have base-year and first follow-up data. Such students include questionnaire-capable students who completed full or partial questionnaires in both the base year and first follow-up, questionnaire-capable students who completed full or partial questionnaires in the first follow-up and had base-year data imputed if not on the NPS (see section 3.6), and students who were questionnaire incapable in the base year and/or the first follow-up. The same procedures were used that were used in developing the first follow-up weight for base-year sample students. That is, GEM was used to perform nonresponse adjustment, extreme value adjustment, and poststratification. The same variables were input for GEM as for F1QWT, and the control totals from the base year for poststratification were the same as for F1QWT.

Table 21 presents the final predictor variables used in the first-stage student nonresponse adjustment model and the average weight adjustment factors resulting from these variables: 3.66 percent unweighted and 14.20 percent weighted of the students were identified as having extreme weights. The first stage of nonresponse adjustment factors met the following constraints:

- minimum: 0.10
- median: 1.08
- maximum: 2.12

Table 22 presents the final predictor variables used in the second-stage student nonresponse adjustment model and the average weight adjustment factors resulting from these variables: 2.99 percent unweighted and 8.54 percent weighted of the students were identified as having extreme weights. The second stage of nonresponse adjustment factors met the following constraints:

- minimum: 0.09
- median: 1.05
- maximum: 1.94

Table 21. Average weight adjustment factors used to adjust panel weights for refusal, by selected characteristics: 2004

Model predictor variables[1]	Number of responding sample members and "other" nonrespondents[2]	Weighted response rate	Average weight adjustment factor
Total	15,422	94.02	1.11
School sector			
Public	12,103	94.10	1.10
Catholic	1,928	93.67	1.07
Other private	1,391	92.21	1.20
School urbanicity			
Urban	5,246	93.94	1.13
Suburban	7,366	93.48	1.10
Rural	2,810	95.49	1.09
10th-grade enrollment			
0–99	2,999	96.19	1.11
100–249	3,944	95.09	1.08
250–499	4,933	93.28	1.12
≥ 500	3,546	93.22	1.12
Type of grades within school			
K–12, PreK–10th, 1st–12th, PreK/1st–9th/12th and PreK–12 schools	1,006	95.84	1.21
Middle grades but no elementary	1,621	94.58	1.08
Only high school	12,795	93.87	1.10
Number of grades within the school			
4	11,769	94.06	1.10
> or < 4	3,653	93.85	1.13
Number of days in school year			
Less than 180 days	4,010	94.53	1.10
180 days	8,539	94.19	1.11
More than 180 days	2,873	92.84	1.12

See notes at end of table.

Table 21. Average weight adjustment factors used to adjust panel weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding sample members and "other" nonrespondents[2]	Weighted response rate	Average weight adjustment factor
Minutes per class period			
≤ 45	3,696	93.07	1.11
46–50	3,303	93.82	1.11
51–80	4,118	93.84	1.12
≥ 81	4,305	94.93	1.09
Class periods per day			
1–4	4,444	95.05	1.09
5–6	3,804	93.19	1.12
7	4,163	93.63	1.11
8–9	3,011	94.03	1.11
IEP[3] percentage			
≤ 5 percent	5,995	93.53	1.11
6–10 percent	3,968	93.84	1.09
11–15 percent	3,398	94.64	1.10
> 15 percent	2,061	94.18	1.13
LEP[4] percentage			
0 percent	6,674	94.52	1.10
1 percent	3,017	93.30	1.11
2–5 percent	2,601	93.48	1.11
≥ 6 percent	3,130	94.42	1.13
Free or reduced-price lunch			
0 percent	2,729	91.90	1.12
1–10 percent	3,458	91.89	1.12
11–30 percent	4,623	94.88	1.11
≥ 31 percent	4,612	95.30	1.09
Number of full-time teachers			
1–40	4,004	95.62	1.09
41–70	3,902	94.45	1.09
71–100	3,981	93.62	1.13
> 100	3,535	93.09	1.12

See notes at end of table.

Table 21. Average weight adjustment factors used to adjust panel weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding sample members and "other" nonrespondents[2]	Weighted response rate	Average weight adjustment factor
Number of part-time teachers			
0–1	4,470	94.58	1.10
2–3	4,414	94.50	1.11
4–6	3,728	93.25	1.12
≥ 7	2,810	93.26	1.11
Full-time teachers certified			
0–90 percent	3,964	95.68	1.11
91–99 percent	2,721	93.20	1.11
100 percent	8,737	93.86	1.11
School coeducational status			
Coeducational school	14,636	94.04	1.11
All-female school	365	91.02	1.09
All-male school	421	94.23	1.06
Total enrollment			
0–600 students	3,637	96.23	1.09
601–1,200 students	4,614	93.68	1.11
1,201–1,800 students	3,508	93.31	1.10
> 1,800 students	3,663	93.65	1.13
Census region			
Northeast	2,841	92.88	1.12
Midwest	3,877	94.41	1.09
South	5,558	94.84	1.09
West	3,146	93.29	1.15
All other races 10th-grade enrollment			
≤ 80 percent	7,708	94.55	1.11
> 80 percent	7,714	93.46	1.11
Asian 10th-grade enrollment			
≤ 2 percent	5,962	94.46	1.09
> 2 percent	9,460	93.74	1.12

See notes at end of table.

Table 21. Average weight adjustment factors used to adjust panel weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding sample members and “other” nonrespondents[2]	Weighted response rate	Average weight adjustment factor
Black or African American 10th-grade enrollment			
≤ 4 percent	5,219	93.66	1.11
> 4 percent	10,203	94.20	1.11
Hispanic or Latino 10th-grade enrollment			
≤ 3 percent	5,933	93.18	1.10
> 3 percent	9,489	94.53	1.11
CHAID[5] segments			
CHAID segment 1 = 0–10 percent free or reduced-price lunch; 0–99 sophomores; 1–40 full-time teachers	1,306	93.99	1.11
CHAID segment 2 = 0–10 percent free or reduced-price lunch; 0–99 sophomores; > 40 full-time teachers	395	87.38	1.15
CHAID segment 3 = 0–10 percent free or reduced-price lunch; 100–249 sophomores; 4 grade levels within the school	1,416	95.02	1.08
CHAID segment 4 = 0–10 percent free or reduced-price lunch; 100–249 sophomores; > or < 4 grade levels within the school	451	91.25	1.16
CHAID segment 5 = 0–10 percent free or reduced-price lunch; > 249 sophomores; ≤ 10 percent IEP	1,654	89.94	1.13
CHAID segment 6 = 0–10 percent free or reduced-price lunch; > 249 sophomores; 11–15 percent IEP	712	93.90	1.11
CHAID segment 7 = 0–10 percent free or reduced-price lunch; > 249 sophomores; > 15 percent IEP	253	87.93	1.21
CHAID segment 8 = > 10 percent free or reduced-price lunch; in school, in grade (in grade 12); 0–99 sophomores	1,045	98.74	1.07
CHAID segment 9 = > 10 percent free or reduced-price lunch; in school, in grade (in grade 12); 100–249 sophomores	1,724	97.37	1.05
CHAID segment 10 = > 10 percent free or reduced-price lunch; in school, in grade (in grade 12); 250–499 sophomores	2,499	95.75	1.10
CHAID segment 11 = > 10 percent free or reduced-price lunch; in school, in grade (in grade 12); ≥ 500 sophomores	1,910	94.48	1.11
CHAID segment 12 = > 10 percent free or reduced-price lunch; in school, out of grade (in grade 10 or 11, ungraded, or graduated early); total enrollment 0–600 students	197	98.55	1.15
CHAID segment 13 = > 10 percent free or reduced-price lunch; in school, out of grade (in grade 10 or 11, ungraded, or graduated early); total enrollment 601–1,800 students	645	88.90	1.16
CHAID segment 14 = > 10 percent free or reduced-price lunch; in school, out of grade (in grade 10 or 11, ungraded, or graduated early); total enrollment > 1,800 students	526	95.61	1.13

See notes at end of table.

Table 21. Average weight adjustment factors used to adjust panel weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding sample members and “other” nonrespondents[2]	Weighted response rate	Average weight adjustment factor
CHAID segments—Continued			
CHAID segment 15 = > 10 percent free or reduced-price lunch; out of school (dropout or homeschooled); race = Asian, White, or Other	325	85.08	1.21
CHAID segment 16 = > 10 percent free or reduced-price lunch; out of school (dropout or homeschooled); race = Black, Hispanic, Indian, or Pacific Islander	364	94.55	1.10
Sex			
Male	7,703	94.00	1.11
Female	7,719	94.03	1.10
Race/ethnicity[6]			
All other races	9,436	93.47	1.13
Asian	1,704	94.69	1.10
Black or African American	2,329	95.01	1.08
Hispanic or Latino	1,953	95.36	1.06
Enrollment status			
In school, in grade (in grade 12)	12,659	94.71	1.10
In school, out of grade (in grade 10 or 11, ungraded, or graduated early)	1,892	92.49	1.15
Out of school (dropout or homeschooled)	871	89.37	1.17
School sector and race/ethnicity			
Public schools, All other races	6,817	93.56	1.12
Public schools, Asian	1,556	94.53	1.10
Public schools, Black or African American	2,062	95.09	1.07
Public schools, Hispanic or Latino	1,668	95.35	1.07
Catholic schools, All other races	1,464	93.71	1.07
Catholic schools, Asian	76	98.10	1.02
Catholic schools, Black or African American	175	91.67	1.09
Catholic schools, Hispanic or Latino	213	93.19	1.02
Other private school, All other races	1,155	91.15	1.21

See notes at end of table.

Table 21. Average weight adjustment factors used to adjust panel weights for refusal, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding sample members and "other" nonrespondents[2]	Weighted response rate	Average weight adjustment factor
School sector and race/ethnicity—Continued			
Other private schools, Asian	72	95.52	1.04
Other private schools, Black or African American	92	93.47	1.28
Other private schools, Hispanic or Latino	72	98.35	1.00

[1] Model predictor variables had a value of 0 or 1. Some of the listed model predictor variables were not actually in the model because they served as reference groups. For each group of variables, one of the categories (predictor variable) was used as a reference group.

[2] "Other" nonresponding students are students who were nonrespondents but did not explicitly refuse. Responding students are grouped with the "other" nonrespondents for the first nonresponse adjustment that adjusts for refusals.

[3] IEP = Individualized Education Program.

[4] LEP = limited English proficient.

[5] CHAID = chi-squared automatic interaction detection.

[6] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

Table 22. Average weight adjustment factors used to adjust panel weights for other nonresponse, by selected characteristics: 2004

Model predictor variables[1]	Number of responding sample members	Weighted response rate	Average weight adjustment factor
Total	14,713	94.53	1.06
School sector			
Public	11,460	94.25	1.07
Catholic	1,898	98.63	1.02
Other private	1,355	96.81	1.06
School urbanicity			
Urban	4,950	92.60	1.08
Suburban	7,063	95.15	1.06
Rural	2,700	95.89	1.05
10th-grade enrollment			
0–99	2,888	95.69	1.06
100–249	3,823	96.27	1.04
250–499	4,704	94.64	1.07
≥ 500	3,298	92.61	1.09
Type of grades within school			
K–12, PreK–10th, 1st–12th, PreK/1st–9th/12th and PreK–12 schools	980	96.74	1.06
Middle grades but no elementary	1,555	95.23	1.05
Only high school	12,178	94.34	1.07
Number of grades within the school			
4	11,206	94.42	1.06
> or < 4	3,507	94.92	1.06
Number of days in school year			
Less than 180 days	3,856	95.13	1.05
180 days	8,135	94.41	1.07
More than 180 days	2,722	94.11	1.07
Minutes per class period			
≤ 45	3,540	94.21	1.06
46–50	3,166	95.44	1.05
51–80	3,925	94.43	1.07
≥ 81	4,082	94.16	1.07

See notes at end of table.

Table 22. Average weight adjustment factors used to adjust panel weights for other nonresponse, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding sample members	Weighted response rate	Average weight adjustment factor
Class periods per day			
1–4	4,219	94.35	1.07
5–6	3,612	94.14	1.07
7	3,984	94.80	1.06
8–9	2,898	95.06	1.06
IEP[2] percentage			
≤ 5 percent	5,801	95.54	1.05
6–10 percent	3,760	94.39	1.07
11–15 percent	3,213	94.16	1.07
> 15 percent	1,939	93.64	1.09
LEP[3] percentage			
0 percent	6,457	95.74	1.05
1 percent	2,897	95.65	1.05
2–5 percent	2,447	93.09	1.08
≥ 6 percent	2,912	92.87	1.09
Free or reduced-price lunch			
0 percent	2,667	96.81	1.04
1–10 percent	3,347	96.11	1.05
11–30 percent	4,386	94.40	1.07
≥ 31 percent	4,313	92.79	1.09
Number of full-time teachers			
1–40	3,857	95.68	1.05
41–70	3,776	96.12	1.05
71–100	3,759	93.80	1.08
> 100	3,321	93.29	1.08
Number of part-time teachers			
0–1	4,205	93.17	1.07
2–3	4,241	95.58	1.06
4–6	3,569	94.63	1.06
≥ 7	2,698	95.03	1.06

See notes at end of table.

Table 22. Average weight adjustment factors used to adjust panel weights for other nonresponse, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding sample members	Weighted response rate	Average weight adjustment factor
Full-time teachers certified			
0–90 percent	3,797	93.90	1.06
91–99 percent	2,577	93.63	1.07
100 percent	8,339	94.97	1.06
School coeducational status			
Coeducational school	13,937	94.43	1.07
All-female school	361	98.76	1.01
All-male school	415	99.15	1.01
Total enrollment			
0–600 students	3,511	96.02	1.05
601–1,200 students	4,453	95.78	1.05
1,201–1,800 students	3,321	93.95	1.07
> 1,800 students	3,428	92.99	1.09
Census region			
Northeast	2,715	94.53	1.06
Midwest	3,699	94.71	1.06
South	5,311	94.56	1.06
West	2,988	94.27	1.08
All other races 10th-grade enrollment			
≤ 80 percent	7,245	92.99	1.08
> 80 percent	7,468	96.14	1.05
Asian 10th-grade enrollment			
≤ 2 percent	5,684	94.04	1.06
> 2 percent	9,029	94.83	1.06
Black or African American 10th-grade enrollment			
≤ 4 percent	5,043	95.75	1.05
> 4 percent	9,670	93.88	1.07
Hispanic or Latino 10th-grade enrollment			
≤ 3 percent	5,716	95.86	1.05
> 3 percent	8,997	93.71	1.07

See notes at end of table.

Table 22. Average weight adjustment factors used to adjust panel weights for other nonresponse, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding sample members	Weighted response rate	Average weight adjustment factor
CHAID[4] segments			
CHAID segment 1 = ≤ 80 percent Other 10th-grade enrollment; out of school (dropout or homeschooled)	453	79.85	1.25
CHAID segment 2 = ≤ 80 percent Other 10th-grade enrollment; in school, in grade (in grade 12); 0–499 sophomores	3,751	97.30	1.04
CHAID segment 3 = ≤ 80 percent Other 10th-grade enrollment; in school, in grade (in grade 12); ≥ 500 sophomores	1,888	94.13	1.08
CHAID segment 4 = ≤ 80 percent Other 10th-grade enrollment; in school, out of grade (in grade 10 or 11, ungraded, or graduated early); region = Northeast, Midwest, or South	884	85.79	1.17
CHAID segment 5 = ≤ 80 percent Other 10th-grade enrollment; in school, out of grade (in grade 10 or 11, ungraded, or graduated early); region = West	269	93.18	1.11
CHAID segment 6 = > 80 percent Other 10th-grade enrollment; in school, in grade (in grade 12); ≤ 2 percent Asian 10th-grade enrollment	2,773	96.92	1.04
CHAID segment 7 = > 80 percent Other 10th-grade enrollment; in school, in grade (in grade 12); > 2 percent Asian 10th-grade enrollment	3,893	98.31	1.03
CHAID segment 8 = > 80 percent Other 10th-grade enrollment; in school, out of grade (in grade 10 or 11, ungraded, or graduated early); ≤ 80 minutes per class period	397	93.12	1.08
CHAID segment 9 = > 80 percent Other 10th-grade enrollment; in school, out of grade (in grade 10 or 11, ungraded, or graduated early); ≥ 81 minutes per class period	147	84.31	1.19
CHAID segment 10 = > 80 percent Other 10th-grade enrollment; out of school (dropout or homeschooled); 1–70 full-time teachers	168	84.85	1.18
CHAID segment 11 = > 80 percent Other 10th-grade enrollment; out of school (dropout or homeschooled); > 71 full-time teachers	90	74.14	1.34
Sex			
Male	7,335	94.36	1.07
Female	7,378	94.69	1.06
Race/ethnicity[5]			
All other races	9,120	95.87	1.05
Asian	1,619	94.19	1.07
Black or African American	2,169	91.78	1.09
Hispanic or Latino	1,805	91.15	1.10

See notes at end of table.

Table 22. Average weight adjustment factors used to adjust panel weights for other nonresponse, by selected characteristics: 2004—Continued

Model predictor variables[1]	Number of responding sample members	Weighted response rate	Average weight adjustment factor
Enrollment status			
In school, in grade (in grade 12)	12,305	96.92	1.04
In school, out of grade (in grade 10 or 11, ungraded, or graduated early)	1,697	88.46	1.14
Out of school (dropout or homeschooled)	711	79.97	1.25
School sector and race/ethnicity			
Public schools, All other races	6,538	95.60	1.06
Public schools, Asian	1,478	94.14	1.07
Public schools, Black or African American	1,913	91.69	1.09
Public schools, Hispanic or Latino	1,531	91.01	1.09
Catholic schools, All other races	1,448	98.95	1.01
Catholic schools, Asian	72	96.10	1.04
Catholic schools, Black or African American	171	97.64	1.03
Catholic schools, Hispanic or Latino	207	97.12	1.03
Other private school, All other races	1,134	97.80	1.03
Other private schools, Asian	69	93.82	1.07
Other private schools, Black or African American	85	91.20	1.12
Other private schools, Hispanic or Latino	67	87.84	1.35

[1] Model predictor variables had a value of 0 or 1. Some of the listed model predictor variables were not actually in the model because they served as reference groups. For each group of variables, one of the categories (predictor variable) was used as a reference group.
[2] IEP = Individualized Education Program.
[3] LEP = limited English proficient.
[4] CHAID = chi-squared automatic interaction detection.
[5] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

Table 23 presents the poststratification control totals and the average weight adjustment factors needed to achieve these totals: 1.85 percent unweighted and 5.50 percent weighted of the students were identified as having extreme weights. The poststratification met the following constraints:

- minimum: 0.07
- median: 1.01
- maximum: 1.04

Table 23. Average weight adjustment factors for poststratifying panel weights to control totals, by selected characteristics: 2004

Model variable[1]	Control total[2]	Average weight adjustment factor
Total	3,474,053	1.00
Census region		
Northeast	641,468	1.00
Midwest	841,308	1.00
South	1,193,807	1.00
West	797,471	1.00
School sector		
Public	3,210,979	1.00
Catholic	146,214	1.00
Other private	116,860	1.01
Sex		
Male	1,760,242	1.01
Female	1,713,810	1.00
Race/ethnicity[3]		
All other races	2,311,679	1.00
Asian	134,793	1.00
Black or African American	557,835	1.00
Hispanic or Latino	469,746	1.00

[1] Model variables had a value of 0 or 1.
[2] The control totals were the base-year expanded weight sums (i.e., 10th-graders in spring 2002); 12th-grade freshened students were not included in the poststratification.
[3] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

Table 24 shows the statistical properties of F1XPNLWT.

3.4.4.5 F1PNLWT

For questionnaire-capable students who have base-year and first follow-up data, F1PNLWT = F1XPNLWT. F1QWT is equal to F1EXPWT for questionnaire-capable students who have base-year and first follow-up data because such students are a subset of the expanded sample that includes questionnaire-capable and questionnaire-incapable students. Table 24 also shows the statistical properties of F1PNLWT.

Table 24. Statistical properties of panel weights: 2004

Weight	F1PNLWT	F1XPNLWT
Mean	231.31	231.20
Variance	25,985.12	25,883.66
Standard deviation	161.20	160.88
Coefficient of variation (x 100)	69.69	69.59
Minimum	1.75	1.75
Maximum	1,445.49	1,445.49
Skewness	1.21	1.21
Kurtosis	2.48	2.49
Sum	3,403,321.11	3,441,475.79
Number of cases	14,713	14,885

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

3.4.4.6 Quality Control

Quality control was emphasized on all activities, including weighting. Because of the central importance of the analysis weights to population estimation, a senior statistician thoroughly checked each set of weights. The most fundamental type of check was the verification of totals that are algebraically equivalent (e.g., marginal totals of the weights of eligible students prior to nonresponse adjustment and of respondents after nonresponse adjustment). In addition, various analytic properties of the initial weights, the weight adjustment factors, and the final weights were examined, both overall and within sampling strata, including

- distribution of the weights;
- ratio of the maximum weight divided by the minimum weight; and
- unequal weighting design effect, or variance inflation effect ($1 + CV^2$).

Additionally, two-dimensional tables before and after weight adjustments were reviewed to ensure that the weight distribution was not distorted.

3.5 Standard Errors and Design Effects

3.5.1 Standard Errors

For probability-based sample surveys, most estimates are nonlinear statistics. For example, a mean or proportion, which is expressed as $\Sigma wy/\Sigma w$,[25] 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. One common procedure for estimating variances of survey statistics is the Taylor series linearization procedure. This 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 presented the mathematical formulation of this procedure (Woodruff 1971).

[25] w is the estimated population, and y is a 0/1 variable indicating whether a certain characteristic is present for the sample member.

The variance estimation must also take into account stratification and clustering. There are other variance estimation procedures, such as jackknife and balanced repeated replication (BRR). However, Taylor series estimation was used for the base year and is sufficient again for the first follow-up. Therefore, replicate weights were not produced. However, ELS:2002/04 will be available at a later date as a Data Analysis System (DAS). For the DAS, BRR replicate weights will be used.

Variance estimation procedures assumed a with-replacement design at the first stage of sampling. Because school sampling rates were moderately low, this assumption yields estimates that are only slightly biased in the positive direction. For stratified multistage surveys and a with-replacement sample design, the Taylor series procedure requires the specification of analysis strata and analysis primary sampling units (PSUs). In the base year, 361 analysis strata were formed from the sampling strata used in the first stage of sampling, and the analysis PSUs were the individual schools. Given that the school sample was selected using probability with minimum replacement (pmr), for variance estimation in the base year, variance estimation strata were formed consisting of two PSUs per stratum (Chromy 1981). However, when there was an odd number of schools in a sampling stratum, one of the analysis strata formed had three PSUs. The same analysis strata and PSUs as in the base year were used in the first follow-up. Each PSU still has at least two responding students. Students from new schools created by school splits (see section 3.3) are in the same strata and PSUs as they were for the base-year school. Also, freshened students are in the same strata and PSUs as the base-year students to whom they are linked.

As described in section 3.2, the ELS:2002 base-year sampling design was a stratified two-stage design. A stratified sample of schools was selected with probabilities proportional to a composite measure of size at the first stage, and a stratified systematic sample of students was selected from sample schools at the second stage. At the first stage, the school sampling rates varied considerably by school sampling strata. At the second stage, Asian and Hispanic students were sampled at higher rates than other students. Because of this complex sampling design, statistical analyses should be conducted using software that properly accounts for the complex survey design.

Many commonly used statistical computing packages assume that the data were obtained from a simple random sample; that is, they assume that the observations are independent and identically distributed. When the data have been collected using a complex sampling design, the simple random sampling assumption usually leads to an underestimate of the sampling variance, which would lead to artificially small confidence intervals and liberal hypothesis test results (i.e., rejecting the null hypothesis when it is in fact true more often than indicated by the nominal Type I error level) (Carlson, Johnson, and Cohen 1993).

Statistical strategies that have been developed to address this issue include first-order Taylor series expansion of the variance equation, balanced repeated replication, and the jackknife approach (Wolter 1985). Special-purpose software packages that have been developed for analysis of complex sample survey data include SUDAAN, WesVar, and Stata. Evaluations of the relative performances of these packages are reported by Cohen (1997).

- SUDAAN is a commercial product developed by RTI; information regarding the features of this package and its lease terms is available from the website http://www.rti.org/sudaan.
- WesVar is a product of Westat, Inc.; information regarding the features of this package and its lease terms is available from the website http://www.westat.com/wesvar.
- Information regarding the features of Stata and its lease terms is available from the website http://www.stata.com.
- In addition to the variance estimation packages noted above, the American Institutes for Research (AIR) has developed the AM Statistical Software. AM software can be downloaded for free from the following website: http://am.air.org/.

Following is an example of generic SUDAAN code to produce estimates and standard errors using Taylor series. The symbols /* and */ in the code indicate the beginning and end of a comment. Note that the dataset must be sorted by analysis strata and analysis PSUs.

```
proc descript data=/* insert filename*/ design=wr;

nest analstr analpsu; /* these variables are the analysis strata and analysis PSUs,

respectively */

weight F1QWT;

var /*insert variables*/;

subpopn /* insert domain of interest if domain is a subset of students*/;

print nsum mean semean  / style=nchs;

run;
```

3.5.2 Design Effects

The impact of the departures of the ELS:2002 complex sample design from a simple random sample design on the precision of sample estimates can be measured by the design effect. The design effect is the ratio of the actual variance of the statistic to the variance that would have been obtained had the sample been a simple random sample. The design standard errors will be different from the standard errors that are based on the assumption that the data are from a simple random sample. The ELS:2002 sample departs from the assumption of simple random sampling in three major respects: student samples were stratified by student characteristics, students were selected with unequal probabilities of selection, and the sample of students was clustered by school. A simple random sample is, by contrast, unclustered and not stratified. Additionally, in a simple random sample, all members of the population have the same probability of selection. Generally, clustering and unequal probabilities of selection increase the variance of sample estimates relative to a simple random sample, and stratification decreases the variance of estimates.

Standard errors and design effects were computed for all respondents and separately for only dropouts. Due to the lack of perfect overlap between questions on the student and dropout questionnaires and because dropouts were not administered tests, it was necessary to select two sets of 30 items. One set represents questions asked of all respondents, and the other set represents questions asked of all dropouts.

Standard errors and design effects were computed for 30 means and proportions overall for all respondents and dropouts and for subgroups of all respondents. They were not computed for subgroups of dropouts due to small cell sizes. The subgroups are similar to those used in NELS:88 and the ELS:2002 base year:

- sex (male and female);
- race/ethnicity (American Indian or Alaska Native, Asian or Pacific Islander, Black or African American, Hispanic or Latino, More than one race, White and all other races);[26]
- school sector (public, Catholic, and other private);
- socioeconomic status (SES) (lowest quarter, middle two quarters, and highest quarter); and
- urbanicity (urban, suburban, and rural).

Tables 3.3.1–9 and 3.3.1–15 from the NELS:88 second follow-up data file user's manual (Ingels et al. 1994) were used to guide the items picked. For all respondents, it was often difficult to find an ELS:2002 item that matched exactly with the NELS:88 item. For dropouts, it was a little easier to find matching variables. The items chosen are a good representation of the different items on the ELS:2002 questionnaires. Therefore, these items should provide a range of data that give a reasonable average, as well as a reading on design effects for subgroups. However, because item matching with NELS:88 was difficult, the ELS:2002 design effects may not be comparable with the NELS:88 repeated design effects. Ideally, one would like to compare exact items between survey systems. Appendix K design effect tables from the ELS:2002 base-year data file user's manual (Ingels et al. 2004) were not used to guide the items picked. Design effects were not expected to change much from the base year to the first follow-up, and it is more important to compare design effects across cohorts (e.g., ELS:2002 versus NELS:88) than to compare design effects from the base year with those from the first follow-up.

The student variables used were the versions after imputation, and all variables used were after disclosure avoidance (see sections 3.6 and 3.7). Also, the public versions of the variables were used when the public version differed from the restricted version. For all respondents and for dropouts, the standard errors and design effects were calculated using both the cross-sectional weight (F1QWT) and the panel weight (F1PNLWT). When using the panel weight, only panel respondents were included. The difference between the cross-sectional and panel respondents is

[26] "White and all other races" is predominantly White, with a very small number of individuals from other race categories. All race categories exclude individuals of Hispanic or Latino origin.

that base-year expanded sample students who responded in the first follow-up and freshened respondents are cross-sectional respondents but are not panel respondents. Expanded sample students were excluded from the analyses.

Appendix I contains tables of design effects for all respondents and dropouts. Each table includes the survey item (or composite variable), variable name and value, percent estimate, design standard error, simple random sample standard error, sample size (N), design effect (DEFF), and square root of the design effect (DEFT). Tables 25 and 26 summarize the average DEFFs and DEFTs for the full sample and panel sample, respectively, for all respondents, dropouts, and each subgroup. The reader should note that the mean DEFTs reported in tables 25, 26, and 27 were not calculated directly from the mean DEFF but, rather, are based on the summary statistics from the tables in appendix I.

Table 25. Mean design effects (DEFFs) and root design effects (DEFTs) for the first follow-up full sample, by selected characteristics: 2004

Characteristic	Mean DEFF	Mean DEFT
All respondents	2.26	1.47
Dropouts	1.31	1.14
Male	1.90	1.37
Female	1.94	1.37
American Indian or Alaska Native	1.51	1.22
Asian or Pacific Islander	2.14	1.44
Black or African American	1.49	1.21
Hispanic or Latino	1.59	1.25
More than one race	1.71	1.30
White and all other races[1]	1.84	1.35
Public schools	1.97	1.37
Catholic schools	2.25	1.46
Other private schools	3.02	1.66
Low socioeconomic status (SES)	1.66	1.27
Middle SES	1.68	1.29
High SES	1.91	1.38
Urban	2.85	1.64
Suburban	2.08	1.41
Rural	1.71	1.29

[1] "White and all other races" is predominantly White, with a very small number of individuals from other race categories. All race categories exclude individuals of Hispanic or Latino origin.

NOTE: The mean DEFT was not calculated directly from the mean DEFF but, rather, is the average DEFT over selected items. See appendix I of this document for more information.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Table 26. Mean design effects (DEFFs) and root design effects (DEFTs) for the first follow-up panel sample, by selected characteristics: 2004

Characteristic	Mean DEFF	Mean DEFT
All respondents	2.23	1.46
Dropouts	1.31	1.14
Male	1.88	1.37
Female	1.93	1.37
American Indian or Alaska Native	1.50	1.21
Asian or Pacific Islander	2.17	1.44
Black or African American	1.49	1.22
Hispanic or Latino	1.60	1.25
More than one race	1.70	1.30
White and all other races[1]	1.83	1.35
Public schools	1.94	1.37
Catholic schools	2.25	1.46
Other private schools	3.00	1.65
Low socioeconomic status (SES)	1.64	1.26
Middle SES	1.67	1.29
High SES	1.92	1.38
Urban	2.80	1.63
Suburban	2.08	1.42
Rural	1.71	1.30

[1] "White and all other races" is predominantly White, with a very small number of individuals from other race categories. All race categories exclude individuals of Hispanic or Latino origin.

NOTE: The mean DEFT was not calculated directly from the mean DEFF but, rather, is the average DEFT over selected items. See appendix I of this document for more information.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Table 27 shows the design effects from the BY for subgroups. The first follow-up design effects are lower for all respondents and for most of the subgroups than the base year design effects. For the full sample, the design effect for males is the same as in the base year, the design effects for American Indian or Alaska Native and for multiracial respondents are greater than in the base year, and the design effects for the other 14 subgroups are less than in the base year. For the panel sample, the design effects for American Indian or Alaska Native and for multiracial respondents are greater than in the base year, and the design effects for the other 15 subgroups are less than in the base year.

Table 27. Mean design effects (DEFFs) and root design effects (DEFTs) for base-year student questionnaire data, by selected characteristics: 2002

Group	Mean DEFF	Mean DEFT
All students	2.35	1.50
Male	1.90	1.37
Female	2.01	1.40
American Indian or Alaska Native	1.42	1.18
Asian or Pacific Islander	2.27	1.49
Black or African American	1.67	1.28
Hispanic or Latino	1.82	1.32
More than one race	1.63	1.27
White and all other races[1]	2.03	1.41
Public schools	2.07	1.41
Catholic schools	2.43	1.51
Other private schools	3.53	1.78
Low socioeconomic status (SES)	1.70	1.29
Middle SES	1.73	1.31
High SES	1.99	1.39
Urban	2.88	1.64
Suburban	2.15	1.44
Rural	1.94	1.37

[1] "White and all other races" is predominantly White, with a very small number of individuals from other race categories. All race categories exclude individuals of Hispanic or Latino origin.

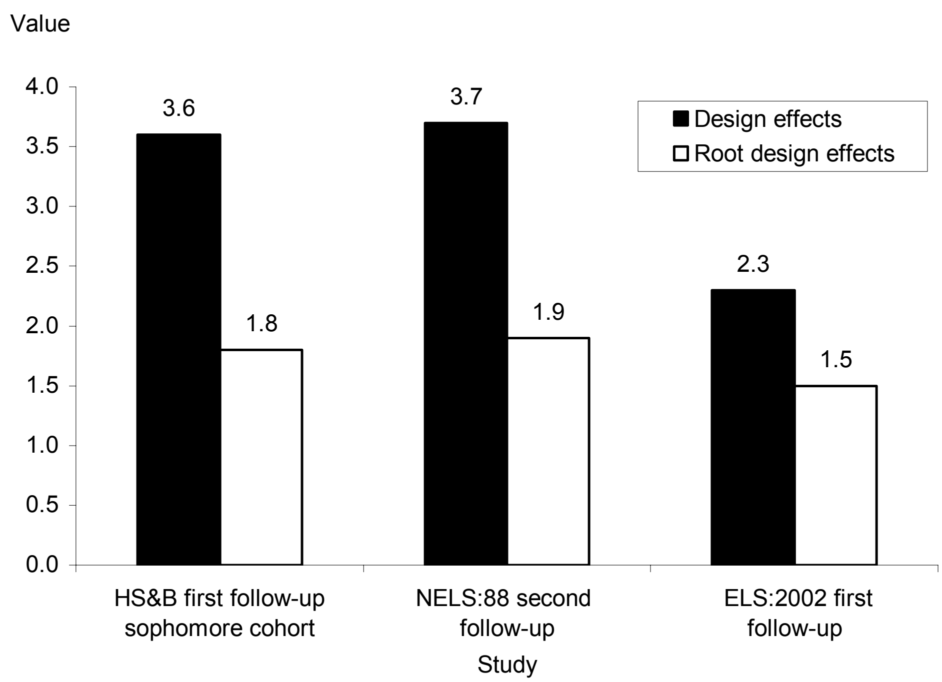
NOTE: The mean DEFT was not calculated directly from the mean DEFF but, rather, is the average DEFT over selected items. See appendix I of this document for more information.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

The smaller design effects in the first follow-up compared with those in the base year may be due to the general tendency in longitudinal studies for design effects to lessen over time, as dispersion reduces the original clustering. In the first follow-up, as some of the sample members left the base-year school, the clusters of students within schools dispersed to an extent. Social characteristics of the sample members potentially varied to a greater extent as the clusters dispersed. Also, the weight trimming was more aggressive in the first follow-up than in the base year (i.e., the weights were trimmed for a larger percentage of the sample members in the first follow-up than in the base year). As discussed in section 3.4, trimming weights reduces the variance, which, by definition, reduces the design effect. Additionally, the items used to compute the mean design effects were different in the first follow-up than in the base year, because the design effects were not expected to change much between the two rounds of the study. It is more important to compare design effects across cohorts, as described below, so the items were chosen to be as comparable to NELS:88 second follow-up items as possible.

The design effects indicate that the ELS:2002 first follow-up full sample was more efficient than the NELS:88 second follow-up full sample and the HS&B first follow-up sophomore cohort full sample. For means and proportions based on first follow-up questionnaire data for all respondents, the average design effect in ELS:2002 was 2.26; the comparable figures were 3.71 for the NELS:88 second follow-up and 3.59 for the HS&B sophomore cohort first follow-up. Figure 4 shows the mean design effects and root design effects for the HS&B first follow-up sophomore cohort, NELS:88 second follow-up, and ELS:2002 first follow-up. The difference in design effects is also apparent for some subgroup estimates. Ingels et al. (1994) present design effects for 16 subgroups defined similarly to those in table 25 above. For all 16 subgroups, the ELS:2002 design effects are smaller on average than those for the NELS:88 second follow-up.

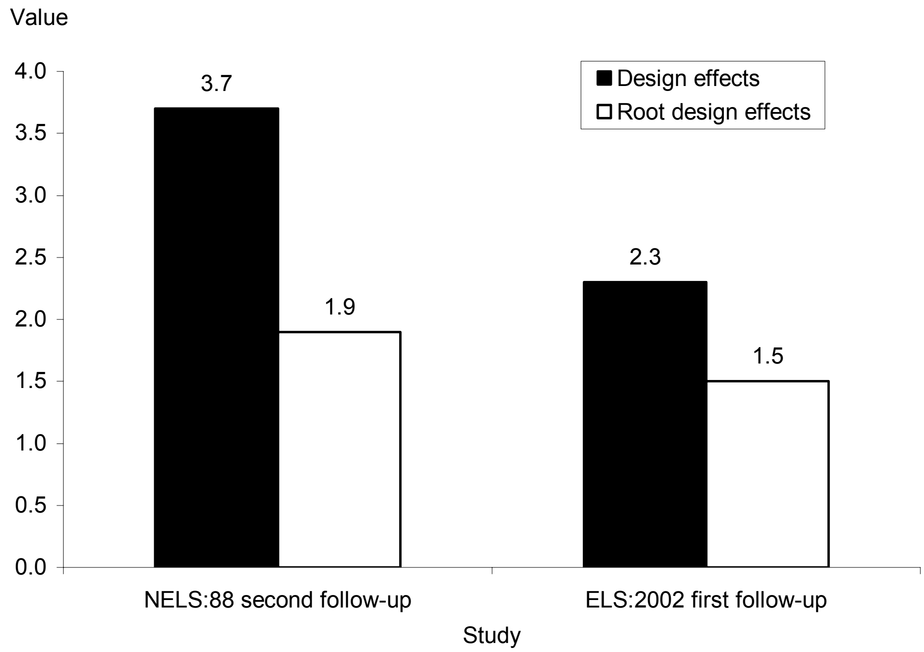
Figure 4. Full sample mean design effects and root design effects, by longitudinal study: Selected years, 1972–2004



SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond (HS&B), “First Follow-up, 1980”; National Education Longitudinal Study of 1988 (NELS:88), “Second Follow-up, 1992”; and Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

The design effects indicate that the ELS:2002 panel sample (sophomore cohort) was more efficient than the NELS:88 F1F2 panel sample (sophomore cohort). For means and proportions based on first follow-up questionnaire data for all respondents, the average design effect in ELS:2002 was 2.23; the comparable figure was 3.73 for the NELS:88 sophomore cohort. Figure 5 shows the mean design effects and root design effects for the NELS:88 second follow-up and the ELS:2002 first follow-up sophomore cohort. The difference in design effects is also apparent for some subgroup estimates. Ingels et al. (1994) present design effects for 16 subgroups defined similarly to those in table 26 above. For all 16 subgroups, the ELS:2002 design effects are smaller on average than those for the NELS:88 sophomore cohort.

Figure 5. Mean design effects and root design effects, by NELS:88 and ELS:2002 panel sample (sophomore cohort): Selected years, 1988–2004



SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88), "Second Follow-up, 1992"; and Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

The design effects indicate that the ELS:2002 full and panel samples were also more efficient than the NELS:88 sample for dropouts. For means and proportions based on first follow-up questionnaire data for dropouts, the average design effect in ELS:2002 was 1.31 for both the full and panel samples; the comparable figures were 2.9 and 2.8 for the NELS:88 second follow-up full and F1F2 panel samples, respectively.

The smaller design effects in ELS:2002 compared with those for NELS:88 and HS&B are probably due to subsampling. Nonrespondents were subsampled in the ELS:2002 first follow-up, but additional subsampling was done in the other studies. In NELS:88, no subsampling was done in the second follow-up, but several types of sample members, including nonrespondents, were subsampled. Additionally, disproportional strata representation was introduced by subsampling in the NELS:88 first follow-up. Dropouts were retained with certainty, whereas other students were subsampled at different rates. See Ingels et al. (1994) for more details. In HS&B, the sophomore cohort members who were no longer in the base-year school were subsampled. See Spencer et al. (1987) for more details. As mentioned above, the general tendency in longitudinal studies is for design effects to lessen over time, as dispersion reduces the original clustering. Subsampling increases design effects because it introduces additional variability into the weights with an attendant loss in sample efficiency.

The smaller design effects in ELS:2002 compared with those for the HS&B sophomore cohort also may reflect the somewhat smaller cluster size used in the later survey in the base year. Although the clusters were reduced somewhat in the first follow-up for both studies, a number of students remained in the base-year school. The HS&B base-year sample design called for 36 sophomores selected from each school. The ELS:2002 sample design called for about 26 sophomores selected from each school. Clustering tends to increase the variance of survey estimates because the observations within a cluster are similar and therefore add less information than independently selected observations. The impact of clustering depends mainly on two factors: the number of observations within each cluster and the degree of within-cluster homogeneity. When cluster sizes vary, the impact of clustering (DEFFc) can be estimated by

$$\text{DEFFc} = 1 + \left(\bar{b} - 1\right) \text{rho},$$

where $\bar{b}$ refers to the average cluster size (the average number of students selected from each school) and rho refers to the intraclass correlation coefficient, a measure of the degree of within-cluster homogeneity. If the value of rho (which varies from one variable to the next) averaged about 0.05 in both studies, then the reduced cluster size in ELS:2002 would almost exactly account for the reduction in the design effects relative to HS&B.

If one must perform a quick analysis of ELS:2002 data without using one of the software packages for analysis of complex survey data, the design effects tables in appendix I 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. One cannot be confident regarding the actual design-based standard error without performing the analysis using one of the software packages specifically designed for analysis of data from complex sample surveys.

Standard errors for a proportion can be estimated from the standard error computed using the formula for the standard error of a proportion based on a simple random sample and the appropriate DEFT:

$$\text{SE} = \text{DEFT} * (p(1\text{-}p)/n)^{1/2}.$$

Similarly, the standard error of a mean can be estimated from the weighted variance of the individual scores and the appropriate mean DEFT:

$$\text{SE} = \text{DEFT} * (\text{Var}/n)^{1/2}.$$

Tables 25, 26, and 27 make it clear that the DEFFs and DEFTs vary considerably by subgroup. It is therefore important to use the mean DEFT for the relevant subgroup in calculating approximate standard errors for subgroup statistics.

Standard error estimates may be needed for subgroups that are not shown in the appendix. One rule of thumb may be useful in such situations. The general rule states that design effects will generally be smaller for groups that are formed by subdividing the subgroups listed in the tables. (Smaller subgroups will be affected less by clustering than larger subgroups; in terms of the equation for DEFFc, $\bar{b}$ will be reduced.) Estimates for Hispanic males, for example, will generally have smaller design effects than the corresponding estimates for all Hispanics or all males. For this reason, it will usually be conservative to use the subgroup mean DEFT to approximate standard errors for estimates concerning a portion of the subgroup. This rule only applies when the variable used to subdivide a subgroup crosscuts schools. Sex is one such variable because most schools include students of both sexes. It will not reduce the average cluster size to form groups that are based on subsets of schools.

Standard errors may also be needed for other types of estimates than the simple means and proportions that are the basis for the results presented in the above tables. A second method can be used to estimate approximate standard errors for comparisons between subgroups. If the subgroups crosscut schools, then the design effect for the difference between the subgroup means will be somewhat smaller than the design effect for the individual means; consequently, the variance of the difference estimate will be less than the sum of the variances of the two subgroup means from which it is derived:

$$\mathrm{Var}(b\text{-}a) = \mathrm{Var}(b) + \mathrm{Var}(a)$$

where Var(b-a) refers to the variance of the estimated difference between the subgroup means, and Var(a) and Var(b) refer to the variances of the two subgroup means. This equation assumes that the covariance of the subgroup means is negligible. It follows from this equation that Var(a) + Var(b) can be used in place of Var(b-a) with conservative results.

A final principle is that more complex estimators show smaller design effects than simple estimators (Kish and Frankel 1974). Thus, correlation and regression coefficients tend to have smaller design effects than subgroup comparisons, and subgroup comparisons have smaller design effects than means. This principle implies that it will be conservative to use the DEFTs in the above tables in calculating approximate standard errors for complex statistics, such as multiple regression coefficients. The procedure for calculating such approximate standard errors is the same as with simpler estimates: first, a standard error is calculated using the formula for data from a simple random sample; then the standard error is multiplied by the appropriate DEFT.

One analytic strategy for accommodating complex survey designs is to use the mean design effect to adjust for the effective sample size resulting from the design. For example, one could create a weight that is the multiplicative inverse of the design effect and use that weight (in conjunction with sampling weights) to deflate the obtained sample size to take into account the inefficiencies due to a sample design that is a departure from a simple random sample. Using this procedure, statistics calculated by a statistical program such as SAS or SPSS will reflect the reduction in sample size in the calculation of standard errors and degrees of freedom. Such techniques capture the effect of the sample design on sample statistics only approximately. However, while not providing a full accounting of the sample design, this procedure provides some adjustment for the sample design and is probably better than conducting analysis that assumes the data were collected from a simple random sample. The analyst applying this correction procedure should carefully examine the statistical software being used and assess whether or not the program treats weights in such a way as to produce the effect described above.

3.6 Imputation

3.6.1 Imputation Variables

Eighteen key analysis variables were selected for imputation for the ELS:2002 first follow-up study. These variables included the same variables that were chosen for imputation in the base-year study and two new variables from the first follow-up study. Table 28 lists the selected variables. The two new variables selected for imputation include the spring 2004 student ability estimate for mathematics and the spring 2004 student enrollment status (e.g., in school in grade 12, in school in other grade or ungraded or early graduate, out of school because of dropout or homeschooled, or out of scope/ineligible). These variables were chosen because they are standard classification variables used in most data reporting.

Table 28. First follow-up imputation variables, by number and weighted proportion imputed: 2004

Variable	Number of cases imputed	Weighted percent imputed[1]
Student sex	1	0.01
Student race/ethnicity	6	0.04
Student language minority status	33	0.20
Student Hispanic subgroup[2]	14	0.09
Student Asian subgroup[2]	12	0.07
School program type	651	4.01
Student postsecondary educational expectations	91	0.56
Parental aspirations for student postsecondary achievement	687	4.23
Family composition	65	0.40
Mother’s educational attainment[3]	111	0.68
Mother’s occupation[3]	166	1.02
Father’s educational attainment[3]	183	1.13
Father’s occupation[3]	237	1.46
Family income (2001)[3]	868	5.34
Enrollment status (in school vs. out)	86	0.53
Spring 2004 student ability estimate (theta) for mathematics[4]	2,707	16.66
10th-grade student ability estimate (theta) for mathematics[4]	651	4.01
10th-grade student ability estimate (theta) for reading[4]	651	4.01

[1] The denominator used in calculating the weighted percent missing varies by variable due to restrictions on eligibility for imputation.
[2] All race categories exclude individuals of Hispanic or Latino origin.
[3] Used to construct socioeconomic status (SES).
[4] Used to construct scale, quartile, and proficiency scores.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

3.6.2 Imputation Methodologies

The ELS:2002 base-year and first follow-up data files were imputed using three imputation methods including logical imputation, weighted sequential hot deck imputation, and multiple imputation. This section gives a brief summary of each of these methods and outlines how each one was used in the imputation plan.

All possible logical imputations were performed before any other imputation method was applied to the data files. For instance, student sex was imputed by assigning a value based on student name. This assignment mapping was developed using the distribution of the known student names and sex values. Student sex and student race were the only two variables that were logically imputed.

After all logical imputations were completed, weighted sequential hot deck imputation (Cox 1980) was used to impute 13 categorical variables. Sequential hot deck imputation is a common procedure used for item nonresponse. This method uses the respondent survey data (donors) to provide imputed values for records with missing values. The basic principle of sequential hot deck imputation involves defining imputation classes, which generally consist of a cross-classification of covariates, and then replacing missing values sequentially from a single pass through the survey data within the imputation classes. When sequential hot deck imputation is performed using the sampling weights of the item respondents and nonrespondents, the procedure is called weighted sequential hot deck imputation. This procedure takes into account the unequal probabilities of selection in the original sample by using the sampling weight to specify the expected number of times a particular respondent's answer was used to replace a missing item. These expected selection frequencies are specified so that, over repeated applications of the algorithm, the expected value of the weighted distribution of the imputed values will equal in expectation within imputation class the weighted distribution of the reported answers. Weighted sequential hot deck imputation was chosen for most of the variables because this procedure works well for categorical data.

The last imputation procedure used was multiple imputation (MI). The MI procedure was chosen for three continuous variables: the 10th-grade student ability estimate (theta) for mathematics, the 10th-grade student ability estimate (theta) for reading, and the spring 2004 student ability estimate (theta) for mathematics. MI is a technique that requires imputing missing values several times and creating *m* complete datasets. These are created such that regular complete-case analyses can be performed. The parameters of interest, then, can be calculated by averaging the parameter estimators from each augmented dataset. The SAS PROC MI procedure was used to impute these three variables. The Markov Chain Monte Carlo (MCMC) model option, which assumes the data are from a multivariate normal distribution, was used to estimate the entire joint posterior probability distribution of the unknown quantities. Random draws from this distribution were taken to fill in the missing values.

The SAS PROC MI procedure was selected for these three variables because it provides an imputation variance based on MI theory and does not require any additional computation. The "theta" value (which is only a restricted-use variable) is used in the construction of various ELS:2002 test variables, and this construction process requires an imputation variance.

It should be noted that MI was not chosen for imputation of all variables, because the MI procedure is currently restricted to imputation of continuous variables and most of the variables selected for imputation are categorical. Therefore, the weighted sequential hot deck was the preferred method for these variables.

3.6.3 Definition of Eligibility for Imputation

Table C-1 in appendix C shows the set of respondents for which each variable was imputed. The appendix lists the different respondent types, including the questionnaire-ineligible (expanded sample) students. As shown in the appendix, all variables were imputed for base-year nonrespondents who became first follow-up respondents (651 students) and for base-year respondents who were also first follow-up respondents (14,062). For base-year questionnaire-incapable students whose status had changed 2 years later and who were successfully surveyed in the first follow-up (n = 105), all variables were imputed except school program type and the 10th-grade ability estimates. For freshened respondents (171), all variables were imputed except school program type, the 10th-grade ability estimates, and parental aspirations. For the first follow-up questionnaire-incapable students (100), all variables were imputed except school program type, student postsecondary educational expectations, and the student ability estimates.

The 16 variables that were imputed in the base-year study were not imputed again for base-year nonrespondents because their data were either reported or imputed in the base year. These variables were only imputed in the first follow-up when not provided by respondents in the new participant supplement by first follow-up respondents who were base-year nonrespondents, 12th-grade freshened sample members, or base-year questionnaire-ineligible students who became first follow-up respondents. The base-year nonrespondents who became first follow-up respondents included students still at the base-year school, transfer students, dropouts, early graduates, and homeschooled students.

The spring 2004 student ability estimate for mathematics was imputed for students who were considered in school (i.e., students still attending the sample school as of spring 2004 and transfer students as of spring 2004). The estimate was not imputed for out-of-school respondents (i.e., dropouts, early graduates, and homeschooled students). For the 651 students who became first follow-up respondents and were base-year nonrespondents, the 10th-grade student ability estimates for mathematics and reading were imputed.

Finally, spring 2004 enrollment status for all first follow-up sample members (respondents and nonrespondents) on the restricted-use file (16,374) was imputed. Most information was imputed using data available from school records, and any remaining missing data were imputed using the weighted sequential hot deck procedure. This variable was imputed because it is an analysis variable that will be used frequently, and it provides a better picture of the cohort dropout rate.

3.6.4 Imputation Results

Of the 15 categorical variables, 2 variables (sex and race/ethnicity) were imputed using logical imputation, and 13 were imputed using a weighted sequential hot deck procedure. The remaining 3 continuous variables were imputed using MI.

Table 28 lists the variables in the order in which they were imputed and shows the number of cases that were imputed. The order in which the variables were imputed depended on whether the response of one variable was dependent upon the response of another variable. For instance, Hispanic and Asian subgroup could only be imputed after the race/ethnicity variable was determined. Similarly, family income was dependent on parent education and occupation; therefore, parent education and occupation were imputed prior to family income. Within these dependencies, the variables were imputed in the same order that they were imputed in the base-year study, generally starting with the variable containing the lowest percentage missing up to the variable with the highest percentage missing.

The basic MI model used for imputing the student ability estimates included the following predictor variables: sex, race/ethnicity, student language, student postsecondary aspirations, parental aspirations for student, family composition, mother's and father's occupation and education level, household income, school type, urbanicity, and census region. The model used for predicting the spring 2004 student ability estimate in mathematics also contained the 10th-grade ability estimate for both mathematics and reading. Similarly, the model used for predicting the 10th-grade ability estimate for both mathematics and reading contained the spring 2004 student ability estimate in mathematics.

Table C-2 presents the imputation classes and sorting variables used for all of the variables imputed by the weighted sequential hot deck approach, and table C-3 presents the variables used in the MI models. Table C-4 presents the before- and after-imputation distributions.

3.6.5 Imputation Evaluation

The key measure for determining whether the imputation methods produce acceptable results is that the before- and after-imputation weighted distributions are similar. For evaluation of the imputation results, distributions were considered to be similar when absolute differences are less than 5 percent where the absolute difference is calculated by subtracting the before-imputation weighted percent from the after-imputation weighted percent. If absolute differences are greater than 5 percent, then the unweighted distributions were examined to see if the large differences are due to small sample sizes. Any large differences were evaluated and corrected when possible (perhaps by using different imputation classes) and documented when no resolution is possible.

MI inference assumes that the analyst's model is the same as the imputer's model. However, the two models may not be the same. Therefore, a general practice is to include as many variables as possible when doing MI. The precision that is lost when unimportant predictors are included is usually relatively small compared with the general validity of analyses of the resultant multiply imputed dataset. The PROC MI procedure provides the between-imputation, within-imputation, and total variances for the model. Additionally, it provides the degrees of freedom for the total variance, the relative increase in variance due to missing values, and the fraction of missing information for each parameter estimate. These statistics were used in the evaluation of the MI.

3.7 Disclosure Risk Analysis and Protections

Because of the paramount importance of protecting the confidentiality of NCES data that contain information about specific individuals, ELS:2002 first follow-up data were subject to various procedures to minimize disclosure risk.

As a first step, all ELS:2002 data files (school and student) were reviewed to identify high-risk variables. Some variables were identified as unsuitable for the public-use file in any form; these variables appear only on the restricted-use files. Public-use variables that might point to specific individuals or schools (e.g., some fine-grained variables, particularly those in continuous form, and variables with extreme outliers) were altered through data coarsening techniques, such as top coding, bottom coding, or recasting into categorical form.

As a second step, a technique called "data swapping" was carried out, both for school-level data and for student-level data. Schools and respondents were randomly selected for swapping to achieve a specific, but undisclosed, swapping rate. In data swapping, some variables for a sample case that has been paired with another case will be exchanged. By so doing, even if a tentative identification of an individual is made, because every case in the file has some undisclosed probability of having been swapped, uncertainty remains about the accuracy and interpretation of the match. The swapping was done independently of the swapping conducted in the base year.

As a final step, the ELS:2002 data underwent a disclosure risk analysis. In this analysis, school characteristics information available on the data files was compared to information on publicly available universe files of schools. A distance measure was used to compute risk of deductive disclosure, and techniques to minimize disclosure risk were applied until school identities were appropriately masked. Specific techniques employed included both perturbation (perturbation directly alters individual respondent data for some variables) and coarsening of the data (coarsening reduces the level of detail, for example, by making a continuous variable categorical).[27]

In the case of the coarsening applied to certain variables on the public-use file, more fine-grained detail for these variables may be found on the restricted-use files. In the case of perturbation of the data (including swapping), all changes imposed on the public-use files were also implemented in the restricted-use files. Although perturbation techniques such as swapping do result in changes in estimates generated from the data, before-and-after weighted distributions and correlations for swapped variables show that, after applying the disclosure limitation techniques, the analytic utility of the data files has not been compromised in any way.

3.8 Student Nonresponse Bias Analysis

Unit nonresponse causes bias in survey estimates when the outcomes of respondents and nonrespondents are different. For ELS:2002, student response is defined as the sample member completing at least a specified portion of the questionnaire. The response rate was above 85 percent overall and for most domains (see section 3.4 for a description of the domains). However, the response rate was below 85 percent for four domains (spring 2002 sophomores who were dropouts, transfer students, homeschooled, or early graduates), so a student-level nonresponse bias analysis was conducted for these domains. The final overall student weighted response rate was 88.7 percent. Although the overall response rate was above 85 percent and a

[27] The NCES Statistical Standards (Seastrom 2003) (http://nces.ed.gov/statprog/2002/std4_2.asp), specifically NCES Standard 4-2, provide information both about the legislative background and legal requirements of maintaining confidentiality, and definitions of key terms (perturbation, coarsening, disclosure risk analysis, data swapping, and so forth).

nonresponse bias analysis is not required by NCES standards, a bias analysis for base-year sophomores was conducted for the purposes of quality and completeness using both the cross-sectional and panel weights.

The nonresponse bias was estimated for variables known for both respondents and nonrespondents. In the base year, information was not collected for nonresponding students other than what was received on the student enrollment lists. On these lists, data were obtained on IEP status, race/ethnicity, and sex. These data were not provided by all schools (in particular, information on IEP status was often missing, and IEP information was typically relevant only for public schools). In consequence, only the school-supplied race/ethnicity and sex data were used. For most of the first follow-up freshened students, race/ethnicity and sex data were available. The student's spring 2004 enrollment status was also used and defined as follows:

- in school, in grade (in grade 12);
- in school, out of grade (in grade 10 or 11, ungraded, or graduated early); and
- out of school (dropout or homeschooled).

There were also extensive data available for schools from the base-year school administrator questionnaire, so these data were used to help reduce potential nonresponse bias. Students were linked to the base-year school from which they were sampled. The first follow-up administrator data were not used when available because it is possible that student nonresponse is correlated with school nonresponse. It was safer to use the base-year administrator data for all students. The school sampling frame constructed from the CCD and PSS also contains data for all base-year schools. School data used included the following:

- school sector;
- urbanicity;
- region;
- sophomore enrollment;
- total enrollment;
- number of minutes per class;
- number of class periods;
- number of school days;
- number of students receiving free or reduced-price lunch;
- number of full-time teachers;
- percentage of full-time teachers certified;
- number of part-time teachers;
- number of different grades taught at the school;
- school level;
- coeducational status;

- percentage of students with an IEP;
- percentage of students with LEP;
- percentage Hispanic or Latino sophomores;
- percentage Asian sophomores;
- percentage Black or African American sophomores; and
- percentage All other race sophomores (includes White).

The procedures used for the nonresponse bias analysis were similar to those used in the base year. First, for the school and student data known for most respondents and nonrespondents, the nonresponse bias was estimated and tested to determine if the bias was significant at the 5 percent level. Second, nonresponse adjustments were computed, and variables known for most respondents and nonrespondents were included in the nonresponse models. The nonresponse adjustments described in section 3.4 were designed to significantly reduce or eliminate nonresponse bias for variables included in the models. Variables not known for most respondents and nonrespondents could not be included in the nonresponse adjustments, and therefore nonresponse bias could not explicitly be reduced for these variables. However, many of the variables in the nonresponse models are correlated with many of the other variables.

Third, after the school and student weights were computed, remaining bias for data known for most respondents and nonrespondents was estimated and statistically tested to check if there was any remaining significant nonresponse bias. Fourth, the remaining bias after student weight adjustments was divided by the standard error, that is, bias/standard error.

The bias in an estimated mean based on respondents, $\overline{y}_R$, is the difference between this mean and the target parameter, π (i.e., the mean that would be estimated if a complete census of the target population was conducted). This bias can be expressed as follows:

$$B(\overline{y}_R) = \overline{y}_r - \pi$$

The estimated mean based on nonrespondents, $\overline{y}_{NR}$, can be computed if data for the particular variable for most of the nonrespondents are available. The estimation of π is as follows:

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

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

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

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. The variance of the bias was computed using Taylor series estimation in RTI's software package SUDAAN.

Tables 29 and 30 show the nonresponse bias before and after weight adjustments for selected variables for base-year sophomores. The first set of columns in each table shows the estimated bias before nonresponse adjustment for the variables available for most responding and nonresponding students. The results are identical for these two tables. Statistical tests (*t* tests) were used to test each level of the variables for significance of the bias at the 0.05/(c-1) significance level, where c is the number of categories (levels) within the primary variable. Below is a summary of the before-adjustment significant bias for tables 29 and 30:

- At least one level of 9 of the 25 variables was biased in each table.
- Sixteen levels of variables were found to be significantly biased in both tables 29 and 30.
- Significant biases were usually small.

The second set of columns in tables 29 and 30 shows the estimated bias after weight adjustments (using F1QWT for table 29 and F1PNLWT for table 30) for the variables available for most responding and nonresponding students. The bias after weight adjustments was computed as the difference between the estimate using nonresponse-adjusted (final) weights and the estimate using the design (base) weights prior to nonresponse adjustment. This latter estimate is an estimate of π because it is the estimate of the target population using the design weights. Similar to the testing of before-adjustment bias, *t* tests were performed to test the significance of the bias for each level of the variables. In both tables 29 and 30, the estimated bias usually decreased after weight adjustments. Therefore, the number of significantly biased levels of variables decreased from 16 *before* adjustment to zero *after* adjustment in both tables.

Tables 31, 32, 33, and 34 show the nonresponse bias before and after weight adjustments for selected variables in domains where the response rate was less than 85 percent. Table 31 refers to the domain of transfer students, table 32 refers to the domain of dropouts, table 33 refers to the domain of early graduates, and table 34 refers to the domain of homeschooled students. As in tables 29 and 30, the first set of columns in each table shows the estimated bias before nonresponse adjustment for the variables available for most responding and nonresponding students. Statistical tests (*t* tests) were again used to test the significance of the bias at the 0.05/(c-1) significance level. Below is a summary of the before-adjustment significant bias for tables 31, 32, 33, and 34:

- At least one level of three variables and a total of four levels were found to be significantly biased in table 31.
- One level of two variables was found to be significantly biased in table 32.
- One level of five variables was found to be significantly biased in table 33.

- At least one level of four variables and a total of five levels were found to be significantly biased in table 34.
- Significant biases were usually small.

As in tables 29 and 30, the second set of columns in tables 31, 32, 33, and 34 shows the estimated bias after weight adjustments (using F1QWT) for the variables available for most responding and nonresponding students. The bias after weight adjustments was computed the same way as described above for tables 29 and 30. Statistical tests (*t* tests) were performed to test the significance of the bias for each level of the variables. In all four tables, the estimated bias sometimes decreased after weight adjustments and sometimes increased after weight adjustments. In tables 31 and 32, the amount of significant bias actually increased to seven levels of four variables and five levels of three variables, respectively. In tables 33 and 34, the amount of significant bias decreased to one and zero variables, respectively. Note that sample members are assigned to these domains based on data known for respondents and nonrespondents, and sample members may actually be in different domains. Therefore, these bias estimates are approximate. Also, the weight adjustments accounted for enrollment status, as described in section 3.4, but enrollment status combined the categories of transfer student, dropout, early graduate, or homeschooled student. Enrollment status was used because it was considered the more important analysis variable and to be consistent with NELS:88.

The student nonresponse bias analyses in conjunction with the weighting adjustments described below do not eliminate all bias. They reduce bias for some of the variables known for most respondents and nonrespondents, which are considered to be some of the analytically important variables and are correlated with many of the other variables. Significant bias after weight adjustments is minimal for the variables analyzed. Some of these variables are used to help create composite (or derived) variables. There may be bias remaining in other variables.

Figures 6 through 11 compare the estimated relative bias before nonresponse adjustment with the estimated relative bias after nonresponse adjustment for base-year sophomores using F1QWT, base-year sophomores using F1PNLWT, transfer students using F1QWT, dropouts using F1QWT, early graduates using F1QWT, and homeschooled students using F1QWT, respectively. Relative bias is the bias of the estimate divided by the estimate. It provides an indication of the order of magnitude of the bias with respect to the estimate. Figures 6 and 7 indicate that when the relative bias was large before nonresponse adjustment, it was almost always reduced after nonresponse adjustment. When the relative bias was small before nonresponse adjustment, it stayed small after nonresponse adjustment with occasional small increases. These two figures clearly show that the nonresponse adjustment reduced bias for base-year sophomores. Figures 8 through 11 show somewhat of a random pattern. Sometimes relative bias decreased after nonresponse adjustment, sometimes relative bias increased after nonresponse adjustment, and sometimes, relative bias did not change much after nonresponse adjustment. As shown in tables 32 through 34, the bias is frequently not significant after nonresponse adjustment. Also, as mentioned above, sample members are assigned to these domains based on data known for respondents and nonrespondents, and sample members may actually be in different domains.

Nonresponse bias can have an effect on significance testing. Tables 29 through 34 include an estimate of the bias ratio (student bias divided by the standard error). If this ratio is larger than 2 percent, then the probability of a Type I error is greater than 0.05. Figures 12 through 17 show the student bias ratio by the Type I error rate for base-year sophomores using F1QWT, base-year sophomores using F1PNLWT, transfer students, dropouts, early graduates, and homeschooled students, respectively. Figures 12 and 13 show that for many of the student variables included in the nonresponse bias analysis, the Type I error rate is at or close to 0.05, and outliers were not graphed. These results are similar to the base-year results for spring 2002 sophomores. Figures 14 through 17 show that although some variables have a Type I error rate at or near 0.05, there are more variables that have a higher Type I error rate. These figures do not take the school bias ratio into account. The school bias ratio varies by school variable, as shown in the ELS:2002 base-year data file user's manual (Ingels et al. 2004). If it is assumed that the school bias ratio is zero, then there is no effect on the student bias ratio. However, if the school bias ratio is large, then the Type I error rates are larger. Although the tables above show that nonresponse bias is minimal, the data user should exercise caution when conducting statistical tests.

Table 29. Nonresponse bias before and after nonresponse adjustment for base-year sophomores using the cross-sectional weight, by selected categorical variables: 2004

Description	Before nonresponse adjustment: Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	After nonresponse adjustment: Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Asian 10th-grade enrollment percent													
≤ 2 percent	5,684	547	38.298	39.784	-0.167	-0.004	N	38.465	38.686	-0.221	-0.461	-0.006	N
> 2 percent	9,029	943	61.702	60.216	0.167	0.003	N	61.535	61.314	0.221	0.461	0.004	N
Black or African American 10th-grade enrollment percent													
≤ 4 percent	5,043	459	34.669	32.029	0.296	0.009	N	34.373	34.296	0.076	0.150	0.002	N
> 4 percent	9,670	1031	65.331	67.971	-0.296	-0.005	N	65.627	65.704	-0.076	-0.150	-0.001	N
Minutes per class period													
≤ 45	3,540	368	18.887	21.081	-0.246	-0.013	N	19.133	19.144	-0.011	-0.031	-0.001	N
46–50	3,166	312	21.924	20.110	0.203	0.009	N	21.720	21.662	0.059	0.110	0.003	N
51–80	3,925	394	28.983	29.746	-0.086	-0.003	N	29.068	29.036	0.033	0.066	0.001	N
81+	4,082	416	30.206	29.063	0.128	0.004	N	30.078	30.159	-0.081	-0.180	-0.003	N
Class periods per day													
1–4	4,219	421	31.191	28.889	0.258	0.008	N	30.933	31.021	-0.088	-0.195	-0.003	N
5–6	3,612	403	26.901	29.533	-0.295	-0.011	N	27.196	27.129	0.067	0.144	0.002	N
7	3,984	400	24.649	25.304	-0.073	-0.003	N	24.722	24.742	-0.019	-0.047	-0.001	N
8–9	2,898	266	17.259	16.274	0.111	0.006	N	17.149	17.109	0.040	0.087	0.002	N
Is the school coeducational?													
Yes	13,937	1,425	97.909	98.506	-0.067	-0.001	N	97.976	97.970	0.006	0.150	#	N
No, all-female school	361	35	1.004	0.890	0.013	0.013	N	0.992	0.991	#	0.014	#	N
No, all-male school	415	30	1.087	0.604	0.054	0.052	N	1.032	1.039	-0.007	-0.283	-0.007	N
Student race/ethnicity[4]													
All other races	9,120	830	67.450	62.158	0.594	0.009	Y	66.857	66.818	0.039	0.089	0.001	N
Asian	1,619	173	3.891	3.623	0.030	0.008	N	3.861	3.853	0.008	0.071	0.002	N
Black or African American	2,169	261	15.708	18.383	-0.300	-0.019	N	16.008	15.985	0.022	0.075	0.001	N
Hispanic or Latino	1,805	226	12.951	15.836	-0.324	-0.024	N	13.275	13.344	-0.069	-0.247	-0.005	N
10th-grade enrollment													
0–99	2,888	255	12.689	9.164	0.395	0.032	Y	12.294	12.337	-0.043	-0.092	-0.004	N
100–249	3,823	293	22.457	16.644	0.652	0.030	Y	21.805	21.947	-0.142	-0.412	-0.007	N
250–499	4,704	485	36.049	38.916	-0.322	-0.009	N	36.371	36.355	0.016	0.031	#	N
500+	3,298	457	28.805	35.276	-0.726	-0.025	Y	29.530	29.361	0.170	0.325	0.006	N

See notes at end of table.

Table 29. Nonresponse bias before and after nonresponse adjustment for base-year sophomores using the cross-sectional weight, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Total enrollment													
≤ 600	3,511	278	17.875	12.259	0.630	0.037	Y	17.245	17.327	-0.082	-0.171	-0.005	N
601–1,200	4,453	406	27.547	25.559	0.223	0.008	N	27.324	27.438	-0.114	-0.290	-0.004	N
1,201–1,800	3,321	364	25.828	29.082	-0.365	-0.014	N	26.193	26.117	0.076	0.195	0.003	N
> 1,800	3,428	442	28.750	33.099	-0.488	-0.017	N	29.238	29.117	0.121	0.227	0.004	N
Enrollment status													
In school, in grade (grade 12)	12,305	888	81.268	58.075	2.602	0.033	Y	78.666	78.622	0.044	0.102	0.001	N
In school, out of grade	1,697	350	13.235	23.153	-1.112	-0.078	Y	14.348	14.339	0.009	0.023	0.001	N
Out of school	711	252	5.497	18.772	-1.489	-0.213	Y	6.986	7.039	-0.053	-0.226	-0.008	N
Free or reduced-price lunch													
0	2,667	258	8.150	7.875	0.031	0.004	N	8.119	8.065	0.055	0.201	0.007	N
1–10	3,347	306	25.022	26.694	-0.188	-0.007	N	25.210	25.211	-0.001	-0.003	#	N
11–30	4,386	450	35.984	32.895	0.347	0.010	N	35.638	35.574	0.064	0.122	0.002	N
> 30	4,313	476	30.843	32.536	-0.190	-0.006	N	31.033	31.150	-0.117	-0.237	-0.004	N
Number of full-time teachers													
1–40	3,857	319	18.359	13.996	0.489	0.027	Y	17.870	17.963	-0.093	-0.211	-0.005	N
41–70	3,776	314	23.521	19.526	0.448	0.019	N	23.073	23.168	-0.095	-0.262	-0.004	N
71–100	3,759	436	30.240	32.764	-0.283	-0.009	N	30.523	30.421	0.102	0.202	0.003	N
101+	3,321	421	27.880	33.714	-0.654	-0.023	Y	28.535	28.448	0.087	0.181	0.003	N
Number of grades within the school													
4	11,206	1,131	79.654	79.374	0.031	#	N	79.623	79.660	-0.037	-0.081	#	N
> or < 4	3,507	359	20.346	20.626	-0.031	-0.002	N	20.377	20.340	0.037	0.081	0.002	N
Types of grades within the school													
K–12, PreK–10th, 1st–12th, PreK/1st–9th/12th and PreK–12 schools	980	91	5.024	3.745	0.143	0.029	N	4.881	4.829	0.051	0.115	0.011	N
Middle grades but no elementary	1,555	153	7.595	6.502	0.123	0.016	N	7.473	7.575	-0.102	-0.564	-0.014	N
Only high school	12,178	1,246	87.380	89.753	-0.266	-0.003	N	87.647	87.596	0.051	0.112	0.001	N
Hispanic 10th-grade enrollment percent													
≤ 3 percent	5,716	533	37.928	37.304	0.070	0.002	N	37.858	38.088	-0.230	-0.482	-0.006	N
> 3 percent	8,997	957	62.072	62.696	-0.070	-0.001	N	62.142	61.912	0.230	0.482	0.004	N

See notes at end of table.

Table 29. Nonresponse bias before and after nonresponse adjustment for base-year sophomores using the cross-sectional weight, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
IEP[5] percentage													
≤ 5 percent	5,801	537	26.532	25.632	0.101	0.004	N	26.431	26.541	-0.110	-0.256	-0.004	N
6–10 percent	3,760	389	32.843	34.502	-0.186	-0.006	N	33.029	32.884	0.145	0.290	0.004	N
11–5 percent	3,213	352	26.441	25.356	0.122	0.005	N	26.319	26.294	0.025	0.058	0.001	N
> 15 percent	1,939	212	14.184	14.510	-0.037	-0.003	N	14.221	14.281	-0.060	-0.122	-0.004	N
LEP[6] percentage													
0 percent	6,457	532	34.559	28.762	0.650	0.019	Y	33.909	33.896	0.013	0.026	#	N
1 percent	2,897	289	23.189	22.184	0.113	0.005	N	23.076	23.079	-0.003	-0.007	#	N
2–5 percent	2,447	282	18.577	23.160	-0.514	-0.027	N	19.091	19.101	-0.009	-0.025	#	N
> 6 percent	2,912	387	23.675	25.894	-0.249	-0.010	N	23.924	23.924	0.000	-0.001	#	N
Urbanicity													
Urban	4,950	588	29.567	35.077	-0.618	-0.020	Y	30.185	30.078	0.107	0.212	0.004	N
Suburban	7,063	674	50.183	49.843	0.038	0.001	N	50.145	50.183	-0.038	-0.073	-0.001	N
Rural	2,700	228	20.250	15.080	0.580	0.029	Y	19.670	19.739	-0.069	-0.141	-0.004	N
All other races[6] 10th-grade enrollment percent													
≤ 80 percent	7,245	845	50.735	55.048	-0.484	-0.009	Y	51.219	51.153	0.066	0.120	0.001	N
> 80 percent	7,468	645	49.265	44.952	0.484	0.010	Y	48.781	48.847	-0.066	-0.120	-0.001	N
Number of part-time teachers													
0–1	4,205	479	30.682	32.753	-0.232	-0.008	N	30.914	30.956	-0.042	-0.086	-0.001	N
2–3	4,241	379	28.906	24.858	0.454	0.016	N	28.452	28.465	-0.013	-0.025	0.000	N
4–6	3,569	370	21.502	22.411	-0.102	-0.005	N	21.604	21.658	-0.053	-0.120	-0.002	N
7+	2,698	262	18.910	19.978	-0.120	-0.006	N	19.030	18.922	0.108	0.270	0.006	N
Full-time teacher certified													
0–90 percent	3,797	360	16.138	14.344	0.201	0.013	N	15.937	15.980	-0.044	-0.121	-0.003	N
91–99 percent	2,577	313	20.008	22.786	-0.312	-0.015	N	20.320	20.211	0.108	0.235	0.005	N
100 percent	8,339	817	63.854	62.871	0.110	0.002	N	63.744	63.808	-0.065	-0.124	-0.001	N
Geocode													
Census division (public schools)													
Public-New England/Middle Atlantic[5]	1,991	222	16.407	18.446	-0.229	-0.014	N	16.636	16.671	-0.034	-0.089	-0.002	N
Public-East North Central	1,782	213	14.241	16.450	-0.248	-0.017	N	14.489	14.359	0.130	0.441	0.009	N

See notes at end of table.

Table 29. Nonresponse bias before and after nonresponse adjustment for base-year sophomores using the cross-sectional weight, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Geocode—Continued													
Public-West North Central	953	70	8.056	5.497	0.287	0.037	N	7.769	8.020	-0.251	-1.338	-0.032	N
Public-South Atlantic	2,112	223	16.390	16.654	-0.030	-0.002	N	16.420	16.440	-0.020	-0.067	-0.001	N
Public-East South Central	850	53	6.216	3.967	0.252	0.042	N	5.964	5.936	0.027	0.136	0.005	N
Public-West South Central	1,318	141	9.459	9.451	0.001	0.000	N	9.458	9.407	0.052	0.219	0.005	N
Public-Mountain	601	94	6.747	9.777	-0.340	-0.048	N	7.087	7.202	-0.115	-0.270	-0.016	N
Public-Pacific	1,853	202	14.705	13.160	0.173	0.012	N	14.531	14.313	0.219	0.446	0.015	N
Census region (private schools)													
Private-Northwest	724	59	1.916	1.248	0.075	0.041	N	1.841	1.817	0.025	0.240	0.013	N
Private-Midwest	964	78	1.990	1.910	0.009	0.005	N	1.981	1.910	0.071	1.090	0.036	N
Private-South	1,031	79	2.374	1.637	0.083	0.036	N	2.291	2.440	-0.149	-2.306	-0.065	N
Private-West	534	56	1.499	1.803	-0.034	-0.022	N	1.533	1.486	0.046	0.198	0.030	N
Number of days in school year													
Less than 180 days	3,856	357	24.501	21.603	0.325	0.013	N	24.176	24.277	-0.101	-0.284	-0.004	N
180 days	8,135	841	56.940	56.859	0.009	#	N	56.931	56.815	0.116	0.234	0.002	N
More than 180 days	2,722	292	18.558	21.538	-0.334	-0.018	N	18.893	18.908	-0.016	-0.039	-0.001	N
School sector													
Public	11,460	1,218	92.221	93.402	-0.132	-0.001	N	92.353	92.346	0.007	0.028	#	N
Catholic	1,898	129	4.438	2.902	0.172	0.040	Y	4.266	4.268	-0.003	-0.037	-0.001	N
Other private	1,355	143	3.341	3.696	-0.040	-0.012	N	3.381	3.385	-0.005	-0.018	-0.001	N
Student sex													
Male	7,335	744	50.198	50.193	0.001	#	N	50.198	50.433	-0.236	-0.609	-0.005	N
Female	7,378	746	49.802	49.807	-0.001	#	N	49.802	49.567	0.236	0.609	0.005	N

\# Rounds to zero.

1 Design weight is used before nonresponse adjustment. This is the distribution to each response category.

2 "Y" denotes statistical significance at $p < .05$. "N" denotes no statistical significance.

3 Weight after nonresponse adjustment.

4 "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.

5 IEP = Individualized Education Program.

6 LEP = limited English proficient.

7 Collapsed category comprising two Census divisions.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Table 30. Nonresponse bias before and after nonresponse adjustment for base-year sophomores using the panel weight, by selected categorical variables: 2004

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Asian 10th-grade enrollment percent													
≤ 2 percent	5,684	547	38.298	39.784	-0.167	-0.004	N	38.465	38.700	-0.235	-0.491	-0.006	N
> 2 percent	9,029	943	61.702	60.216	0.167	0.003	N	61.535	61.300	0.235	0.491	0.004	N
Black or African American 10th-grade enrollment percent													
≤ 4 percent	5,043	459	34.669	32.029	0.296	0.009	N	34.373	34.346	0.026	0.051	0.001	N
> 4 percent	9,670	1031	65.331	67.971	-0.296	-0.005	N	65.627	65.654	-0.026	-0.051	#	N
Minutes per class period													
≤ 45	3,540	368	18.887	21.081	-0.246	-0.013	N	19.133	19.153	-0.019	-0.056	-0.001	N
46–50	3,166	312	21.924	20.110	0.203	0.009	N	21.720	21.650	0.070	0.132	0.003	N
51–80	3,925	394	28.983	29.746	-0.086	-0.003	N	29.068	29.028	0.040	0.080	0.001	N
81+	4,082	416	30.206	29.063	0.128	0.004	N	30.078	30.169	-0.091	-0.201	-0.003	N
Class periods per day													
1–4	4,219	421	31.191	28.889	0.258	0.008	N	30.933	31.005	-0.073	-0.160	-0.002	N
5–6	3,612	403	26.901	29.533	-0.295	-0.011	N	27.196	27.110	0.086	0.183	0.003	N
7	3,984	400	24.649	25.304	-0.073	-0.003	N	24.722	24.743	-0.021	-0.051	-0.001	N
8–9	2,898	266	17.259	16.274	0.111	0.006	N	17.149	17.141	0.008	0.018	#	N
Is the school coeducational?													
Yes	13,937	1,425	97.909	98.506	-0.067	-0.001	N	97.976	97.965	0.011	0.263	#	N
No, all-female school	361	35	1.004	0.890	0.013	0.013	N	0.992	0.993	-0.002	-0.053	-0.002	N
No, all-male school	415	30	1.087	0.604	0.054	0.052	N	1.032	1.042	-0.009	-0.396	-0.009	N
Student race/ethnicity[4]													
All other races	9,120	830	67.450	62.158	0.594	0.009	Y	66.857	66.817	0.040	0.090	0.001	N
Asian	1,619	173	3.891	3.623	0.030	0.008	N	3.861	3.853	0.008	0.067	0.002	N
Black or African American	2,169	261	15.708	18.383	-0.300	-0.019	N	16.008	15.985	0.023	0.077	0.001	N
Hispanic or Latino	1,805	226	12.951	15.836	-0.324	-0.024	N	13.275	13.345	-0.070	-0.248	-0.005	N
10th-grade enrollment													
0–99	2,888	255	12.689	9.164	0.395	0.032	Y	12.294	12.345	-0.051	-0.109	-0.004	N
100–249	3,823	293	22.457	16.644	0.652	0.030	Y	21.805	21.952	-0.147	-0.426	-0.007	N
250–499	4,704	485	36.049	38.916	-0.322	-0.009	N	36.371	36.384	-0.013	-0.025	#	N
500+	3,298	457	28.805	35.276	-0.726	-0.025	Y	29.530	29.320	0.211	0.404	0.007	N

See notes at end of table.

Table 30. Nonresponse bias before and after nonresponse adjustment for base-year sophomores using the panel weight, by selected categorical variables: 2004—Continued

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Total enrollment													
≤ 600	3,511	278	17.875	12.259	0.630	0.037	Y	17.245	17.341	-0.096	-0.199	-0.006	N
601–1,200	4,453	406	27.547	25.559	0.223	0.008	N	27.324	27.416	-0.092	-0.233	-0.003	N
1,201–1,800	3,321	364	25.828	29.082	-0.365	-0.014	N	26.193	26.225	-0.033	-0.084	-0.001	N
> 1,800	3,428	442	28.750	33.099	-0.488	-0.017	N	29.238	29.018	0.220	0.412	0.008	N
Enrollment status													
In school, in grade (grade 12)	12,305	888	81.268	58.075	2.602	0.033	Y	78.666	78.715	-0.049	-0.113	-0.001	N
In school, out of grade	1,697	350	13.235	23.153	-1.112	-0.078	Y	14.348	14.289	0.059	0.144	0.004	N
Out of school	711	252	5.497	18.772	-1.489	-0.213	Y	6.986	6.996	-0.010	-0.044	-0.001	N
Free or reduced-price lunch													
0	2,667	258	8.150	7.875	0.031	0.004	N	8.119	8.067	0.052	0.196	0.006	N
1–10	3,347	306	25.022	26.694	-0.188	-0.007	N	25.210	25.211	-0.001	-0.002	#	N
11–30	4,386	450	35.984	32.895	0.347	0.010	N	35.638	35.603	0.035	0.068	0.001	N
> 30	4,313	476	30.843	32.536	-0.190	-0.006	N	31.033	31.120	-0.087	-0.177	-0.003	N
Number of full-time teachers													
1–40	3,857	319	18.359	13.996	0.489	0.027	Y	17.870	17.976	-0.106	-0.240	-0.006	N
41–70	3,776	314	23.521	19.526	0.448	0.019	N	23.073	23.120	-0.047	-0.130	-0.002	N
71–100	3,759	436	30.240	32.764	-0.283	-0.009	N	30.523	30.451	0.072	0.142	0.002	N
101+	3,321	421	27.880	33.714	-0.654	-0.023	Y	28.535	28.453	0.081	0.171	0.003	N
Number of grades within the school													
4	11,206	1,131	79.654	79.374	0.031	#	N	79.623	79.619	0.004	0.009	#	N
> or < 4	3,507	359	20.346	20.626	-0.031	-0.002	N	20.377	20.381	-0.004	-0.009	#	N
Types of grades within the school													
K–12, PreK–10th, 1st–12th, PreK/1st-9th/12th and PreK–12 schools	980	91	5.024	3.745	0.143	0.029	N	4.881	4.829	0.052	0.116	0.011	N
Middle grades but no elementary	1,555	153	7.595	6.502	0.123	0.016	N	7.473	7.556	-0.083	-0.478	-0.011	N
Only high school	12,178	1,246	87.380	89.753	-0.266	-0.003	N	87.647	87.615	0.031	0.070	#	N
Hispanic 10th-grade enrollment percent													
≤ 3 percent	5,716	533	37.928	37.304	0.070	0.002	N	37.858	38.059	-0.200	-0.422	-0.005	N
> 3 percent	8,997	957	62.072	62.696	-0.070	-0.001	N	62.142	61.941	0.200	0.422	0.003	N

See notes at end of table.

Table 30. Nonresponse bias before and after nonresponse adjustment for base-year sophomores using the panel weight, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
IEP[5] percentage													
≤ 5 percent	5,801	537	26.532	25.632	0.101	0.004	N	26.431	26.567	-0.136	-0.319	-0.005	N
6–10 percent	3,760	389	32.843	34.502	-0.186	-0.006	N	33.029	32.877	0.152	0.305	0.005	N
11–15 percent	3,213	352	26.441	25.356	0.122	0.005	N	26.319	26.356	-0.037	-0.084	-0.001	N
> 15 percent	1,939	212	14.184	14.510	-0.037	-0.003	N	14.221	14.200	0.021	0.043	0.001	N
LEP[6] percentage													
0 percent	6,457	532	34.559	28.762	0.650	0.019	Y	33.909	33.927	-0.018	-0.037	-0.001	N
1 percent	2,897	289	23.189	22.184	0.113	0.005	N	23.076	23.136	-0.060	-0.151	-0.003	N
2–5 percent	2,447	282	18.577	23.160	-0.514	-0.027	N	19.091	19.051	0.040	0.104	0.002	N
> 6 percent	2,912	387	23.675	25.894	-0.249	-0.010	N	23.924	23.886	0.038	0.071	0.002	N
Urbanicity													
Urban	4,950	588	29.567	35.077	-0.618	-0.020	Y	30.185	30.020	0.165	0.327	0.005	N
Suburban	7,063	674	50.183	49.843	0.038	0.001	N	50.145	50.252	-0.107	-0.206	-0.002	N
Rural	2,700	228	20.250	15.080	0.580	0.029	Y	19.670	19.728	-0.058	-0.118	-0.003	N
All other races 10th-grade enrollment percent													
≤ 80 percent	7,245	845	50.735	55.048	-0.484	-0.009	Y	51.219	51.104	0.115	0.210	0.002	N
> 80 percent	7,468	645	49.265	44.952	0.484	0.010	Y	48.781	48.896	-0.115	-0.210	-0.002	N
Number of part-time teachers													
0–1	4,205	479	30.682	32.753	-0.232	-0.008	N	30.914	30.925	-0.011	-0.023	#	N
2–3	4,241	379	28.906	24.858	0.454	0.016	N	28.452	28.440	0.012	0.024	#	N
4–6	3,569	370	21.502	22.411	-0.102	-0.005	N	21.604	21.704	-0.100	-0.224	-0.005	N
7+	2,698	262	18.910	19.978	-0.120	-0.006	N	19.030	18.931	0.099	0.250	0.005	N
Full-time teacher certified													
0–90 percent	3,797	360	16.138	14.344	0.201	0.013	N	15.937	15.903	0.033	0.091	0.002	N
91–99 percent	2,577	313	20.008	22.786	-0.312	-0.015	N	20.320	20.210	0.110	0.239	0.005	N
100 percent	8,339	817	63.854	62.871	0.110	0.002	N	63.744	63.887	-0.143	-0.274	-0.002	N

See notes at end of table.

Table 30. Nonresponse bias before and after nonresponse adjustment for base-year sophomores using the panel weight, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Geocode													
Census division (public schools)													
Public-New England/Middle Atlantic[7]	1,991	222	16.407	18.446	-0.229	-0.014	N	16.636	16.686	-0.050	-0.131	-0.003	N
Public-East North Central	1,782	213	14.241	16.450	-0.248	-0.017	N	14.489	14.357	0.132	0.445	0.009	N
Public-West North Central	953	70	8.056	5.497	0.287	0.037	N	7.769	8.019	-0.250	-1.318	-0.032	N
Public-South Atlantic	2,112	223	16.390	16.654	-0.030	-0.002	N	16.420	16.407	0.013	0.041	0.001	N
Public-East South Central	850	53	6.216	3.967	0.252	0.042	N	5.964	5.934	0.030	0.148	0.005	N
Public-West South Central	1,318	141	9.459	9.451	0.001	#	N	9.458	9.429	0.030	0.124	0.003	N
Public-Mountain	601	94	6.747	9.777	-0.340	-0.048	N	7.087	7.217	-0.130	-0.308	-0.018	N
Public-Pacific	1,853	202	14.705	13.160	0.173	0.012	N	14.531	14.297	0.234	0.476	0.016	N
Census region (private schools)													
Private-Northwest	724	59	1.916	1.248	0.075	0.041	N	1.841	1.802	0.039	0.381	0.021	N
Private-Midwest	964	78	1.990	1.910	0.009	0.005	N	1.981	1.911	0.070	1.093	0.035	N
Private-South	1,031	79	2.374	1.637	0.083	0.036	N	2.291	2.455	-0.164	-2.335	-0.072	N
Private-West	534	56	1.499	1.803	-0.034	-0.022	N	1.533	1.485	0.048	0.203	0.031	N
Number of days in school year													
Less than 180 days	3,856	357	24.501	21.603	0.325	0.013	N	24.176	24.313	-0.137	-0.389	-0.006	N
180 days	8,135	841	56.940	56.859	0.009	#	N	56.931	56.839	0.092	0.186	0.002	N
More than 180 days	2,722	292	18.558	21.538	-0.334	-0.018	N	18.893	18.848	0.045	0.115	0.002	N
School sector													
Public	11,460	1,218	92.221	93.402	-0.132	-0.001	N	92.353	92.346	0.007	0.028	#	N
Catholic	1,898	129	4.438	2.902	0.172	0.040	Y	4.266	4.268	-0.002	-0.037	-0.001	N
Other private	1,355	143	3.341	3.696	-0.040	-0.012	N	3.381	3.386	-0.005	-0.019	-0.001	N
Student sex													
Male	7,335	744	50.198	50.193	0.001	#	N	50.198	50.435	-0.237	-0.611	-0.005	N
Female	7,378	746	49.802	49.807	-0.001	#	N	49.802	49.565	0.237	0.611	0.005	N

[#] Rounds to zero.
[1] Design weight is used before nonresponse adjustment. This is the distribution to each response category.
[2] "Y" denotes statistical significance at $p < .05$. "N" denotes no statistical significance.
[3] Weight after nonresponse adjustment.
[4] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.
[5] IEP = Individualized Education Program.
[6] LEP = limited English proficient.
[7] Collapsed category comprising two Census divisions.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Table 31. Nonresponse bias before and after nonresponse adjustment for transfer students, by selected categorical variables: 2004

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Asian 10th-grade enrollment percent													
≤ 2 percent	499	207	38.940	43.595	-1.484	-0.037	N	40.425	39.200	1.225	0.975	0.030	N
> 2 percent	764	316	61.060	56.405	1.484	0.025	N	59.575	60.800	-1.225	-0.975	-0.021	N
Black or African American 10th-grade enrollment percent													
≤ 4 percent	388	157	31.132	30.075	0.337	0.011	N	30.795	31.231	-0.436	-0.369	-0.014	N
> 4 percent	875	366	68.868	69.925	-0.337	-0.005	N	69.205	68.769	0.436	0.369	0.006	N
Minutes per class period													
≤ 45	292	118	16.627	17.673	-0.334	-0.020	N	16.961	16.365	0.596	0.520	0.035	N
46–50	256	94	18.943	19.014	-0.023	-0.001	N	18.966	18.806	0.160	0.153	0.008	N
51–80	382	160	34.360	31.884	0.790	0.024	N	33.570	35.087	-1.517	-1.217	-0.045	N
81+	333	151	30.070	31.428	-0.433	-0.014	N	30.503	29.742	0.761	0.630	0.025	N
Class periods per day													
1–4	338	139	31.118	28.703	0.770	0.025	N	30.347	30.483	-0.136	-0.117	-0.004	N
5–6	369	160	32.535	35.291	-0.879	-0.026	N	33.414	33.882	-0.469	-0.344	-0.014	N
7	343	139	22.398	23.522	-0.359	-0.016	N	22.757	22.052	0.704	0.604	0.031	N
8–9	213	85	13.949	12.484	0.467	0.035	N	13.482	13.582	-0.100	-0.105	-0.007	N
Is the school coeducational?													
Yes	1,205	508	98.063	98.997	-0.298	-0.003	N	98.361	98.121	0.240	1.738	0.002	N
No, all-female school	23	8	0.798	0.566	0.074	0.102	N	0.724	0.785	-0.061	-0.702	-0.085	N
No, all-male school	35	7	1.139	0.436	0.224	0.245	N	0.915	1.094	-0.179	-1.739	-0.195	N
Student race/ethnicity[4]													
All other races	632	251	53.508	55.613	-0.672	-0.012	N	54.179	53.159	1.020	0.762	0.019	N
Asian	131	61	3.716	3.731	-0.005	-0.001	N	3.721	3.723	-0.002	-0.010	-0.001	N
Black or African American	292	115	24.884	22.887	0.637	0.026	N	24.247	24.881	-0.634	-0.606	-0.026	N
Hispanic or Latino	208	96	17.892	17.769	0.039	0.002	N	17.853	18.237	-0.384	-0.457	-0.022	N
10th-grade enrollment													
0–99	267	105	12.298	10.865	0.457	0.039	N	11.841	12.647	-0.807	-1.247	-0.068	N
100–249	283	95	17.840	15.690	0.686	0.040	N	17.155	18.089	-0.934	-1.103	-0.054	N
250–499	395	166	35.178	37.831	-0.846	-0.023	N	36.024	34.762	1.261	0.926	0.035	N
500+	318	157	34.684	35.615	-0.297	-0.008	N	34.981	34.501	0.480	0.361	0.014	N

See notes at end of table.

Table 31. Nonresponse bias before and after nonresponse adjustment for transfer students, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Total enrollment													
≤ 600	301	107	15.675	12.404	1.043	0.071	N	14.632	15.917	-1.286	-1.710	-0.088	N
601–1,200	346	140	23.330	27.929	-1.467	-0.059	N	24.797	24.139	0.658	0.520	0.027	N
1,201–1,800	287	120	27.049	26.741	0.098	0.004	N	26.951	26.619	0.332	0.287	0.012	N
> 1,800	329	156	33.945	32.926	0.325	0.010	N	33.620	33.325	0.295	0.228	0.009	N
Enrollment status													
In school, in grade (grade 12)	1,069	410	83.088	77.862	1.667	0.020	N	81.421	80.386	1.035	1.105	0.013	N
In school, out of grade	193	85	16.829	16.362	0.149	0.009	N	16.680	19.496	-2.816	-3.053	-0.169	Y
Out of school	‡	28	0.083	5.776	-1.816	-0.956	Y	1.899	0.118	1.781	4.122	0.938	Y
Free or reduced-price lunch													
0	251	84	9.756	7.616	0.683	0.075	N	9.074	9.721	-0.647	-0.987	-0.071	N
1–10	246	94	20.829	23.433	-0.831	-0.038	N	21.660	20.808	0.851	0.656	0.039	N
11–30	353	157	35.491	31.627	1.233	0.036	N	34.259	34.415	-0.157	-0.117	-0.005	N
> 30	413	188	33.923	37.324	-1.085	-0.031	N	35.008	35.055	-0.047	-0.038	-0.001	N
Number of full-time teachers													
1–40	362	125	18.597	15.696	0.925	0.052	N	17.672	18.950	-1.279	-1.532	-0.072	N
41–70	320	107	21.113	17.826	1.048	0.052	N	20.065	21.556	-1.491	-1.613	-0.074	N
71–100	298	153	30.407	33.530	-0.996	-0.032	N	31.403	30.339	1.064	0.800	0.034	N
101+	283	138	29.883	32.948	-0.978	-0.032	N	30.861	29.154	1.707	1.334	0.055	N
Number of grades within the school													
4	968	382	80.539	76.561	1.269	0.016	N	79.270	80.289	-1.019	-0.951	-0.013	N
> or < 4	295	141	19.461	23.439	-1.269	-0.061	N	20.730	19.711	1.019	0.951	0.049	N
Types of grades within the school													
K–12, PreK–10th, 1st–12th, PreK/1st–9th/12th and PreK–12 schools	101	36	5.501	3.928	0.502	0.100	N	5.000	5.861	-0.861	-1.791	-0.172	N
Middle grades but no elementary	123	63	6.554	7.838	-0.410	-0.059	N	6.963	6.566	0.398	0.896	0.057	N
Only high school	1,039	424	87.945	88.233	-0.092	-0.001	N	88.037	87.574	0.463	0.705	0.005	N
Hispanic 10th-grade enrollment percent													
≤ 3 percent	411	163	31.872	32.595	-0.231	-0.007	N	32.102	31.158	0.945	0.684	0.029	N
> 3 percent	852	360	68.128	67.405	0.231	0.003	N	67.898	68.842	-0.945	-0.684	-0.014	N

See notes at end of table.

Table 31. Nonresponse bias before and after nonresponse adjustment for transfer students, by selected categorical variables: 2004—Continued

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
IEP[5] percentage													
≤ 5 percent	527	178	28.194	24.358	1.224	0.045	N	26.971	28.403	-1.432	-1.279	-0.053	N
6–10 percent	307	148	33.959	33.567	0.125	0.004	N	33.834	31.945	1.889	1.411	0.056	N
11–15 percent	257	118	24.193	26.080	-0.602	-0.024	N	24.795	25.161	-0.366	-0.325	-0.015	N
> 15 percent	172	79	13.653	15.995	-0.747	-0.052	N	14.400	14.492	-0.092	-0.090	-0.006	N
LEP[6] percentage													
0 percent	526	185	30.619	28.095	0.805	0.027	N	29.814	31.079	-1.266	-1.163	-0.042	N
1 percent	230	110	22.575	27.127	-1.452	-0.060	N	24.027	21.628	2.399	1.810	0.100	N
2–5 percent	194	85	17.641	18.103	-0.147	-0.008	N	17.788	18.090	-0.301	-0.313	-0.017	N
> 6 percent	313	143	29.165	26.676	0.794	0.028	N	28.371	29.203	-0.832	-0.679	-0.029	N
Urbanicity													
Urban	516	224	37.376	38.433	-0.337	-0.009	N	37.713	37.955	-0.242	-0.186	-0.006	N
Suburban	551	221	46.516	44.836	0.536	0.012	N	45.980	45.783	0.197	0.149	0.004	N
Rural	196	78	16.109	16.730	-0.198	-0.012	N	16.307	16.262	0.045	0.052	0.003	N
All other races 10th-grade enrollment percent													
≤ 80 percent	714	321	59.812	58.717	0.349	0.006	N	59.463	59.696	-0.233	-0.176	-0.004	N
> 80 percent	549	202	40.188	41.283	-0.349	-0.009	N	40.537	40.304	0.233	0.176	0.006	N
Number of part-time teachers													
0–1	404	191	34.307	38.381	-1.299	-0.036	N	35.607	35.162	0.445	0.339	0.012	N
2–3	312	121	23.970	20.679	1.050	0.046	N	22.920	23.503	-0.583	-0.498	-0.025	N
4–6	319	130	23.523	22.978	0.174	0.007	N	23.349	23.159	0.191	0.174	0.008	N
7+	228	81	18.200	17.962	0.076	0.004	N	18.124	18.176	-0.053	-0.045	-0.003	N
Full-time teacher certified													
0–90 percent	389	135	20.484	15.960	1.443	0.076	N	19.041	21.254	-2.214	-2.352	-0.116	Y
91–99 percent	221	81	19.054	16.203	0.909	0.050	N	18.144	19.208	-1.064	-1.255	-0.059	N
100 percent	653	307	60.463	67.838	-2.352	-0.037	Y	62.815	59.537	3.278	2.762	0.052	Y

See notes at end of table.

Table 31. Nonresponse bias before and after nonresponse adjustment for transfer students, by selected categorical variables: 2004—Continued

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Geocode													
Census division (public schools)													
Public-New England/Middle Atlantic[7]	112	51	10.274	13.368	-0.987	-0.088	N	11.261	10.045	1.216	1.085	0.108	N
Public-East North Central	142	93	12.613	18.875	-1.997	-0.137	N	14.610	13.065	1.545	1.452	0.106	N
Public-West North Central	76	25	7.650	5.417	0.712	0.103	N	6.938	7.451	-0.514	-0.849	-0.074	N
Public-South Atlantic	185	74	17.128	15.128	0.638	0.039	N	16.490	17.128	-0.638	-0.666	-0.039	N
Public-East South Central	49	19	4.375	5.068	-0.221	-0.048	N	4.596	4.392	0.204	0.519	0.044	N
Public-West South Central	124	45	11.451	8.235	1.026	0.098	N	10.425	10.703	-0.278	-0.453	-0.027	N
Public-Mountain	47	28	6.326	9.953	-1.157	-0.155	N	7.483	7.085	0.398	0.582	0.053	N
Public-Pacific	216	91	20.574	17.834	0.874	0.044	N	19.700	20.407	-0.707	-0.671	-0.036	N
Census region (private schools)													
Private-Northwest	57	19	1.766	0.985	0.249	0.164	N	1.517	1.710	-0.194	-1.617	-0.128	N
Private-Midwest	95	30	2.386	2.155	0.074	0.032	N	2.313	2.464	-0.151	-0.812	-0.065	N
Private-South	94	35	2.665	1.978	0.219	0.090	N	2.446	2.524	-0.078	-0.365	-0.032	N
Private-West	66	13	2.791	1.005	0.570	0.256	N	2.221	3.024	-0.803	-1.972	-0.361	N
Number of days in school year													
Less than 180 days	308	117	23.265	21.733	0.489	0.021	N	22.776	23.502	-0.725	-0.816	-0.032	N
180 days	729	303	57.790	59.478	-0.538	-0.009	N	58.329	59.391	-1.062	-0.864	-0.018	N
More than 180 days	226	103	18.945	18.789	0.050	0.003	N	18.895	17.108	1.787	1.503	0.095	N
School sector													
Public	951	426	90.392	93.877	-1.112	-0.012	Y	91.504	90.277	1.226	2.369	0.013	Y
Catholic	157	42	4.376	2.388	0.634	0.169	Y	3.742	4.169	-0.427	-2.063	-0.114	N
Other private	155	55	5.232	3.734	0.478	0.100	N	4.754	5.554	-0.800	-1.704	-0.168	N
Student sex													
Male	635	252	51.073	45.767	1.692	0.034	N	49.380	53.053	-3.672	-2.874	-0.074	Y
Female	628	271	48.927	54.233	-1.692	-0.033	N	50.620	46.947	3.672	2.874	0.073	Y

[#] Rounds to zero.
‡ Reporting standards not met.
[1] Design weight is used before nonresponse adjustment. This is the distribution to each response category.
[2] "Y" denotes statistical significance at $p < .05$. "N" denotes no statistical significance.
[3] Weight after nonresponse adjustment.
[4] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.
[5] IEP = Individualized Education Program.
[6] LEP = limited English proficient.
[7] Collapsed category comprising two Census divisions.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Table 32. Nonresponse bias before and after nonresponse adjustment for dropouts, by selected categorical variables: 2004

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Asian 10th-grade enrollment percent													
≤ 2 percent	275	78	40.915	45.749	-1.318	-0.031	N	42.233	39.881	2.352	1.294	0.056	N
> 2 percent	395	112	59.085	54.251	1.318	0.023	N	57.767	60.119	-2.352	-1.294	-0.041	N
Black or African American 10th-grade enrollment percent													
≤ 4 percent	129	57	22.543	31.284	-2.383	-0.096	N	24.926	23.577	1.349	0.908	0.054	N
> 4 percent	541	133	77.457	68.716	2.383	0.032	N	75.074	76.423	-1.349	-0.908	-0.018	N
Minutes per class period													
≤ 45	131	34	18.673	19.662	-0.270	-0.014	N	18.943	19.312	-0.369	-0.273	-0.019	N
46–50	129	27	19.172	10.406	2.390	0.142	Y	16.783	19.727	-2.945	-2.670	-0.175	Y
51–80	189	58	30.253	34.481	-1.153	-0.037	N	31.405	31.572	-0.167	-0.087	-0.005	N
81+	221	71	31.902	35.451	-0.968	-0.029	N	32.869	29.388	3.481	2.023	0.106	N
Class periods per day													
1–4	224	77	32.916	38.421	-1.501	-0.044	N	34.417	30.577	3.840	2.222	0.112	N
5–6	182	49	28.673	28.892	-0.060	-0.002	N	28.733	30.829	-2.097	-1.174	-0.073	N
7	167	38	24.750	20.837	1.067	0.045	N	23.683	24.023	-0.340	-0.205	-0.014	N
8–9	97	26	13.661	11.850	0.494	0.037	N	13.167	14.571	-1.404	-1.300	-0.107	N
Is the school coeducational?													
Yes	667	189	99.665	99.888	-0.061	-0.001	N	99.726	99.669	0.058	0.741	0.001	N
No, all-female school	‡	‡	0.231	0.112	0.033	0.164	N	0.199	0.237	-0.038	-0.512	-0.193	N
No, all-male school	‡	‡	0.104	#	#	#	N	0.075	0.094	-0.019	-0.988	-0.254	N
Student race/ethnicity[4]													
All other races	298	112	49.471	60.197	-2.924	-0.056	N	52.395	51.548	0.847	0.488	0.016	N
Asian	52	15	2.688	1.908	0.213	0.086	N	2.475	2.451	0.024	0.090	0.010	N
Black or African American	167	31	24.174	18.869	1.446	0.064	N	22.728	23.645	-0.918	-0.708	-0.040	N
Hispanic or Latino	153	32	23.667	19.026	1.265	0.056	N	22.402	22.355	0.046	0.034	0.002	N
10th-grade enrollment													
0–99	103	23	9.173	9.058	0.031	0.003	N	9.142	9.475	-0.334	-0.277	-0.036	N
100–249	131	40	20.203	19.590	0.167	0.008	N	20.036	18.413	1.622	1.072	0.081	N
250–499	232	69	34.173	42.579	-2.292	-0.063	N	36.465	34.561	1.904	1.045	0.052	N
500+	204	58	36.451	28.773	2.093	0.061	N	34.358	37.550	-3.192	-1.847	-0.093	N

See notes at end of table.

Table 32. Nonresponse bias before and after nonresponse adjustment for dropouts, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Total enrollment													
≤ 600	130	33	14.925	13.395	0.417	0.029	N	14.508	14.201	0.307	0.209	0.021	N
601–1,200	149	48	21.800	26.169	-1.191	-0.052	N	22.991	21.263	1.728	1.095	0.075	N
1,201–1,800	189	56	29.132	29.408	-0.075	-0.003	N	29.207	27.968	1.239	0.780	0.042	N
> 1,800	202	53	34.143	31.027	0.849	0.026	N	0.023	0.028	-0.006	-0.993	-0.258	N
Enrollment status													
Out of school	669	190	99.969	100.000	-0.008	#	N	99.977	99.972	0.006	—	#	N
Free or reduced-price lunch													
0	27	6	2.288	1.554	0.200	0.096	N	2.088	2.848	-0.760	-1.022	-0.364	N
1–10	106	37	18.462	21.421	-0.807	-0.042	N	19.268	18.439	0.829	0.489	0.043	N
11–30	220	65	34.551	33.426	0.307	0.009	N	34.244	35.744	-1.499	-0.920	-0.044	N
> 30	317	82	44.699	43.599	0.300	0.007	N	44.400	42.969	1.430	0.762	0.032	N
Number of full-time teachers													
1–40	140	35	15.869	10.743	1.398	0.097	N	14.472	15.023	-0.551	-0.465	-0.038	N
41–70	129	46	18.489	25.637	-1.949	-0.095	N	20.438	17.780	2.657	1.773	0.130	N
71–100	194	57	30.095	32.966	-0.783	-0.025	N	30.877	31.115	-0.237	-0.137	-0.008	N
101+	207	52	35.547	30.654	1.334	0.039	N	34.213	36.082	-1.869	-1.114	-0.055	N
Number of grades within the school													
4	533	152	81.030	78.088	0.802	0.010	N	80.228	82.281	-2.053	-1.226	-0.026	N
> or < 4	137	38	18.970	21.912	-0.802	-0.041	N	19.772	17.719	2.053	1.226	0.104	N
Types of grades within the school													
K–12, PreK–10th, 1st–12th, PreK/1st–9th/12th and PreK–12 schools	18	4	2.146	5.069	-0.797	-0.271	N	2.943	2.666	0.277	0.235	0.094	N
Middle grades but no elementary	60	13	8.457	4.499	1.079	0.146	N	7.378	6.427	0.952	0.927	0.129	N
Only high school	592	173	89.396	90.432	-0.282	-0.003	N	89.679	90.907	-1.228	-0.821	-0.014	N
Hispanic 10th-grade enrollment percent													
≤ 3 percent	248	67	34.371	37.298	-0.798	-0.023	N	35.169	31.527	3.642	2.019	0.104	Y
> 3 percent	422	123	65.629	62.702	0.798	0.012	N	64.831	68.473	-3.642	-2.019	-0.056	Y

See notes at end of table.

Table 32. Nonresponse bias before and after nonresponse adjustment for dropouts, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
IEP[5] percentage													
≤ 5 percent	158	51	19.525	26.546	-1.914	-0.089	N	21.439	19.635	1.804	1.115	0.084	N
6–10 percent	186	54	34.592	32.195	0.653	0.019	N	33.938	32.693	1.245	0.707	0.037	N
11–15 percent	203	57	30.611	27.038	0.974	0.033	N	29.637	31.111	-1.474	-0.904	-0.050	N
> 15 percent	123	28	15.272	14.221	0.287	0.019	N	14.986	16.561	-1.575	-1.147	-0.105	N
LEP[6] percentage													
0 percent	201	70	24.965	34.034	-2.472	-0.090	N	27.437	26.449	0.989	0.654	0.036	N
1 percent	154	29	24.395	12.640	3.205	0.151	Y	21.190	22.109	-0.919	-0.645	-0.043	N
2–5 percent	118	36	19.251	23.948	-1.280	-0.062	N	20.531	18.538	1.994	1.250	0.097	N
> 6 percent	197	55	31.389	29.378	0.548	0.018	N	30.841	32.905	-2.064	-1.156	-0.067	N
Urbanicity													
Urban	263	64	37.056	36.739	0.086	0.002	N	36.970	40.296	-3.326	-1.925	-0.090	N
Suburban	276	92	43.284	47.660	-1.193	-0.027	N	44.477	41.161	3.316	1.863	0.075	N
Rural	131	34	19.659	15.601	1.106	0.060	N	18.553	18.544	0.009	0.007	0.001	N
All other races 10th-grade enrollment percent													
≤ 80 percent	434	109	65.990	59.564	1.752	0.027	N	64.238	64.267	-0.029	-0.017	#	N
> 80 percent	236	81	34.010	40.436	-1.752	-0.049	N	35.762	35.733	0.029	0.017	0.001	N
Number of part-time teachers													
0–1	272	82	42.411	45.376	-0.808	-0.019	N	43.219	42.483	0.736	0.414	0.017	N
2–3	167	39	24.305	20.452	1.050	0.045	N	23.254	24.895	-1.641	-1.054	-0.071	N
4–6	156	49	22.251	23.508	-0.343	-0.015	N	22.594	21.402	1.192	0.895	0.053	N
7+	75	20	11.033	10.664	0.101	0.009	N	10.933	11.220	-0.288	-0.245	-0.026	N
Full-time teacher certified													
0–90 percent	135	49	16.745	21.346	-1.254	-0.070	N	18.000	16.025	1.975	1.414	0.110	N
91–99 percent	134	34	23.639	22.456	0.323	0.014	N	23.317	23.962	-0.645	-0.388	-0.028	N
100 percent	401	107	59.615	56.197	0.932	0.016	N	58.683	60.013	-1.330	-0.698	-0.023	N

See notes at end of table.

Table 32. Nonresponse bias before and after nonresponse adjustment for dropouts, by selected categorical variables: 2004—Continued

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Geocode													
Census division (public schools)													
Public-New England/Middle Atlantic[7]	115	38	17.689	22.811	-1.396	-0.073	N	19.085	19.386	-0.301	-0.217	-0.016	N
Public-East North Central	98	27	14.843	15.744	-0.246	-0.016	N	15.089	14.436	0.652	0.439	0.043	N
Public-West North Central	40	11	5.665	5.934	-0.073	-0.013	N	5.739	5.874	-0.136	-0.183	-0.024	N
Public-South Atlantic	132	38	20.966	19.734	0.336	0.016	N	20.630	18.943	1.687	1.239	0.082	N
Public-East South Central	64	10	8.380	6.045	0.637	0.082	N	7.744	7.531	0.213	0.243	0.027	N
Public-West South Central	66	18	10.038	5.776	1.162	0.131	N	8.876	8.817	0.059	0.099	0.007	N
Public-Mountain	31	18	6.531	10.065	-0.963	-0.129	N	7.494	8.102	-0.608	-0.586	-0.081	N
Public-Pacific	87	22	14.159	8.955	1.419	0.111	N	12.741	15.109	-2.368	-2.163	-0.186	N
Census region (private schools)													
Private-Northwest	‡	‡	0.177	0.112	0.018	0.112	N	0.159	0.214	-0.055	-0.729	-0.344	N
Private-Midwest	12	3	0.576	0.243	0.091	0.187	N	0.485	0.643	-0.158	-1.214	-0.325	N
Private-South	18	3	0.544	0.361	0.050	0.101	N	0.494	0.629	-0.135	-1.069	-0.273	N
Private-West	5	‡	0.432	4.220	-1.033	-0.705	N	1.464	0.315	1.149	1.005	0.785	N
Number of days in school year													
Less than 180 days	167	41	23.478	18.139	1.455	0.066	N	22.023	22.108	-0.085	-0.073	-0.004	N
180 days	379	115	55.810	66.759	-2.985	-0.051	N	58.795	57.642	1.153	0.644	0.020	N
More than 180 days	124	34	20.712	15.101	1.530	0.080	N	19.183	20.250	-1.068	-0.677	-0.056	N
School sector													
Public	633	182	98.272	95.064	0.874	0.009	N	97.397	98.199	-0.802	-0.698	-0.008	N
Catholic	9	‡	0.469	0.112	0.098	0.262	N	0.372	0.419	-0.047	-1.133	-0.126	N
Other private	28	7	1.259	4.824	-0.972	-0.436	N	2.231	1.382	0.848	0.737	0.380	N
Student sex													
Male	375	107	53.769	49.503	1.163	0.022	N	52.606	56.236	-3.629	-2.015	-0.069	Y
Female	295	83	46.231	50.497	-1.163	-0.025	N	47.394	43.764	3.629	2.015	0.077	Y

— Not available.
\# Rounds to zero.
‡ Reporting standards not met.
[1] Design weight is used before nonresponse adjustment. This is the distribution to each response category.
[2] "Y" denotes statistical significance at $p < .05$. "N" denotes no statistical significance.
[3] Weight after nonresponse adjustment.
[4] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.
[5] IEP = Individualized Education Program.
[6] LEP = limited English proficient.
[7] Collapsed category comprising two Census divisions.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Table 33. Nonresponse bias before and after nonresponse adjustment for early graduates, by selected categorical variables: 2004

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Asian 10th-grade enrollment percent													
≤ 2 percent	266	62	44.452	56.500	-2.339	-0.050	N	46.791	46.602	0.189	0.086	0.004	N
> 2 percent	291	65	55.548	43.500	2.339	0.044	N	53.209	53.398	-0.189	-0.086	-0.004	N
Black or African American 10th-grade enrollment percent													
≤ 4 percent	124	26	26.134	28.875	-0.532	-0.020	N	26.667	24.581	2.086	0.851	0.078	N
> 4 percent	433	101	73.866	71.125	0.532	0.007	N	73.333	75.419	-2.086	-0.851	-0.028	N
Minutes per class period													
≤ 45	59	16	9.856	13.018	-0.614	-0.059	N	10.470	10.196	0.274	0.227	0.026	N
46–50	96	29	19.762	21.386	-0.315	-0.016	N	20.078	17.716	2.361	0.884	0.118	N
51–80	148	21	28.707	16.765	2.318	0.088	N	26.389	28.081	-1.692	-0.896	-0.064	N
81+	254	61	41.674	48.831	-1.389	-0.032	N	43.063	44.007	-0.944	-0.431	-0.022	N
Class periods per day													
1–4	248	63	41.117	50.504	-1.822	-0.042	N	42.939	42.784	0.155	0.070	0.004	N
5–6	142	26	28.331	15.394	2.511	0.097	N	25.820	27.243	-1.424	-0.586	-0.055	N
7	115	29	21.095	25.131	-0.783	-0.036	N	21.878	19.087	2.792	1.501	0.128	N
8–9	52	9	9.457	8.972	0.094	0.010	N	9.363	10.886	-1.523	-1.337	-0.163	N
Is the school coeducational?													
Yes	551	127	99.503	100.000	-0.096	-0.001	N	99.599	99.452	0.147	1.371	0.001	N
No, all-female school	4	#	0.388	#	#	#	N	0.313	0.444	-0.131	-1.237	-0.419	N
No, all-male school	‡	#	0.109	#	#	#	N	0.088	0.104	-0.016	-1.311	-0.183	N
Student race/ethnicity[4]													
All other races	300	65	59.404	52.710	1.299	0.022	N	58.105	59.572	-1.468	-0.678	-0.025	N
Asian	52	8	3.048	1.989	0.206	0.072	N	2.843	2.745	0.098	0.319	0.035	N
Black or African American	114	29	19.738	22.655	-0.566	-0.028	N	20.304	21.077	-0.773	-0.576	-0.038	N
Hispanic or Latino	91	25	17.810	22.646	-0.939	-0.050	N	18.748	16.606	2.142	1.226	0.114	N
10th-grade enrollment													
0–99	86	11	11.487	3.285	1.592	0.161	Y	9.895	9.847	0.048	0.030	0.005	N
100–249	121	25	20.199	18.169	0.394	0.020	N	19.805	20.090	-0.286	-0.185	-0.014	N
250–499	198	54	34.678	47.137	-2.418	-0.065	N	37.097	37.600	-0.504	-0.250	-0.014	N
500+	152	37	33.636	31.409	0.432	0.013	N	33.204	32.462	0.742	0.293	0.022	N

See notes at end of table.

Table 33. Nonresponse bias before and after nonresponse adjustment for early graduates, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Total enrollment													
≤ 600	103	13	15.111	6.145	1.741	0.130	Y	13.370	13.700	-0.329	-0.204	-0.025	N
601–1,200	151	35	25.051	30.838	-1.124	-0.043	N	26.174	25.852	0.322	0.173	0.012	N
1,201–1,800	148	41	26.563	32.032	-1.062	-0.038	N	27.625	28.634	-1.009	-0.606	-0.037	N
> 1,800	155	38	33.275	30.985	0.445	0.014	N	32.831	31.814	1.017	0.405	0.031	N
Enrollment status													
In school, out of grade	556	127	99.675	100.000	-0.063	-0.001	N	99.738	99.698	0.040	0.952	#	N
Free or reduced-price lunch													
0	41	7	5.414	2.513	0.563	0.116	N	4.851	4.757	0.094	0.068	0.019	N
1–10	95	22	17.009	19.831	-0.548	-0.031	N	17.557	17.057	0.500	0.396	0.028	N
11–30	187	38	35.179	33.020	0.419	0.012	N	34.760	37.276	-2.516	-1.223	-0.072	N
> 30	234	60	42.398	44.636	-0.434	-0.010	N	42.832	40.910	1.922	0.796	0.045	N
Number of full-time teachers													
1–40	120	14	16.257	5.781	2.034	0.143	Y	14.224	16.944	-2.720	-2.548	-0.191	Y
41–70	128	24	19.676	22.688	-0.585	-0.029	N	20.261	20.663	-0.402	-0.233	-0.020	N
71–100	146	46	31.117	37.338	-1.208	-0.037	N	32.325	28.015	4.309	1.713	0.133	N
101+	163	43	32.949	34.193	-0.241	-0.007	N	33.191	34.378	-1.187	-0.573	-0.036	N
Number of grades within the school													
4	446	104	81.820	86.231	-0.856	-0.010	N	82.676	82.047	0.629	0.366	0.008	N
> or < 4	111	23	18.180	13.769	0.856	0.049	N	17.324	17.953	-0.629	-0.366	-0.036	N
Types of grades within the school													
K–12, PreK–10th, 1st–12th, PreK/1st–9th/12th and PreK–12 schools	28	‡	5.560	0.941	0.897	0.192	N	4.663	3.843	0.820	0.528	0.176	N
Middle grades but no elementary	37	10	4.392	5.150	-0.147	-0.032	N	4.539	4.514	0.025	0.046	0.005	N
Only high school	492	115	90.048	93.908	-0.749	-0.008	N	90.798	91.642	-0.844	-0.529	-0.009	N
Hispanic 10th-grade enrollment percent													
≤ 3 percent	217	55	35.238	38.850	-0.701	-0.020	N	35.939	37.863	-1.924	-1.005	-0.054	N
> 3 percent	340	72	64.762	61.150	0.701	0.011	N	64.061	62.137	1.924	1.005	0.030	N

See notes at end of table.

Table 33. Nonresponse bias before and after nonresponse adjustment for early graduates, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment					
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
IEP[5] percentage													
≤ 5 percent	157	30	27.199	18.845	1.622	0.063	N	25.577	24.098	1.479	0.662	0.058	N
6–10 percent	150	34	28.786	37.260	-1.645	-0.054	N	30.431	31.620	-1.189	-0.640	-0.039	N
11–15 percent	168	39	31.728	28.597	0.608	0.020	N	31.120	29.794	1.326	0.590	0.043	N
> 15 percent	82	24	12.288	15.297	-0.584	-0.045	N	12.872	14.488	-1.616	-1.286	-0.126	N
LEP[6] percentage													
0 percent	188	31	27.250	21.913	1.036	0.040	N	26.214	28.934	-2.721	-1.656	-0.104	N
1 percent	126	29	22.890	19.536	0.651	0.029	N	22.239	23.025	-0.786	-0.478	-0.035	N
2–5 percent	95	39	16.827	37.069	-3.929	-0.189	Y	20.757	17.924	2.832	1.680	0.136	N
> 6 percent	148	28	33.033	21.482	2.242	0.073	N	30.791	30.116	0.675	0.260	0.022	N
Urbanicity													
Urban	210	56	41.696	40.710	0.191	0.005	N	41.504	38.237	3.267	1.253	0.079	N
Suburban	256	53	43.490	45.431	-0.377	-0.009	N	43.867	47.048	-3.181	-1.451	-0.073	N
Rural	91	18	14.814	13.859	0.186	0.013	N	14.629	14.715	-0.086	-0.068	-0.006	N
All other races 10th-grade enrollment percent													
≤ 80 percent	345	79	64.455	56.894	1.468	0.023	N	62.987	61.991	0.996	0.490	0.016	N
> 80 percent	212	48	35.545	43.106	-1.468	-0.040	N	37.013	38.009	-0.996	-0.490	-0.027	N
Number of part-time teachers													
0–1	188	45	37.980	34.827	0.612	0.016	N	37.368	37.224	0.144	0.061	0.004	N
2–3	181	31	31.809	26.096	1.109	0.036	N	30.700	30.708	-0.008	-0.004	#	N
4–6	125	33	17.981	22.667	-0.910	-0.048	N	18.890	20.229	-1.338	-0.931	-0.071	N
7+	63	18	12.230	16.410	-0.812	-0.062	N	13.041	11.839	1.202	0.751	0.092	N
Full-time teacher certified													
0–90 percent	117	21	21.369	10.265	2.156	0.112	Y	19.214	17.568	1.646	0.640	0.086	N
91–99 percent	108	37	19.441	32.139	-2.465	-0.113	N	21.906	18.970	2.936	1.573	0.134	N
100 percent	332	69	59.190	57.596	0.309	0.005	N	58.880	63.462	-4.581	-1.859	-0.078	N

See notes at end of table.

Table 33. Nonresponse bias before and after nonresponse adjustment for early graduates, by selected categorical variables: 2004—Continued

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Geocode													
Census division (public schools)													
Public-New England/Middle Atlantic[7]	56	13	10.900	7.828	0.596	0.058	N	10.304	10.698	-0.394	-0.292	-0.038	N
Public-East North Central	80	17	14.068	17.413	-0.649	-0.044	N	14.717	15.377	-0.660	-0.456	-0.045	N
Public-West North Central	33	10	5.546	6.753	-0.234	-0.041	N	5.780	6.403	-0.623	-0.895	-0.108	N
Public-South Atlantic	113	31	20.509	22.393	-0.366	-0.018	N	20.875	20.364	0.511	0.371	0.024	N
Public-East South Central	43	10	6.434	8.027	-0.309	-0.046	N	6.743	7.004	-0.261	-0.306	-0.039	N
Public-West South Central	89	26	14.695	23.286	-1.668	-0.102	N	16.363	13.900	2.463	1.526	0.151	N
Public-Mountain	34	6	8.080	7.974	0.021	0.003	N	8.060	10.474	-2.414	-1.935	-0.300	N
Public-Pacific	66	6	15.517	4.786	2.083	0.155	N	13.434	13.072	0.362	0.145	0.027	N
Census region (private schools)													
Private-Northwest	4	‡	0.418	0.272	0.028	0.073	N	0.390	0.389	0.001	0.012	0.002	N
Private-Midwest	12	5	0.597	0.922	-0.063	-0.096	N	0.660	0.685	-0.025	-0.242	-0.038	N
Private-South	18	‡	0.899	0.346	0.107	0.136	N	0.791	0.993	-0.201	-1.385	-0.254	N
Private-West	9	#	2.336	#	#	#	N	1.883	0.642	1.240	0.843	0.659	N
Number of days in school year													
Less than 180 days	131	39	22.161	34.883	-2.470	-0.100	N	24.631	23.966	0.665	0.430	0.027	N
180 days	330	71	60.394	51.556	1.716	0.029	N	58.678	59.943	-1.264	-0.577	-0.022	N
More than 180 days	96	17	17.445	13.561	0.754	0.045	N	16.691	16.092	0.599	0.327	0.036	N
School sector													
Public	514	119	95.750	98.460	-0.526	-0.005	N	96.276	97.291	-1.015	-0.695	-0.011	N
Catholic	8	‡	0.413	0.402	0.002	0.005	N	0.411	0.418	-0.007	-0.112	-0.018	N
Other private	35	6	3.837	1.138	0.524	0.158	N	3.313	2.291	1.022	0.699	0.309	N

See notes at end of table.

Table 33. Nonresponse bias before and after nonresponse adjustment for early graduates, by selected categorical variables: 2004—Continued

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Student sex													
Male	275	60	50.330	50.115	0.042	0.001	N	50.288	51.578	-1.289	-0.574	-0.026	N
Female	282	67	49.670	49.885	-0.042	-0.001	N	49.712	48.422	1.289	0.574	0.026	N

Rounds to zero.
‡ Reporting standards not met.
[1] Design weight is used before nonresponse adjustment. This is the distribution to each response category.
[2] “Y” denotes statistical significance at *p* < .05. “N” denotes no statistical significance.
[3] Weight after nonresponse adjustment.
[4] “All other races” includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.
[5] IEP = Individualized Education Program.
[6] LEP = limited English proficient.
[7] Collapsed category comprising two Census divisions.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Table 34. Nonresponse bias before and after nonresponse adjustment for homeschooled students, by selected categorical variables: 2004

Description	Before nonresponse adjustment: Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	After nonresponse adjustment: Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Asian 10th-grade enrollment percent													
≤ 2 percent	14	9	36.443	42.093	-1.802	-0.047	N	38.245	38.227	0.017	0.003	#	N
> 2 percent	26	11	63.557	57.907	1.802	0.029	N	61.755	61.773	-0.017	-0.003	#	N
Black or African American 10th-grade enrollment percent													
≤ 4 percent	20	‡	55.692	13.165	13.564	0.322	Y	42.128	52.812	-10.684	-1.776	-0.254	N
> 4 percent	20	18	44.308	86.835	-13.564	-0.234	Y	57.872	47.188	10.684	1.776	0.185	N
Minutes per class period													
≤ 45	13	5	25.215	19.633	1.781	0.076	N	23.435	29.804	-6.370	-1.384	-0.272	N
46–50	11	‡	24.487	7.603	5.385	0.282	N	19.102	26.071	-6.969	-1.766	-0.365	N
51–80	9	3	31.145	26.231	1.567	0.053	N	29.578	23.887	5.690	0.911	0.192	N
81+	7	10	19.152	46.534	-8.733	-0.313	N	27.886	20.237	7.648	1.472	0.274	N
Class periods per day													
1–4	8	10	27.383	46.534	-6.108	-0.182	N	33.491	20.526	12.965	2.110	0.387	N
5–6	11	3	32.682	26.231	2.058	0.067	N	30.624	33.051	-2.427	-0.453	-0.079	N
7	11	4	22.604	12.312	3.283	0.170	N	19.321	25.490	-6.169	-1.507	-0.319	N
8–9	10	3	17.331	14.924	0.768	0.046	N	16.564	20.933	-4.370	-1.068	-0.264	N
Is the school coeducational?													
Yes	37	20	97.424	100.000	-0.822	-0.008	N	98.246	97.834	0.411	1.141	0.004	N
No, all-female school	‡	#	1.651	#	#	#	N	1.125	1.335	-0.210	-0.932	-0.187	N
No, all-male school	‡	#	0.925	#	#	#	N	0.630	0.831	-0.201	-0.902	-0.320	N
Student race/ethnicity[4]													
All other races	29	15	66.631	72.847	-1.982	-0.029	N	68.614	67.280	1.334	0.252	0.019	N
Asian	‡	‡	0.395	2.952	-0.815	-0.673	N	1.211	0.323	0.887	0.959	0.733	N
Black or African American	4	3	12.742	17.877	-1.638	-0.114	N	14.379	12.116	2.263	0.590	0.157	N
Hispanic or Latino	6	‡	20.232	6.325	4.436	0.281	N	15.796	20.281	-4.485	-1.233	-0.284	N
10th-grade enrollment													
0–99	17	3	28.730	10.048	5.959	0.262	N	22.772	23.878	-1.106	-0.201	-0.049	N
100–249	6	5	14.005	23.254	-2.950	-0.174	N	16.955	14.172	2.783	0.707	0.164	N
250–499	9	9	30.745	40.466	-3.101	-0.092	N	33.845	33.079	0.766	0.142	0.023	N
500+	8	3	26.521	26.231	0.092	0.003	N	26.428	28.871	-2.443	-0.451	-0.092	N

See notes at end of table.

Table 34. Nonresponse bias before and after nonresponse adjustment for homeschooled students, by selected categorical variables: 2004—Continued

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Total enrollment													
≤ 600	16	‡	31.545	5.108	8.432	0.365	Y	23.113	26.242	-3.129	-0.579	-0.135	N
601–1,200	11	9	25.027	40.729	-5.008	-0.167	N	30.035	27.181	2.854	0.548	0.095	N
1,201–1,800	5	6	17.913	27.932	-3.196	-0.151	N	21.109	19.222	1.887	0.418	0.089	N
> 1,800	8	3	25.515	26.231	-0.228	-0.009	N	25.743	27.355	-1.612	-0.299	-0.063	N
Enrollment status													
Out of school	40	20	100.000	100.000	#	#	Y	100.000	100.000	#	—	#	N
Free or reduced-price lunch													
0	12	3	16.342	8.028	2.652	0.194	N	13.690	10.209	3.481	0.673	0.254	N
1–10	4	‡	11.845	16.425	-1.461	-0.110	N	13.306	12.785	0.521	0.126	0.039	N
11–30	14	7	48.928	41.624	2.330	0.050	N	46.599	53.474	-6.875	-1.192	-0.148	N
> 30	10	8	22.884	33.923	-3.521	-0.133	N	26.405	23.532	2.873	0.612	0.109	N
Number of full-time teachers													
1–40	20	6	40.155	26.043	4.501	0.126	N	35.654	36.874	-1.220	-0.203	-0.034	N
41–70	6	5	12.676	24.320	-3.714	-0.227	N	16.390	12.970	3.420	0.833	0.209	N
71–100	8	4	24.545	18.941	1.787	0.079	N	22.758	26.851	-4.093	-0.885	-0.180	N
101+	6	5	22.623	30.696	-2.575	-0.102	N	25.198	23.305	1.893	0.379	0.075	N
Number of grades within the school													
4	24	15	72.682	75.849	-1.010	-0.014	N	73.692	76.647	-2.955	-0.489	-0.040	N
> or < 4	16	5	27.318	24.151	1.010	0.038	N	26.308	23.353	2.955	0.489	0.112	N
Types of grades within the school													
K–12, PreK–10th, 1st–12th, PreK/1st–9th/12th and PreK–12 schools	10	‡	16.196	7.694	2.712	0.201	N	13.484	10.936	2.549	0.469	0.189	N
Middle grades but no elementary	5	#	8.692	#	#	#	N	5.920	8.908	-2.988	-1.626	-0.505	N
Only high school	25	18	75.112	92.306	-5.484	-0.068	N	80.596	80.157	0.439	0.080	0.005	N
Hispanic 10th-grade enrollment percent													
≤ 3 percent	12	8	25.884	35.141	-2.953	-0.102	N	28.837	25.398	3.439	0.730	0.119	N
> 3 percent	28	12	74.116	64.859	2.953	0.041	N	71.163	74.602	-3.439	-0.730	-0.048	N

See notes at end of table.

Table 34. Nonresponse bias before and after nonresponse adjustment for homeschooled students, by selected categorical variables: 2004—Continued

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
IEP[5] percentage													
≤ 5 percent	19	6	34.812	19.899	4.757	0.158	N	30.056	27.945	2.111	0.383	0.070	N
6–10 percent	9	6	30.592	34.188	-1.147	-0.036	N	31.739	32.697	-0.958	-0.175	-0.030	N
11–15 percent	7	3	21.799	23.138	-0.427	-0.019	N	22.226	23.538	-1.312	-0.265	-0.059	N
> 15 percent	5	5	12.797	22.776	-3.183	-0.199	N	15.979	15.820	0.159	0.038	0.010	N
LEP[6] percentage													
0 percent	22	12	43.965	50.930	-2.222	-0.048	N	46.187	41.181	5.005	0.840	0.108	N
1 percent	5	3	12.355	21.332	-2.863	-0.188	N	15.218	11.807	3.411	0.818	0.224	N
2–5 percent	7	4	23.244	21.025	0.708	0.031	N	22.536	26.781	-4.245	-0.855	-0.188	N
> 6 percent	6	‡	20.436	6.713	4.377	0.273	N	16.059	20.231	-4.172	-1.171	-0.260	N
Urbanicity													
Urban	10	3	17.742	8.028	3.098	0.212	N	14.644	20.807	-6.163	-1.679	-0.421	N
Suburban	19	10	57.755	57.268	0.155	0.003	N	57.599	52.817	4.783	0.836	0.083	N
Rural	11	7	24.503	34.705	-3.254	-0.117	N	27.757	26.376	1.380	0.280	0.050	N
All other races 10th-grade enrollment percent													
≤ 80 percent	17	12	49.219	55.986	-2.158	-0.042	N	51.377	52.461	-1.084	-0.183	-0.021	N
> 80 percent	23	8	50.781	44.014	2.158	0.044	N	48.623	47.539	1.084	0.183	0.022	N
Number of part-time teachers													
0–1	14	9	40.492	43.889	-1.083	-0.026	N	41.575	44.061	-2.485	-0.438	-0.060	N
2–3	9	5	26.332	21.688	1.481	0.060	N	24.851	18.514	6.337	1.148	0.255	N
4–6	9	4	19.750	20.768	-0.325	-0.016	N	20.075	22.015	-1.941	-0.417	-0.097	N
7+	8	‡	13.426	13.655	-0.073	-0.005	N	13.499	15.410	-1.911	-0.483	-0.142	N
Full-time teacher certified													
0–90 percent	17	3	36.817	8.028	9.182	0.332	Y	27.635	31.377	-3.743	-0.673	-0.135	N
91–99 percent	‡	3	9.238	17.397	-2.602	-0.220	N	11.841	9.107	2.734	0.741	0.231	N
100 percent	21	14	53.945	74.576	-6.580	-0.109	N	60.525	59.516	1.009	0.172	0.017	N

See notes at end of table.

Table 34. Nonresponse bias before and after nonresponse adjustment for homeschooled students, by selected categorical variables: 2004—Continued

Description	Before nonresponse adjustment							After nonresponse adjustment					
	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Geocode													
Census division (public schools)													
Public-New England/Middle Atlantic[7]	‡	4	7.581	21.468	-4.429	-0.369	N	12.010	10.267	1.743	0.408	0.145	N
Public-East North Central	8	‡	25.700	5.612	6.407	0.332	N	19.293	25.966	-6.673	-1.763	-0.346	N
Public-West North Central	‡	#	4.704	#	#	#	N	3.204	4.541	-1.337	-1.286	-0.417	N
Public-South Atlantic	4	4	12.578	25.748	-4.201	-0.250	N	16.778	12.706	4.072	0.923	0.243	N
Public-East South Central	‡	4	6.223	16.928	-3.414	-0.354	N	9.637	6.385	3.252	1.050	0.337	N
Public-West South Central	4	‡	11.439	2.727	2.779	0.321	N	8.660	12.417	-3.757	-1.279	-0.434	N
Public-Mountain	‡	#	5.854	#	#	#	N	3.987	6.805	-2.818	-1.252	-0.707	N
Public-Pacific	3	‡	9.184	17.136	-2.536	-0.216	N	11.720	10.379	1.341	0.298	0.114	N
Census region (private schools)													
Private-Northwest	‡	#	0.887	#	#	#	N	0.604	0.960	-0.356	-0.957	-0.589	N
Private-Midwest	‡	2	0.395	4.709	-1.376	-0.777	N	1.771	0.323	1.448	1.306	0.817	N
Private-South	6	2	11.413	5.673	1.831	0.191	N	9.582	4.064	5.518	1.059	0.576	N
Private-West	5	#	4.042	#	#	#	N	2.753	5.185	-2.432	-1.970	-0.883	N
Number of days in school year													
Less than 180 days	14	3	30.146	8.273	6.976	0.301	Y	23.170	32.305	-9.136	-2.116	-0.394	N
180 days	23	13	60.270	68.624	-2.664	-0.042	N	62.935	58.376	4.559	0.837	0.072	N
More than 180 days	3	4	9.584	23.103	-4.312	-0.310	N	13.895	9.319	4.577	1.103	0.329	N
School sector													
Public	27	16	83.262	89.618	-2.027	-0.024	N	85.290	89.467	-4.178	-0.806	-0.049	N
Catholic	‡	‡	2.181	2.920	-0.236	-0.098	N	2.416	1.842	0.574	0.589	0.238	N
Other private	11	3	14.557	7.462	2.263	0.184	N	12.294	8.690	3.604	0.692	0.293	N

See notes at end of table.

Table 34. Nonresponse bias before and after nonresponse adjustment for homeschooled students, by selected categorical variables: 2004—Continued

	Before nonresponse adjustment							After nonresponse adjustment						
Description	Unweighted respondents	Unweighted non-respondents	Respondent mean weighted[1]	Non-respondent mean weighted[1]	Esti-mated bias	Relative bias	SIG[2]	Overall mean, before adjust-ments[1]	Overall mean, after adjust-ments[3]	Esti-mated bias	Bias per standard error	Relative bias	SIG[2]
Student sex													
Male	20	8	56.978	44.752	3.899	0.073	N	53.079	56.685	-3.607	-0.631	-0.068	N
Female	20	12	43.022	55.248	-3.899	-0.083	N	46.921	43.315	3.607	0.631	0.077	N

— Not available.

[#] Rounds to zero.

‡ Reporting standards not met.

[1] Design weight is used before nonresponse adjustment. This is the distribution to each response category.

[2] "Y" denotes statistical significance at $p < .05$. "N" denotes no statistical significance.

[3] Weight after nonresponse adjustment.

[4] "All other races" includes White, American Indian or Alaska Native, Pacific Islander or Native Hawaiian, and Multiracial. All race categories exclude individuals of Hispanic or Latino origin.

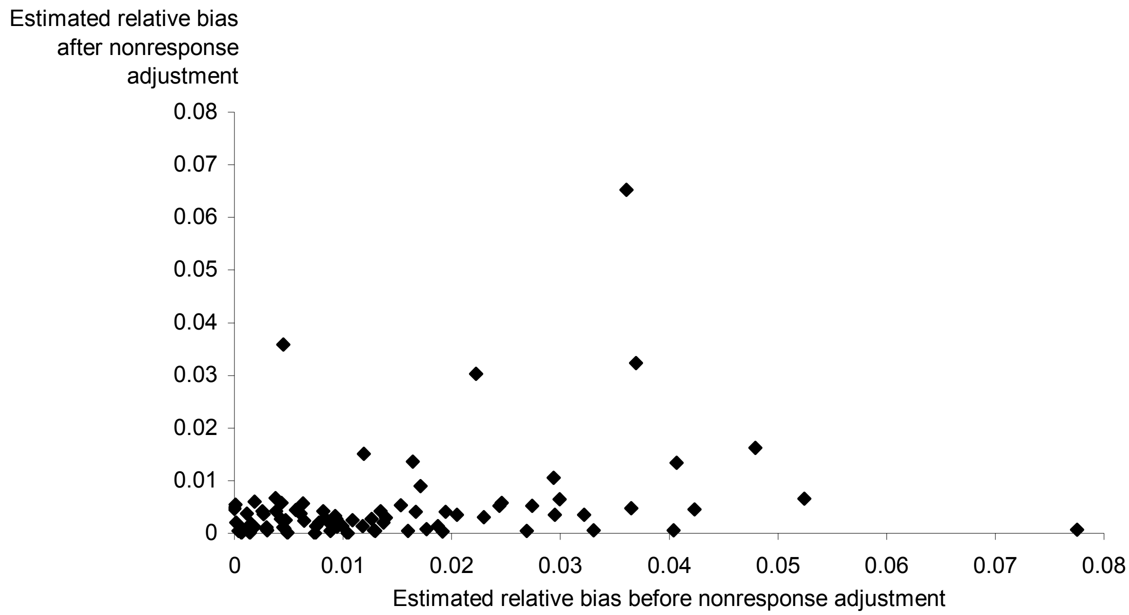
[5] IEP = Individualized Education Program.

[6] LEP = limited English proficient.

[7] Collapsed category comprising two Census divisions.

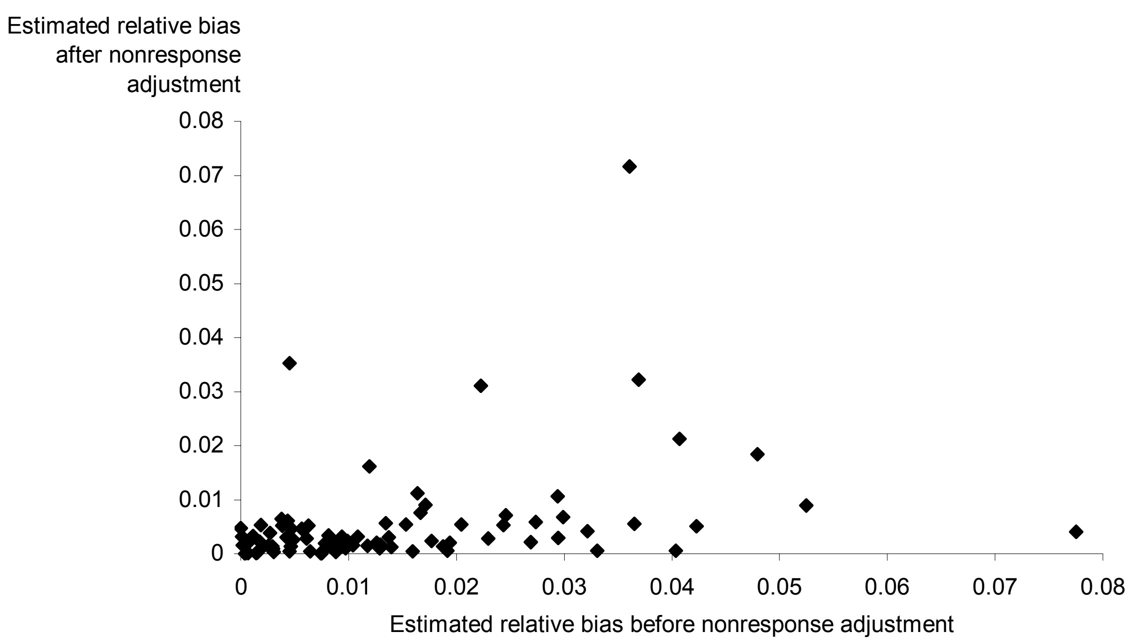
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Figure 6. Before versus after nonresponse adjustment estimates for relative bias for base-year sophomores using the cross-sectional weight: 2004



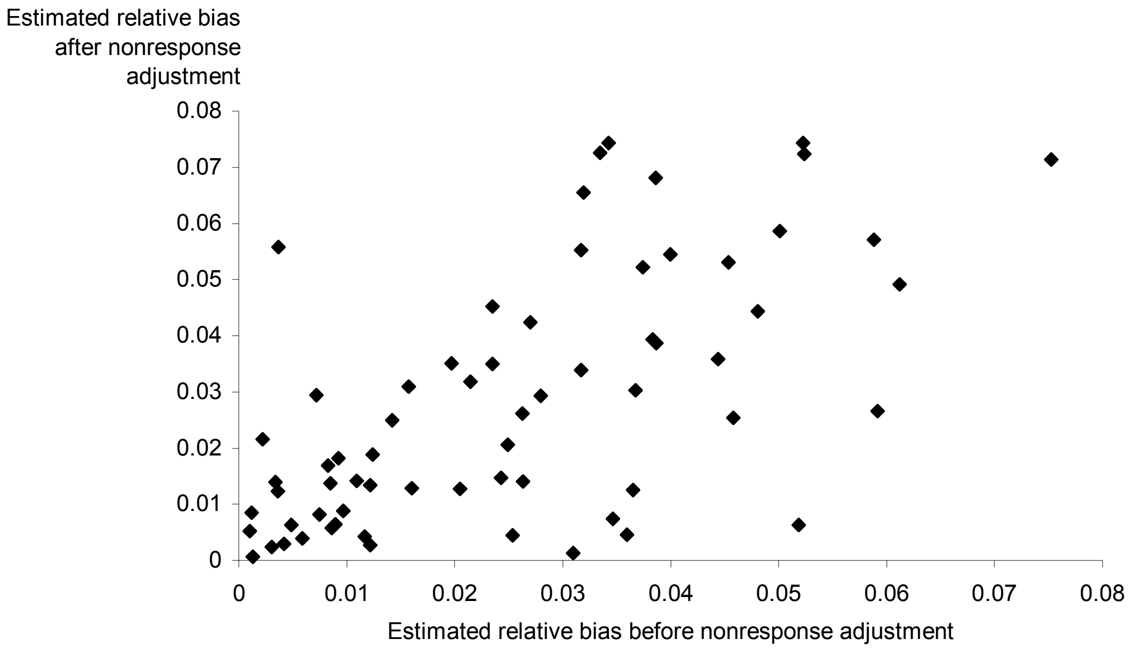
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Figure 7. Before versus after nonresponse adjustment estimates for relative bias for base-year sophomores using the panel weight: 2004



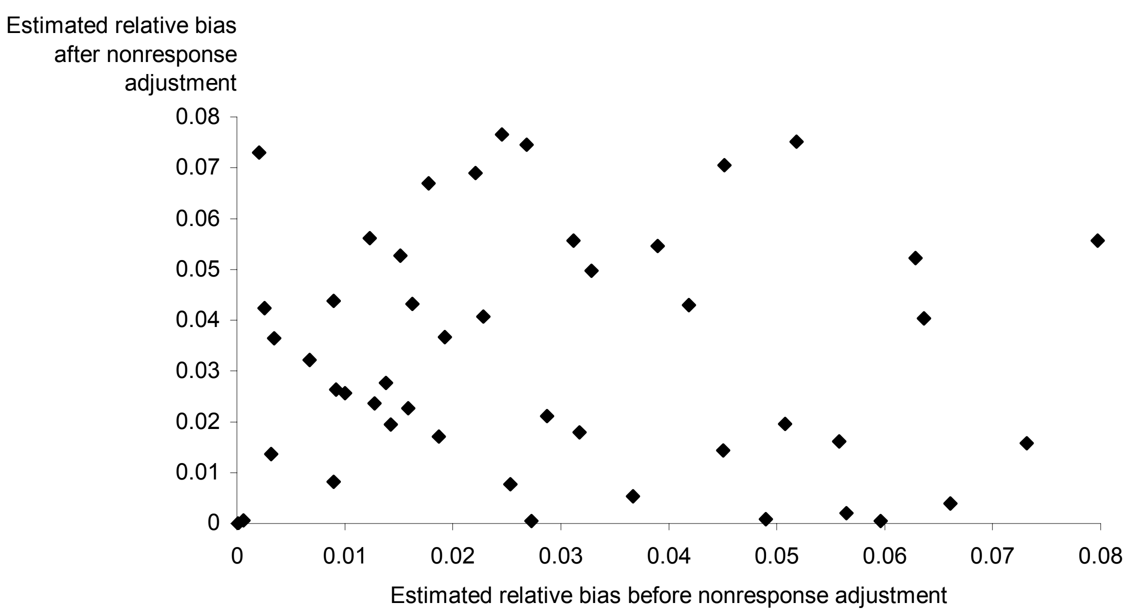
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Figure 8. Before versus after nonresponse adjustment estimates for relative bias for transfer students using the cross-sectional weight: 2004



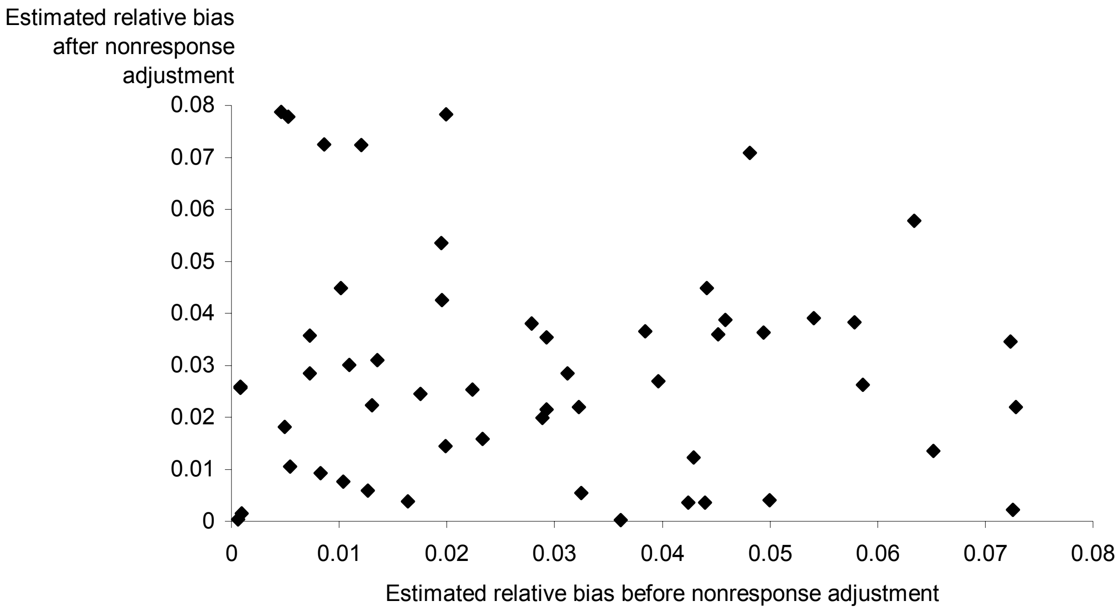
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Figure 9. Before versus after nonresponse adjustment estimates for relative bias for dropouts using the cross-sectional weight: 2004



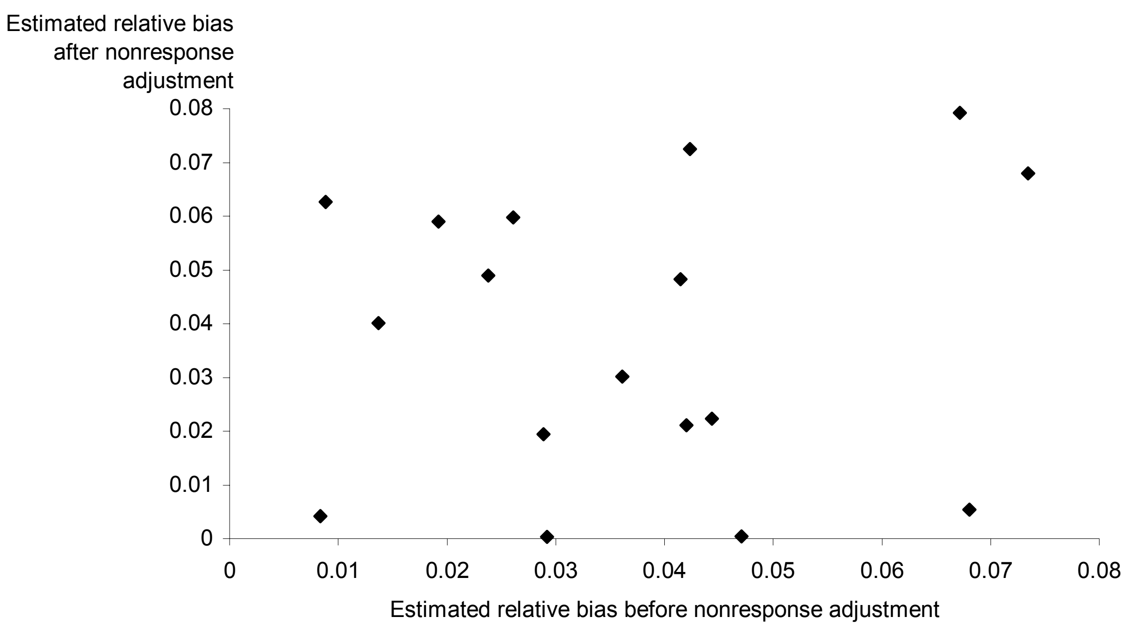
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Figure 10. Before versus after nonresponse-adjustment estimates for relative bias for early graduates using the cross-sectional weight: 2004



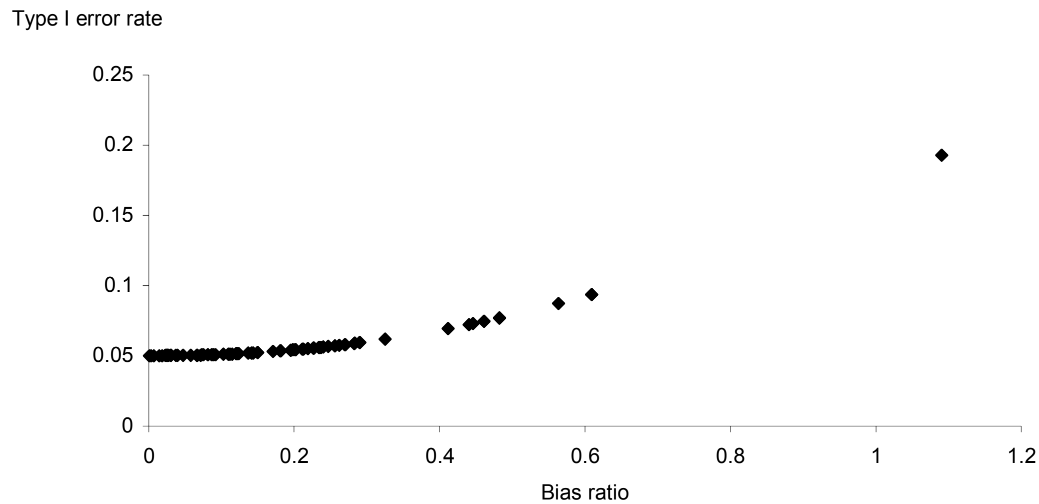
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Figure 11. Before versus after nonresponse adjustment estimates for relative bias for homeschooled students using the cross-sectional weight: 2004



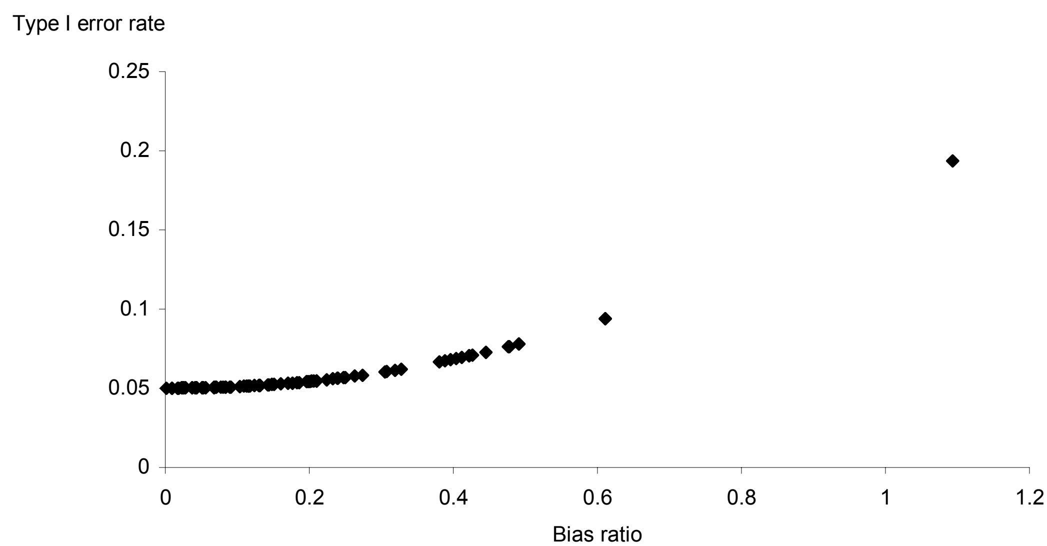
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Figure 12. Minimum bias ratio by Type I error rate for base-year sophomores using the cross-sectional weight: 2004



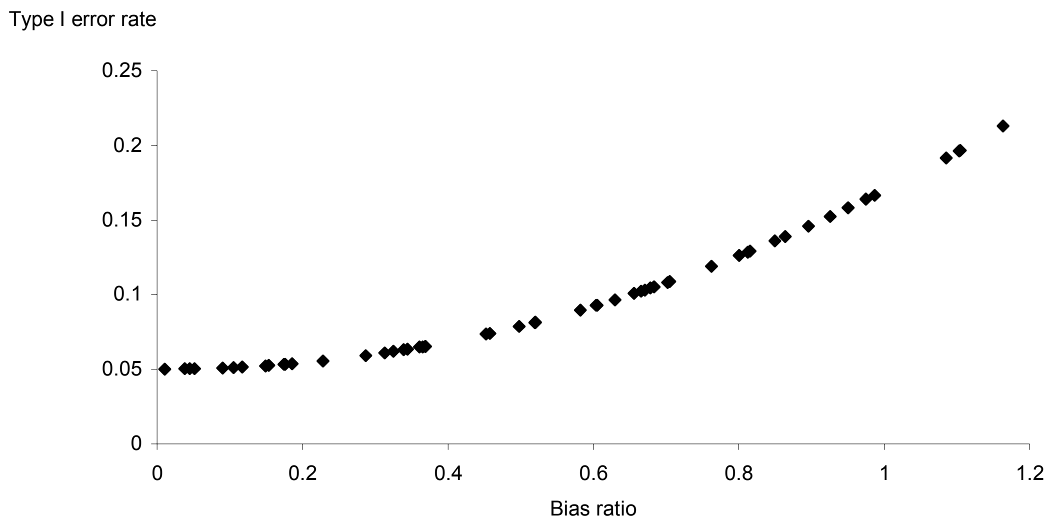
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Figure 13. Minimum bias ratio by Type I error rate for base-year sophomores using the panel weight: 2004



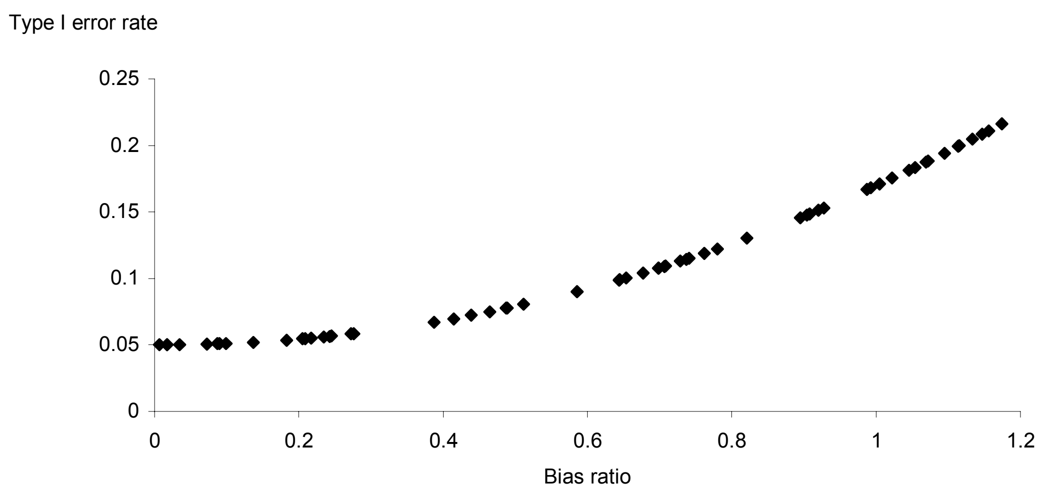
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Figure 14. Minimum bias ratio by Type I error rate for transfer students using the cross-sectional weight: 2004



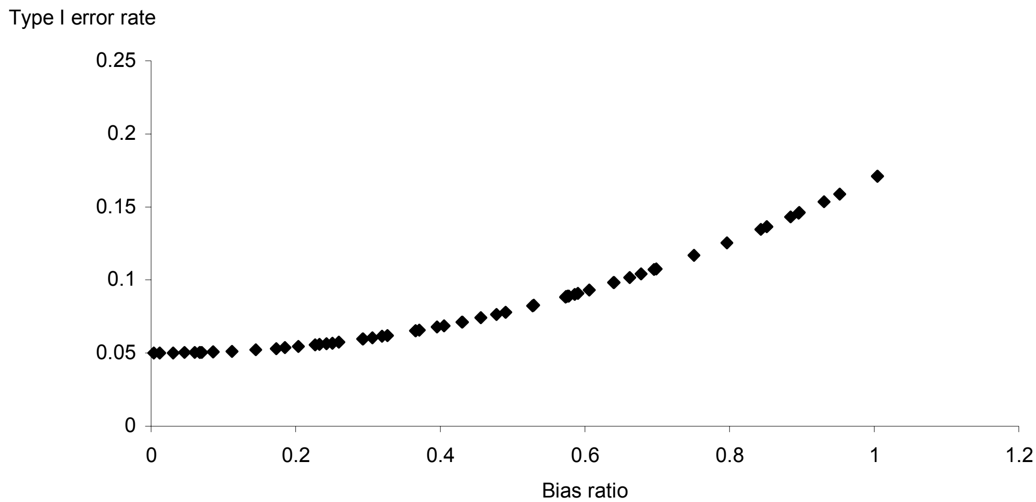
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Figure 15. Minimum bias ratio by Type I error rate for dropouts using the cross-sectional weight: 2004



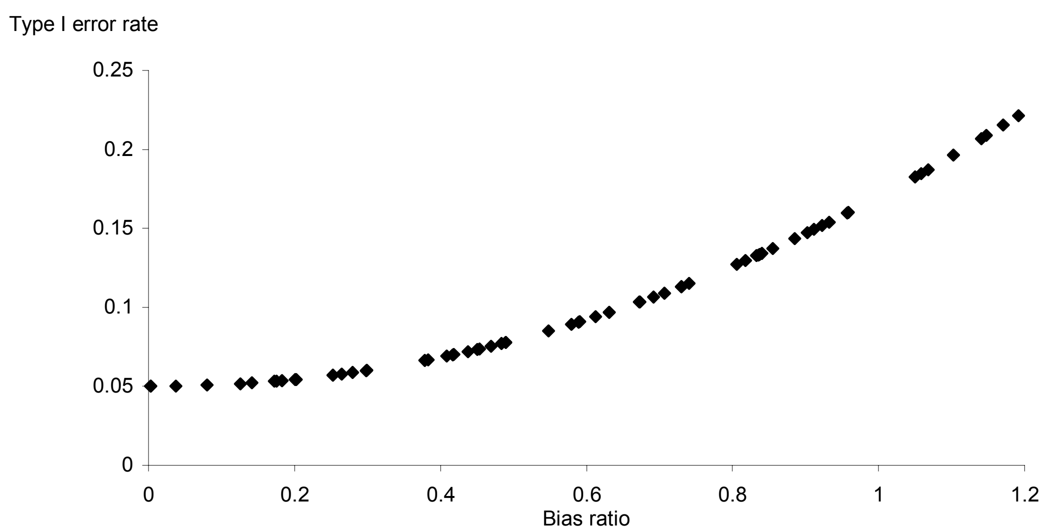
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Figure 16. Minimum bias ratio by Type I error rate for early graduates using the cross-sectional weight: 2004



SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Figure 17. Minimum bias ratio by Type I error rate for homeschooled students using the cross-sectional weight: 2004



SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Chapter 4
Data Collection Methodology and Results

4.1 Data Collection Overview

This chapter briefly describes data collection for the Education Longitudinal Study of 2002 (ELS:2002) base-year survey and, more expansively, data collection for the first follow-up. The discussion of first follow-up data collection includes both in-school student data collection and out-of-school follow-up for those no longer in school or unable to take part in the school setting.

The base-year survey collected data from students, parents, teachers, librarians, and school administrators. Pre-data-collection activities included securing endorsements from educational organizations and gaining cooperation from state education agencies, school districts, and individual schools. Self-administered questionnaires and cognitive tests were the principal mode of data collection. Data collection primarily took place during in-school survey sessions conducted by an RTI field interviewer or team.

Base-year data were collected in spring term 2002. A total of 752 high schools participated, resulting in a weighted school response rate of 67.8 percent. A total of 15,362 students participated, primarily in in-school sessions, for an 87.3 percent weighted response rate.[28] Each sampled student's mathematics teacher and English teacher were given a questionnaire to complete. Weighted student-level coverage rates for teacher data were 91.6 percent (indicating receipt of a report from either the math teacher, the English teacher, or both). School administrators and library media coordinators also completed a questionnaire (weighted response rates were 98.5 percent and 95.9 percent, respectively). Mail questionnaires were sent to parents with a telephone follow-up for nonresponders. Student coverage for parent questionnaires was 87.5 percent (weighted). Survey administrators (SAs) completed a facilities checklist at each school. Full details about the base-year study may be found in the *Education Longitudinal Study of 2002: Base Year Data File User's Manual* (NCES 2004–405) (Ingels et al. 2004), available on the NCES website. The number of completed instruments and both weighted and unweighted completion rates are summarized in table 35.

[28] In a two stage-sample, a final response rate should be viewed as the product of both levels of participation. For example, with a school response rate of 67.8 percent and a student response rate of 87.3 percent, the final response rate taking both stages of the design into account is 67.8 * 87.3 = 59.2 percent. A school nonresponse analysis was conducted in the base year to establish that nonresponse bias at the school level was minimal and to provide a fuller basis for nonresponse adjustments in the final weighting. Similar analysis and adjustment were undertaken at the student level. For details see Ingels et al. (2004), *Education Longitudinal Study of 2002: Base Year Data File User's Manual* (NCES 2004–405), chapter 3, section 3.2.6.

Table 35. Summary of ELS:2002 base-year completion and coverage rates, by instrument: 2002

Instrument	Selected	Participated	Weighted percent	Unweighted percent
Student questionnaire	17,591	15,362	87.28	87.33
Student assessment[1]	15,362	14,543	95.08	94.67
Parent questionnaire[2]	15,362	13,488	87.45	87.80
Teacher ratings of students[3]	15,362	14,081	91.64	91.66
School administrator questionnaire	752	743	98.53	98.80
Library media center questionnaire	752	718	95.93	95.48
Facilities checklist	752	752	100.00	100.00

[1] Percentage of cases for which a student questionnaire and cognitive test were obtained. When a test was not obtained, test results were imputed.

[2] Indicates a coverage rate: the proportion of participating students with a parent report. More parents participated; completed case numbers reflect the records in the public-use data file, where parent (and teacher) data were excluded for students who did not complete a base-year student questionnaire.

[3] Indicates a coverage rate: ratings obtained from at least one teacher.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

First follow-up in-school data collection occurred between January and June 2004. Out-of-school data collection took place between February and August 2004 and included telephone and in-person interviews. Results are summarized in table 36.

Table 36. Summary of ELS:2002 first follow-up completion and coverage rates, by instrument: 2004

Instrument	Selected	Participated	Weighted percent	Unweighted percent
Total sample for public-use file	16,515	14,989	88.70	90.76
Student questionnaire	13,092	12,427	93.39	94.92
Student assessment[1]	12,427	10,995	87.40	88.48
School administrator questionnaire[2]	12,427	11,856	95.90	95.41
Transfer questionnaire	1,799	1,275	68.36	70.87
Dropout questionnaire	876	686	73.20	78.31
Early graduate questionnaire	687	560	80.64	81.51
Homeschool questionnaire	61	41	61.46	67.21

[1] Indicates a coverage rate: percentage of cases for which a student questionnaire and cognitive test were obtained. When a test was not obtained, test results were imputed.

[2] Indicates a coverage rate: percentage of students affiliated with base-year (2002) schools in 2004 (student questionnaire completers) for whom a school administrator report was obtained.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

Tables 37 and 38 give further information about response rates for each of the first follow-up questionnaires. Table 37 shows that overall about 89 percent (weighted; or 91 percent unweighted) of the total ELS:2002 sample (comprising both 2002 sophomores 2 years later and 2004 freshened seniors) were successfully surveyed—whether through completion of a student, transfer student, dropout, homeschool, or early graduate questionnaire.

Table 37. Summary of ELS:2002 first follow-up completion and coverage rates, overall results by student questionnaire, math assessment, and school questionnaire, by selected characteristics: 2004

Characteristic	Total[1]		Student questionnaire		Coverage: math assessment[2]		Coverage: school questionnaire[3]	
	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted
Total	88.70	90.76	93.39	94.92	87.40	88.48	95.19	95.41
Participated		14,989		12,427		10,995		11,856
Sampled		16,515		13,092		12,427		12,427
Base-year school sector								
Public	88.57	90.33	93.38	94.94	86.92	87.23	94.92	94.82
Catholic	92.36	93.64	93.85	95.40	92.92	92.46	98.81	98.14
Other private	87.97	90.57	92.90	94.05	92.73	92.89	97.40	96.18
Base-year school urbanicity								
Urban	86.74	89.25	92.18	93.93	85.91	88.73	94.86	96.09
Suburban	88.89	91.31	93.18	95.18	88.10	88.92	95.57	95.25
Rural	91.30	92.17	95.60	96.00	87.73	86.87	94.68	94.63
Base-year school region								
Northeast	88.07	90.56	92.02	93.75	84.88	86.70	92.34	93.62
Midwest	88.75	90.96	93.78	95.51	89.58	89.68	96.79	97.08
South	89.55	91.47	94.45	95.98	89.53	90.27	95.64	96.00
West	87.91	89.45	92.61	93.48	83.98	85.49	95.24	93.96
Race/ethnicity[4]								
American Indian or Alaska Native	89.83	90.44	95.98	94.90	87.85	84.95	98.91	97.85
Asian or Pacific Islander	89.39	90.54	93.35	94.08	85.39	87.42	96.31	95.23
Black or African American	87.78	89.36	94.55	95.38	86.25	87.11	91.67	92.09
Hispanic or Latino	88.25	89.91	94.16	95.10	85.22	86.19	96.51	95.88
More than one race	81.26	83.64	86.69	88.85	88.06	88.32	93.86	95.02
White	89.63	92.04	93.50	95.46	88.23	89.51	95.55	95.99

[1] A student, transfer, early graduate, dropout, or homeschool questionnaire was obtained.
[2] Percentage of participating student cohort members in base-year schools who completed the math test.
[3] Percentage of participating (i.e., questionnaire completers) student cohort members in base-year schools for whom administrator data were obtained.
[4] All race categories exclude individuals of Hispanic or Latino origin.
NOTE: Coverage rates are based on questionnaire completers associated with base-year (2002) schools in 2004 (i.e., sophomore cohort members who remained in base-year schools or freshened seniors at the same schools).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Table 38. Summary of ELS:2002 first follow-up completion and coverage rates, overall results by transfer, dropout, early graduate, and homeschool questionnaire, by selected characteristics: 2004

Characteristic	Transfer questionnaire		Dropout questionnaire		Early graduate questionnaire		Homeschool questionnaire	
	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted
Total	68.36	70.87	73.20	78.31	80.64	81.51	68.65	67.21
Participated		1,275		686		560		41
Sampled		1,799		876		687		61
Base-year school sector								
Public	67.57	69.28	73.85	78.10	80.19	81.26	67.16	63.64
Catholic	79.64	78.89	91.89	90.00	81.03	80.00	61.46	66.67
Other private	74.94	73.81	40.92	80.00	93.43	85.71	80.60	78.57
Base-year school urbanicity								
Urban	67.67	69.93	73.26	80.72	81.17	79.18	84.40	78.57
Suburban	69.13	71.43	71.50	75.60	79.80	82.85	68.29	65.52
Rural	67.75	71.84	77.20	79.64	81.60	83.49	60.07	61.11
Base-year school region								
Northeast	64.15	70.71	67.88	75.32	85.30	81.08	45.73	42.86
Midwest	64.81	67.89	72.22	78.87	76.77	79.62	86.44	78.57
South	71.79	72.63	77.62	80.78	76.77	79.34	64.89	60.71
West	69.07	71.55	71.01	75.15	89.42	90.16	70.34	83.33
Race/ethnicity[1]								
American Indian or Alaska Native	78.18	80.00	50.25	60.00	100.00	100.00	#	#
Asian or Pacific Islander	67.01	70.06	82.28	75.00	76.84	81.48	100.00	100.00
Black or African American	70.08	72.16	77.15	81.42	78.45	79.39	72.15	71.43
Hispanic or Latino	69.04	70.36	78.96	84.58	78.18	80.29	87.22	85.71
More than one race	62.39	61.95	68.26	75.93	69.82	75.00	32.40	25.00
White	67.82	71.72	68.80	74.37	83.03	83.18	63.55	65.85

Rounds to zero.

[1] All race categories exclude individuals of Hispanic or Latino origin.

NOTE: Coverage rates are based on questionnaire completers associated with base-year (2002) schools in 2004 (i.e., sophomore cohort members who remained in base-year schools or freshened seniors at the same schools).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Student questionnaire completers comprise those participating first follow-up sample members then currently (spring term 2004) associated with a base-year (2002) school. In other words, the student questionnaire sample was drawn from base-year sophomore cohort members who remained at their base-year school or seniors brought in through the freshening process at those same schools. There were 13,092 individuals in the sample eligible to complete a student questionnaire, and 12,427 did so. The overall response rate for this group was 93.4 percent, weighted (94.9 percent unweighted).

The mathematics assessment was administered to about 87 percent (weighted) of the student questionnaire sample (again, the individuals who remained in, or were freshened in, the base-year schools). For this same sample (students associated with a base-year school 2 years later), school administrator data are available 95 percent (weighted) of the time.

Of course, not all sophomore cohort members remained in their base-year schools. Many transferred to a new school. These students completed a transfer student questionnaire. (Although they did not complete the mathematics assessment, a mathematics score was imputed for them.) Table 38 shows that for transfer students, a 68.4 percent weighted (70.9 percent unweighted) questionnaire completion rate was achieved.

Dropouts were defined in ELS:2002 as sample members who were absent from school for 4 consecutive weeks or more at the time of the survey, and not absent due to accident or illness. Table 38 also shows that the sophomore cohort dropout participation rate was about 73 percent (though over 78 percent unweighted). Early graduates were defined as sample members who had graduated from high school or obtained certification of high school equivalency (e.g., obtained the General Educational Development [GED] credential) on or before March 15, 2004. Table 38 also provides information about early graduates (80.6 percent weighted response rate) and the small number (61) of 2002 sophomores who were in a homeschool situation 2 years later.

Although it is of interest to examine response rates in terms of the various first follow-up questionnaires, it is also of interest to examine questionnaire response in terms of such analytic populations as high school seniors. This examination requires that response rates for two different questionnaires, the student questionnaire and the transfer student questionnaire, be combined. The senior cohort comprises sophomore cohort members 2 years later who were spring-term seniors in 2004, regardless of whether they remained at the base-year school or transferred to a new school. It also includes a freshening sample of seniors who were not eligible for selection into the sophomore cohort (either because they were not in 10th grade in 2002 or were not in the country). Table 39 shows that over 94 percent of 2004 seniors completed a questionnaire. The table also reports separately on student questionnaire completers (the "stayers" who remained in the base-year schools and were seniors, and the freshened seniors in the same schools) and transfer questionnaire completers (the "movers" who went to another school and were also seniors in 2004).

Table 39. Questionnaire completion rate for ELS:2002 senior cohort, by selected characteristics: 2004

Characteristic	Completed student questionnaire		Completed transfer questionnaire		Overall completion rate	
	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted
Total (2004 seniors)	96.84	96.78	74.32	73.79	94.42	94.25
Participated		12,269		1,157		13,426
Sampled		12,677		1,568		14,245
Base-year school sector						
Public	96.77	96.57	73.63	72.07	94.30	93.89
Catholic	97.69	97.61	83.91	80.77	96.45	96.04
Other private	97.66	97.29	79.47	77.89	94.86	94.59
Base-year school urbanicity						
Urban	96.87	96.78	74.23	73.27	93.78	93.63
Suburban	96.58	96.72	75.03	74.52	94.44	94.52
Rural	97.46	96.94	72.55	73.09	95.25	94.66
Base-year school region						
Northeast	96.11	96.14	80.92	77.60	95.17	94.80
Midwest	97.54	97.53	69.40	70.36	94.44	94.41
South	97.14	97.14	75.61	74.60	94.71	94.63
West	96.28	95.84	74.62	74.38	93.37	92.92
Race/ethnicity[1]						
American Indian or Alaska Native	96.86	95.79	83.78	83.33	93.79	93.81
Asian or Pacific Islander	97.10	96.86	72.86	74.03	94.40	94.51
Black or African American	97.13	96.90	77.37	76.47	93.72	93.40
Hispanic or Latino	96.94	96.86	74.22	73.08	93.77	93.36
More than one race	96.60	95.19	67.61	63.74	93.19	91.07
White	96.77	96.87	73.48	73.91	94.82	94.87

[1] All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

4.2 First Follow-up Pre-Data-Collection Activities

Although the results of data collection have been described above, section 4.2 describes pre-data-collection activities, and sections 4.3 through 4.5 discuss in-school student and administrator and out-of-school data collection procedures. Prior to beginning first follow-up data collection, it was necessary to recruit schools and have the school coordinator (the point of contact for ELS:2002 at the school) fill out enrollment status update information (in anticipation of tracing and sampling activities). Additionally, SAs had to be hired and trained.

4.2.1 School Recruitment

States and districts had been informed in the base year that there would be a first follow-up 2 years later. For that reason, the states were not recontacted. For most districts, a courtesy letter was mailed reminding them about ELS:2002 and stating that their schools would be contacted to gain permission to collect follow-up data. A few districts required that a research application be resubmitted to return to the schools in their jurisdiction.

After receiving district approval (or 1 week after sending the district courtesy letter for those districts that did not require applications), each school was sent an information package by Federal Express. The package was addressed to the principal. It contained a letter from the project officer and a list of the students who had been sampled from the base year. The letter contained a request that the school update this student list with current student status and return it to RTI. The package also contained an endorsement letter from the district, if the district had provided a letter, and a district-level approval to conduct research if applicable.

Several days after the package was sent, schools were contacted by telephone. After determining the appropriate person with whom to speak, the recruiter discussed details of the study and answered any questions. If the school agreed to participate again, a school coordinator was identified. This person served as a point of contact at the school and was responsible for handling the logistical arrangements. Dates for Survey Day and two Makeup Days were scheduled. Also, the name of the staff member who should receive the school administrator questionnaire was obtained. The type of parental consent that the school required was determined, and approval was obtained for a student incentive.

Some 752 schools participated in the base-year study. When base-year schools were recontacted for the first follow-up, it was learned that five of the schools no longer had ELS:2002 sample members (enrolled in any grade at the school) or high school seniors (hence no freshening sample). These schools, therefore, were no longer eligible for the study. Of the eligible schools, 698 (93.4 percent) allowed RTI to return to collect data in the schools. In 44 cases, the school refused to allow RTI to return to the school to collect data. Three districts (representing a total of five schools) also refused to allow RTI to return to their schools to collect data. Data from students enrolled at these schools/districts were collected outside of the school setting. Students at the base-year schools completed student questionnaires and a math test at the in-school administration. School administrator questionnaires were collected.

A handful of base-year schools split into multiple schools between 2002 and 2004. Thus, in addition to schools that participated in the base year, five schools that received pools of students from base-year schools were included as new schools in survey activities but were not added to the probability sample. All five of these schools agreed to participate in the first follow-up. The students who had moved to these new schools in en masse transfers from a base-year school were asked to complete both the student questionnaires and the mathematics assessment. An in-school administration was held, with the full complement of makeup days. School administrator questionnaires were also collected to provide student contextual data; no school weight has been generated for the five new schools.

As expected, there were numerous instances in which students had transferred from the base-year school to another school. If five or more students had transferred to the same school, an attempt was made to conduct a Survey Day at the destination school. These schools were called “convenience” schools. Ten schools were identified as convenience schools and agreed to participate. Students at convenience schools completed transfer student questionnaires at the in-school administration but did not complete the math test. School administrator questionnaires were not collected at convenience schools.

At the time schools were recruited, recruiters ascertained the type of consent required by the school. A total of 91.2 percent of the schools allowed passive consent. Private, non-Catholic schools (other private) had the lowest rate of passive consent (88.6 percent allowing passive consent compared with 91.3 percent and 92.3 percent, respectively, for public and Catholic schools).

4.2.2 Presurvey Contacts With Schools

In the spring and again in the autumn of 2003, each base-year school was provided a list of ELS:2002 base-year sample members from their school. The school was asked to indicate whether each sample member was still enrolled at the school. For any sample member who was no longer enrolled, the school was asked to indicate the reason and date the student left. If the student had transferred to another school, the base-year school was asked to indicate the name and location of the transfer school. This information was gathered again in the spring of 2004, prior to the school’s scheduled Survey Day.

In the fall of 2003, each base-year school was also asked to provide a list of the 12th-graders enrolled at that school, so this information could be used as part of the freshening process.

4.2.3 Tracing the Student Sample

As noted in the prior section, schools were asked to identify sample members who no longer attended the base-year school. At the time, contact information for those individuals was collected.

A postcard update was mailed to all ELS:2002 sample members in the early fall of 2003. Sample members were asked to update contact information and return the postcard to RTI. A total of 3,830 postcards were returned by sample members. In addition, 280 mailings were returned from the post office with forwarding address information, and 1,028 were returned with no forwarding information.

Prior to the start of first follow-up data collection, location information for the sample members was processed through locating databases (including the U.S. Postal Service National Change of Address [NCOA] file). In addition, the following types of cases were sent through Telematch (a national database that provides telephone number):

- any case that had a new address from NCOA;
- any base-year nonrespondent or questionnaire-ineligible case;
- any base-year respondent that was a candidate for out-of-school data collection (because the base-year school identified the respondent as having left the school); and

- any base-year respondent or freshened eligible 12th-grader with an address but no phone number.

During the course of data collection, cases were sent to the tracing unit for intensive tracing if the telephone unit was unsuccessful in locating the sample member. Information crucial to tracing was collected at the time of the base-year data collection and was made available to the tracing staff. The students were asked to provide the following information when they completed the in-school questionnaire in the base year:

- student's full name, address, and current telephone number;
- student's Social Security number;
- full name, address, telephone number (both home and work), and e-mail address of mother/father or female/male guardian;
- full name, address, and telephone number of a close relative or friend not currently living with the student who is likely to know how to locate the student should the student relocate; and
- student's nickname, if any.

The questionnaire the parents completed contained a similar set of questions:

- student's Social Security number;
- parent's Social Security number;
- full name, address, and telephone number (home and work) of mother/father or female/male guardian; and
- full name, address, and telephone number of a close relative or friend not currently living with the family who is likely to know how to locate the student or the parent should the student or family relocate.

The tracing unit updated addresses and telephone numbers produced by these tracing activities directly into the ELS:2002 locator database. The database maintained the most current location information for the students (i.e., name, address, telephone number, and Social Security number) as well as historical data generated from various tracing activities.

Tracing sources included Fastdata (for name, address, and change of address searches), Experian (for address or Social Security number searches), LexisNexis (for Social Security number, address, and reverse phone searches), and Trans Union (to develop Social Security numbers from other information). In addition, the Department of Education's Central Processing System (CPS) was checked to see if sample members had applied for postsecondary financial aid using the Free Application for Federal Student Aid (FAFSA). Some 1,666 cases were sent for matching, with information located for 271 cases.

The in-house tracing unit was able to locate 1,137 sample members. Of the 1,611 cases that went through tracing, interviews were completed with 964 of them.

Cases that could not be located via telephone or database search were sent to the field for tracing. Field staff used sources such as apartment complex management, Department of Motor Vehicles' databases, real estate agents, voter registration rolls, and neighbors to try to locate sample members or their families. Field staff also often returned to the base-year school to see if any additional locating information could be provided.

Peer locating was also attempted. The locator inquired whether the sample member knew the whereabouts of other sample members from the same (base-year) school.

4.2.4 Training

4.2.4.1 Field Staff Recruitment and Training

In the first follow-up, 10 field supervisors (FS) and 85 survey administrators (SA) were hired and trained. Staff were identified from RTI's National Interviewer File, a database that contains information about available field staff across the country. Five of the FSs had worked on the base-year ELS:2002 study. A number of the SAs had worked on previous rounds of ELS:2002 (either as SAs or as SA assistants). The others had experience on a variety of other research studies.

Prior to training, each SA was mailed a copy of the SA manual and a home study exercise. The SAs were instructed to read the manual and complete the home study exercise before the first day of training. Project staff conducted training in Durham, North Carolina, on January 9–11, 2004. Table 40 presents the SA training agenda.

Each SA signed a confidentiality agreement and an affidavit of nondisclosure at the beginning of training. During training, contacts that had already been made with the schools were discussed, as well as contacts that each SA would need to make with the school coordinator prior to Survey Day. Survey Day logistics were covered as well as administration instructions for the student questionnaire and cognitive tests. Criteria for scheduling Makeup Days were also covered as well as how to schedule the Makeup Days with the coordinator. The field supervisor discussed the recruitment, hiring, and training procedures for SA assistants (SAs were responsible for hiring their own assistant). While explaining active and passive consent procedures, there was a discussion about contacting parents for gaining active permission and converting refusals.

Before the beginning of out-of-school field data collection, the field supervisors and regional supervisors identified SAs and other field personnel who would be suited to conduct in-person interviews with sample members. These staff received additional training by telephone. Training focused extensively on field tracing techniques and on administering a screener to sample members to determine the correct questionnaire to use for the interview. A total of 92 staff were trained to collect data in the field.

Table 40. Survey administration training agenda: 2004

Friday, January 9, 2004

- Introductions
- Confidentiality
- Prior NCES studies/overview of ELS:2002
- Prior contacts with schools
- Consent types
- Types of schools (base year, new, convenience)
- CAC and CAC exercise
- Roster
- Working with the school coordinator
- Role play—going over roster
  - Recognizing and dealing with reluctant coordinators
- Types of students
- Survey Day logistics
- Student and new participant student questionnaires (NPSQs)
- Math test
- Editing and edit exercise

Saturday, January 10, 2004

- Questions about previous day
- Unusual situations
- Coordinator honorarium
- Other end of Survey Day activities—collect school administrator, catalogs, nonresponding student form
- Transmittal form and transmittal form exercise
- Packing list
- Shipping materials
- Phone report to field supervisors
- Survey Day from start to finish
- Makeup Days
- Contacting parents (with role play)
- Hiring and training survey administrator (SA) assistants

Sunday, January 11, 2004

- Questions from previous days
- Student nonresponse follow-up
- Dealing with paperwork
- Dealing with disruptive students/other problems at schools
- Institutional Review Board (IRB) training
- Headway procedures
- Certification
- Distribution of assignments

4.2.4.2 Telephone Interviewer Training

Telephone interviewers were trained beginning on February 7, 2004. Several training classes were held in conjunction with the graduated release of sample to the telephone interviewers. Table 41 presents the telephone interviewer training agenda.

Telephone interviewer training included an overview of the study, frequently asked questions, practice with the various questionnaires, and practice with the computer-assisted telephone interview (CATI) Case Management System (how to get into the computer system, coding various call outcomes, etc.). Interviewers also had extensive practice on refusal avoidance and refusal conversion. Questionnaire practice took the form of "round robins" (where the entire group took turns asking various questions from the questionnaire and keying responses) and paired mocks (where two interviewers were paired together—one acted as the respondent and the other acted as the interviewer). Prior to beginning calling, interviewers had to pass a certification process to prove that they had mastered the training material. Certification included answering frequently asked questions as well as demonstrating proficiency in two practice interviews and refusal avoidance.

4.3 Data Collection Procedures—In-School

After training, each SA recruited, hired, and trained an SA assistant to help in the school. In some cases, the SA was able to use the same assistant for all of the assigned schools. However, in a few cases, the schools were far enough away from where the SA lived that it involved an overnight stay. In that case, the SA hired an SA assistant who lived close to the school.

The SAs received case assignment cards for each of their assigned schools. The case assignment cards contained information about the school, including the name and phone number of the school coordinator and the designated Survey Day and Makeup Days. Prior to the designated Survey Day, the SA contacted the coordinator to make sure that the Survey Day supplies had arrived and the arrangements were in place. The SA also asked for an update of sample members' status (e.g., if anyone had transferred/dropped out or if any of the students who had left the school had returned since the fall update) and determined the eligibility of students on the freshened 12th-grader list. At the same time, the SA determined if the coordinator had received any parental refusals. If so, the SA began refusal conversion efforts if the school coordinator was willing to provide a telephone number for the parent. In active consent schools, the SA also determined from the coordinator which parents had not yet returned permission forms. If the school was willing to provide telephone numbers and/or if contact information was available from base-year data collection, the SA began calling those parents to prompt them to return the forms.

Table 41. Telephone interviewer training agenda: 2004

Saturday, February 7, 2004

- Welcome/introduction of staff
- Introduction to ELS:2002/overview
- Demo interview (student interview)
- Group questions
  - Divide into groups; scripted questions asked by project staff; group discussion about reactions to questionnaire, project, etc.
- Frequently asked questions (FAQs)
  - Cover key FAQs in detail, present certification questions
- Confidentiality forms
- Screener—eligibility
  - Presentation about screener
- Round robin mock: Homeschool
- Incentives
- Round robin mock: Transfer
- Front-end practice
  - Intro to the front-end and computer-assisted telephone interview (CATI) Case Management System (CMS). Discuss what happens when no one answers the phone. Review how to code a refusal, intro to roster lines, etc.
- Round robin mock: Early graduate
- Quality control (QC)
  - QC meetings, monitoring, etc.

Sunday, February 8, 2004

- Questions from previous day
- Refusal avoidance presentation
  - Generic refusal avoidance presentation, tone of voice, listening skills, etc.; some project-specific material
- Round robin mock: Dropout
- Front-end practice
  - Brief review of previous day; in depth about roster lines, adding roster lines, informed consent, etc.
- Refusal avoidance practice (mocks)
  - Divide into groups or pairs; telephone interviewers (TIs) have scripted sheets and FAQs to use; mock phone calls with respondents; how to address concerns (some project-specific concerns based on field test)
- Round robin: New participant student
- Refusal avoidance practice (mocks)
  - Continuation from above; focus on project-specific concerns
- Scripted paired mocks
  - Divide into pairs—one TI is interviewer, the other is respondent
- Certification

On Survey Day at each school, the SA checked in with the school coordinator and collected any parental permission forms that had been received. In active consent schools, the SA checked the student roster to make sure that only students who had returned signed permission forms were allowed to participate. In both active and passive consent schools, the SA made sure that no one for whom the school received a parental refusal was allowed to participate unless the parent had rescinded that decision in writing. As students entered the testing room, they were checked off on the student roster. After the majority of the sampled students arrived, the school coordinator was asked to try to locate the students who were not present.

Survey Day at each school was staffed with one SA and one SA assistant. The SA labeled questionnaires and tests with each student's identification number. Prior to beginning data collection, the students were read a script describing the study, giving the elements of informed consent and instructions for completing the questionnaires/tests. Students who were base-year respondents received student questionnaires. Students who had not participated in the base year received new participant student questionnaires (NPSQs).

Each student was given a questionnaire to complete during a 45-minute group administration. After the questionnaires were collected, the SA handed out math tests. There were four different math test forms. Base-year mathematics test results determined which test form each base-year respondent received in the first follow-up (high, medium, or low difficulty). Students who did not participate in the base year were given a math test that encompassed a range of questions from high to low math ability. Students were given 26 minutes to complete the math test. While the students were taking the tests, the SA and SA assistant checked the student questionnaires for critical items. After the tests had been completed, the SA asked students who missed critical items to complete them before returning to class.

At the conclusion of the group administration, the SA gave each participating student an incentive if preapproved by the school. Nearly three-fourths of the schools (72.9 percent) approved a $20 cash incentive for each participating student. Approximately 20 percent of the schools did not approve cash but allowed a $20 gift certificate to be presented to each participating student. Approximately 4 percent of the schools did not allow either incentive but had alternative arrangements (such as a cash equivalent donation to the student council, school library, etc.). Fewer than 3 percent of the schools would not permit an incentive of any type.

After distributing the incentive and sending the students back to class, the SA determined whether a Makeup Day was necessary. A Makeup Day was automatically scheduled if three or more students who had permission to participate were not present for Survey Day. If fewer students missed the session, a decision was made on a case-by-case basis. If a Makeup Day was deemed necessary, the SA informed the school coordinator. Makeup Days had been scheduled during the recruitment phase of the study. During the first follow-up, 190 schools had only a Survey Day administration. A Survey Day and one Makeup Day were held at 320 schools. A total of 203 schools required a Survey Day and at least two Makeup Days. Because of the smaller number of students in makeup sessions, only one person covered Makeup Days. Generally, the SA conducted Makeup Days unless the SA assistant lived substantially closer to the school.

As expected, the first day of data collection at a school was the most productive. Of those who participated in in-school survey sessions, 87.5 percent (9,737) were interviewed on Survey Day, and the remaining 12.5 percent on a Makeup Day. Some 10.1 percent (1,126) participated on the first Makeup Day, and 2.4 percent (262) on a subsequent Makeup Day.

School coordinators were given a base honorarium of $50. However, as a graduated-results-based incentive, additional honorarium amounts of up to $50 were given for schools with high student response rates.

Table 42 shows the proportion of student questionnaire cases completed in in-school sessions versus those that had to be completed outside school. Table 43 reports on the completion rates for sample members who were classified as currently enrolled students at schools that allowed in-school survey administration for the first follow-up. Of the 12,161 students sampled from schools that allowed in-school survey administration, 89.0 percent who participated took part during the in-school administration. Even though these schools allowed at least one in-school Survey Day (and often one or more Makeup Days), it was nevertheless necessary to pursue some students outside school. An additional 5.8 percent were surveyed outside the school setting, to achieve an overall weighted participation rate of 94.8 percent.

Although questionnaire completion defines participation in ELS:2002, student questionnaire completers were also asked to complete a mathematics assessment. There is little difference in the ultimate questionnaire-defined response rates according to whether the school allowed a survey session (94.8 percent) or did not (93.4 percent), but a greater difference exists for test completion. Math test completion rates are shown in tables 44 and 45. Table 44 shows test completion rates of all sample members classified as currently (spring 2004) enrolled students in base-year schools regardless of whether the school allowed in-school data collection for the first follow-up. Math tests were collected for 93.1 percent (weighted) of all sample members classified as currently enrolled. Table 45 reports on test completion rates of currently enrolled student respondents at high schools where in-school Survey Days were held. As expected, the rate of test completion among questionnaire completers who attended schools that permitted in-school survey administration was quite high—99.1 percent.

Table 42. Proportion of student questionnaire cases completed in-school versus out-of-school, by selected characteristics: 2004

Characteristic	Total		In-school		Out of school		Nonrespondent	
	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted
Total	93.39	94.92	82.83	84.72	10.56	10.20	6.61	5.08
Participated		12,427		11,092		1,335		665
Sampled		13,092		13,092		13,092		13,092
Base-year school sector								
Public	93.38	94.94	82.39	83.62	10.99	11.32	6.62	5.06
Catholic	93.85	95.40	88.34	89.04	5.52	6.37	6.15	4.60
Other private	92.90	94.05	87.25	87.44	5.66	6.61	7.10	5.95
Base-year school urbanicity								
Urban	92.18	93.93	81.79	84.30	10.39	9.63	7.82	6.07
Suburban	93.18	95.18	82.20	85.12	10.98	10.06	6.82	4.82
Rural	95.60	96.00	85.89	84.44	9.72	11.57	4.40	4.00
Base-year school region								
Northeast	92.02	93.75	78.46	81.59	13.55	12.16	7.98	6.25
Midwest	93.78	95.51	84.74	86.68	9.04	8.83	6.22	4.49
South	94.45	95.98	86.43	87.69	8.02	8.29	5.55	4.02
West	92.61	93.48	79.27	80.19	13.34	13.30	7.39	6.52
Race/ethnicity[1]								
American Indian or Alaska Native	95.98	94.90	85.33	80.61	10.65	14.29	4.02	5.10
Asian or Pacific Islander	93.35	94.08	80.16	82.68	13.19	11.40	6.65	5.92
Black or African American	94.55	95.38	83.38	84.06	11.17	11.32	5.45	4.62
Hispanic or Latino	94.16	95.10	81.87	82.78	12.29	12.33	5.84	4.90
More than one race	86.69	88.85	74.80	79.24	11.89	9.62	13.31	11.15
White	93.50	95.46	83.73	86.19	9.78	9.27	6.50	4.54

[1] All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Table 43. Student questionnaire completion rates at base-year schools that allowed in-school data collection in the first follow-up, by selected characteristics: 2004

Characteristic	In-school		Out-of-school	
	Weighted	Unweighted	Weighted	Unweighted
Total	88.97	91.21	5.78	4.98
Participated		11,093		606
Sampled		12,161		12,161
Base-year school sector				
Public	88.73	90.64	6.06	5.70
Catholic	91.88	93.38	2.84	2.85
Other private	91.24	92.57	2.46	2.42
Base-year school urbanicity				
Urban	85.66	88.95	7.25	5.97
Suburban	89.20	91.71	5.74	4.79
Rural	93.16	94.11	3.74	3.66
Base-year school region				
Northeast	85.49	88.38	8.01	7.11
Midwest	90.21	92.49	4.71	4.14
South	92.42	93.86	3.48	3.22
West	85.46	87.66	8.44	7.08
Race/ethnicity[1]				
American Indian or Alaska Native	91.69	88.76	6.87	8.99
Asian or Pacific Islander	86.72	88.62	8.24	6.88
Black or African American	89.53	91.50	6.07	5.24
Hispanic or Latino	87.42	88.92	8.26	7.49
More than one race	84.25	85.36	5.33	5.43
White	89.67	92.68	5.03	3.93

[1] All race categories exclude individuals of Hispanic or Latino origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Table 44. Math test completion—all eligible students (students still associated with a base-year school at time of data collection, regardless of whether the school permitted an in-school survey session), by selected characteristics: 2004

Characteristic	Tests completed	
	Weighted	Unweighted
Total	93.06	93.99
Participated		10,995
Sampled		11,698
Base-year school sector		
Public	92.75	93.18
Catholic	95.96	96.14
Other private	97.32	97.36
Base-year school urbanicity		
Urban	91.01	92.65
Suburban	93.41	94.50
Rural	95.06	95.07
Base-year school region		
Northeast	91.03	92.20
Midwest	93.90	94.57
South	95.13	95.52
West	90.73	92.22
Race/ethnicity[1]		
American Indian or Alaska Native	93.03	90.80
Asian or Pacific Islander	90.82	92.32
Black or African American	92.65	93.48
Hispanic or Latino	90.26	91.34
More than one race	92.16	93.12
White	93.97	95.11

[1] All race categories exclude individuals of Hispanic or Latino origin.

NOTE: Students were eligible to take the mathematics test only if they were enrolled in their base-year (2002) school 2 years later (2004) or were a 2004 freshened senior in a base-year school that participated in the first follow-up.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Table 45. Math test completion—only base-year schools allowing survey days in the first follow-up, as a percentage of questionnaire completers, by selected characteristics: 2004

Characteristic	Tests completed	
	Weighted	Unweighted
Total	99.10	99.12
Participated		10,995
Sampled		11,093
Base-year school sector		
Public	99.08	99.04
Catholic	98.86	99.01
Other private	99.95	99.91
Base-year school urbanicity		
Urban	98.71	98.87
Suburban	99.41	99.41
Rural	98.87	98.77
Base-year school region		
Northeast	99.56	99.62
Midwest	98.79	98.78
South	98.72	98.81
West	99.69	99.67
Race/ethnicity[1]		
American Indian or Alaska Native	100.00	100.00
Asian or Pacific Islander	99.45	99.48
Black or African American	98.93	98.84
Hispanic or Latino	98.80	99.03
More than one race	97.99	99.04
White	99.25	99.12

[1] All race categories exclude individuals of Hispanic or Latino origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

4.4 Data Collection Procedures—School Administrator Survey

When schools were recruited for the first follow-up, school coordinators were asked to name an individual who would be responsible for completing the school administrator survey. Because the bulk of the questions were of a general nature about the school and its policies, any knowledgeable staff member was permitted to complete the majority of the questionnaire. It was required that the final section be filled out by the principal of the school. Because this section only took about 5 minutes to complete, it reduced the burden on the principal by allowing someone else in the school to complete the greater part of the questionnaire.

School administrator questionnaires were mailed to the designated survey recipients in February 2004. These questionnaires were sent to the base-year participating schools, including those schools that did not permit in-school data collection for the first follow-up (with the exception of 13 that refused both in-school administration and the school administrator questionnaire). Prompting for school administrator questionnaires was done during SA contacts with the schools. After the last Survey Day in the school, institutional recruiters prompted for questionnaires. In an attempt to boost participation, a small subset of the schools was offered the option of completing an abbreviated questionnaire designed to gather key data points. Schools were also offered the option of e-mailing or faxing the completed questionnaire instead of sending it by mail. A total of 712 questionnaires (94.7 percent) were received. Completed school administrator questionnaires were received from 98.9 percent of all of the schools that allowed first follow-up data collection in the schools and 47.8 percent of the schools that refused in-school data collection.

4.5 Data Collection Procedures—Out-of-School

During the school recruitment process, base-year schools were asked to provide enrollment status updates for sample members at three points in time: spring term of 2003, fall term of 2003, and several weeks prior to the scheduled Survey Day in spring term of 2004. For those who left their base-year school, the school was asked to provide contact information to allow for out-of-school data collection during the first follow-up survey period.

Telephone data collection began in February 2004. Sample members who were identified for initial contact by the telephone unit included those no longer enrolled at the base-year school and those who attended base-year schools that did not grant permission to conduct an in-school survey session. Other cases were identified for telephone follow-up after the Survey Day and all Makeup Days had taken place at the school the sample members attended.

For sample members under the age of 18, parental permission was obtained by telephone prior to initiating contact with the sample member. Once parental permission was obtained (and for those sample members aged 18 or older), a screener was administered to the sample member to determine eligibility and which type of questionnaire to administer (student, transfer, dropout, early graduate, or homeschool). Sample members who did not participate in the base year were also administered a new participant supplement (NPS).

Some nonresponding sample members were assigned to SAs for field follow-up. The determination of which cases were sent to the field was based on the distance of the sample member from the SA, the SA's availability, and whether telephone leads on the sample member had been exhausted. In March 2004, SAs were identified to work cases in the field that had proved difficult to reach by telephone. A total of 1,803 cases were assigned to field staff. The SAs were sent tracing information on each sample member. As with the telephone interviewing, SAs obtained parental permission for sample members under the age of 18. SAs also screened sample members prior to interviewing them to determine eligibility and which questionnaire to administer. A total of 797 sample members were interviewed in the field. An additional 80 field cases were completed either by mailed questionnaire or telephone interview and were withdrawn from the field assignment. (Questionnaires were mailed to sample members at their request, but there was no mass mailing.)

4.6 First Follow-up Yield

Tables 46 and 47 summarize additional data collection results for the ELS:2002 first follow-up that are of methodological interest. (Because they are not concerned with population estimates but have a methodological focus, the tables present only unweighted percentages.)

Overall yield by method of data collection is shown in table 46. The majority of those who responded did so during the in-school Survey or Makeup Day. Approximately 20 percent participated as a result of the telephone interview follow-up. Just over 5 percent were interviewed by a field interviewer.

Table 46. Overall yield, by method of data collection (unweighted percents): 2004

Method	Number of responses	Percent of total response
Total responses	14,989	100.00
In school	11,125	74.21
Mail	43	0.29
Telephone	3024	20.17
Field	797	5.33

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Table 47 summarizes response rates by the sample members' base-year status. As expected, response rates were higher for sample members who had been base-year respondents than for those who had not participated in 2002. Nevertheless, about two-thirds of the sample of base-year nonparticipants took part in the first follow-up, a high percentage given the past response propensities of this group. More specifically, the first follow-up response rate for base-year respondents was 92.4 percent, compared with 66.7 percent for base-year nonrespondents. Freshened sample members were enrolled in the 12th grade in the spring term of 2004 but had not been eligible to participate in the base year because they were either out of the country or were not high school sophomores at that time. Some 82.6 percent of freshened seniors completed a first follow-up student questionnaire. Finally, some sophomores sampled in the base year were unable, for reasons of their language status (insufficient command of English) or owing to a severe disability, to participate through questionnaire completion at the time (nonetheless, contextual data were collected for these individuals, who appear only on the base-year restricted-use file). A subset of these individuals was reclassified in the spring of 2004 as able to complete a questionnaire and took part in the study. These 105 individuals are included in the total row only; they are included on the public-use file ECB.

Table 47. Overall unweighted response rates, by base-year status: 2004

Base-year status	Eligible sample	Respondents	Response rate (unweighted percent)
Total	16,515[1]	14,989[1]	90.76
Base-year nonrespondent	976	651	66.70
Base-year respondent	15,227	14,062	92.35
Freshened 12th-grader	207	171	82.61

[1] Includes (shown only in totals) 105 sophomore cohort members who were classified as incapable of completing a questionnaire in 2002 but were reevaluated in 2004, found to be capable, and responded to the first follow-up survey.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, 2004.”

Chapter 5
Data Preparation and Processing

This chapter describes the automated systems used to control survey processes for the Education Longitudinal Study of 2002 (ELS:2002), including procedures used to maintain receipt control; aspects of data preparation (such as coding); and the various procedures for data capture, cleaning, and editing. The chapter is organized into seven sections: (1) overview of systems design, development, and testing; (2) data receipt; (3) coding for hardcopy instruments; (4) data capture for optically scanned instruments; (5) data cleaning and editing; (6) data capture and editing for computer-assisted telephone interviewing (CATI); and (7) data processing and file preparation.

5.1 Overview of Systems Design, Development, and Testing

Most systems were developed in the base year, then redesigned if necessary during the first follow-up field test with concern for the processes needed for the first follow-up main study. The effort was to test systems in a smaller environment to reveal points in which improvements could be implemented on a larger scale. After the field test, improvements were implemented and checked in a test environment.

The following systems were developed in the base year and refined and tested in the first follow-up field test:

- a recruiting system;
- a Survey Control System (SCS);
- a Survey Day materials generation program;
- a questionnaire receipt application;
- a web-based Integrated Management System (IMS);
- production reports;
- TELEform (application used for scanning questionnaires);
- a mail return application;
- an incentive tracking application;
- a field reporting system to help field supervisors track the status of in-school data collection and field interviewing;
- a Structured Query Language (SQL) server database to store scanned data responses;
- a scanned image database; and
- a student CATI instrument.

A full development process, including design, programming, testing, and implementation, was used in the creation of these systems. Specifications were developed in word processing documents and flowchart applications, and progress was tracked using Microsoft Project and Microsoft Excel. Specifications for questionnaires were designed in word processing documents and were updated to reflect what changed between the field test questionnaires and the full-scale questionnaires.

Between the field test and full-scale studies, systems and procedures were evaluated, and the following functionality was added to the full-scale operations:

- a field assignment system;
- a field materials generation system;
- mail generation invoked by requests in CATI;
- a computer-assisted data entry (CADE) program for the field screener;
- TELEform versions of out-of-school hardcopy questionnaires (i.e., transfer, dropout, early graduate);
- quality control steps implemented during scanning, rather than later during data delivery processes;
- data cleaning and editing programs;
- a scanned image archive server that allowed instant access to scanned questionnaires during the data cleaning and review process;
- a cleaning and editing application that allowed editors to review and correct questionnaire data as appropriate, working in conjunction with actual scanned images in cases in which inconsistent data occurred;
- a data review system that allowed reviewers to randomly review questionnaires with data to detect data deficiencies (e.g., scanning problems); and
- an occupation coding application.

5.2 Data Receipt

The data preparation facility received all materials returned to RTI after a school's survey was complete or school officials sent in completed questionnaires. Procedures were established to systematically receive and record all required forms; this process included the scanning of bar-coded labels. Receipt events were available for the full-scale study to identify questionnaires that were not completed fully or accurately and to allow project staff to follow up promptly. Different versions of questionnaires (e.g., student, transfer, early graduate, etc.) were easily distinguishable within the receipt process and were automatically batched separately based on the questionnaire type.

After questionnaires were received and added to the receipt system, a batch number was assigned to the questionnaire. To assist the project team in cases that required referring to a questionnaire, the system was able to access dynamically the status of an individual questionnaire and provide its batch number. If the questionnaire had moved beyond the scanning stage, the scanned image could be accessed as well. Questionnaires were occasionally identified for data removal (e.g., when parental consent was lacking). Rather than deal with the removal process manually, a spreadsheet was developed to document these cases, and case removal was integrated into the data delivery process. This approach was useful because it did not disrupt the questionnaire processes and provided the ability to add cases back to final data files when appropriate (e.g., when parental permission was obtained).

5.3 Coding for Hardcopy Instruments

The following text items were obtained in the questionnaires:

- mother/female guardian occupation (from student's new participant supplement);
- father/male guardian occupation (from student's new participant supplement);
- expected occupation after high school (from student questionnaire); and
- expected occupation at age 30 (from student questionnaire).

Occupation text was loaded into a coding application in which a coding specialist could select the correct code from the 16 occupation categories. The resulting codes were merged back into the data files.

5.4 Data Capture for Optically Scanned Instruments

The following questionnaires were developed for optical scanning:

- a student questionnaire;
- a new participant student questionnaire (new participant supplement joined with an abbreviated student questionnaire);
- four math tests;
- a school administrator questionnaire;
- an abbreviated student questionnaire;
- a new participant supplement;
- a transfer questionnaire;
- a not currently in school (dropout) questionnaire;
- an early graduate questionnaire; and
- a homeschool questionnaire.

After questionnaires were received and batched, they were ready for TELEform scanning. A TELEform questionnaire contained text fields that could be recognized by scanning machines and interpreted forms text to data through optical character recognition. Verifiers reviewed data that were not interpreted accurately by the scanning machines or were not consistent with expected ranges. Once verification was complete, the data were converted to an American Standard Code for Information Interchange (ASCII) file, and the questionnaire image was written to the server. This process provided immediate access to raw questionnaire data and a repository of images accessible by ELS:2002 staff.

TELEform development began with the field test TELEform document and specifications in Microsoft Word that indicated changes made between the field test and the full-scale study. Modifications were easily made, and variable names were updated appropriately. Any new TELEform documents were first developed in Microsoft Word as a specification. As changes in the TELEform document were required, the corresponding Microsoft Word document was updated using the “Track Changes” tool. Reviewers would compare the specifications to the printed version of the TELEform document to ensure that all questionnaires were the latest version. When a TELEform document was confirmed as final, internal testing of the scanning and data-writing processes occurred. About 10 forms were printed and filled out for testing purposes. The test forms were scanned so that the resulting data could be compared to the original questionnaire; this comparison would detect problems with the printed questionnaire, the scanning program, or the SQL server database.

Scanning procedures were evaluated after the field test in an effort to streamline the scanning process for the full-scale study. Different stages of the scanning process were timed, and averages across each stage (i.e., cutting, scanning, evaluation, verification, data/image commit) for each questionnaire were used to analyze system and staffing needs. The need for efficient archiving procedures arose from the large amount of space taken by scanned images on the server and the need for access to the image for review. An application was developed to control the archiving process across the tens of thousands of scanned images. Archive procedures were modified from those used during the field test, and an SQL database was created to track what had been archived (and to which CD volume) for easy image retrieval.

Questionnaire data were committed to ASCII data files and loaded with a scheduled process into an SQL server database each night. Raw SQL server data were compared to the original questionnaires to ensure that scanning procedures were accurately storing data to the SQL server. The SCS tracked each form that was scanned by indicating a scanned event whenever the SQL server database was updated for a questionnaire. If a record was not transmitted successfully before or during the commit (i.e., nightly loading process) to the SQL server, a scanned event would be lacking for the questionnaire and could be easily identified later for rescanning. This approach ultimately ensured that all questionnaires had a corresponding data record and could not be dropped without detection.

5.5 Data Cleaning and Editing

An application was developed in which case/item-specific issues were reviewed and new values were recorded for subsequent data cleaning and editing. Records were selected for review based on one of the following criteria: random selection, suspicious values during frequency reviews, values out of expected ranges, and values not adhering to a particular skip pattern. The review application provided the case/item-level information, reasons for review, and a link to the scanned image of the questionnaire. Reviewers determined scanning corrections, recommended changes (if respondents had misinterpreted the question), and reviewed items randomly to spot potential problems that would require more widespread review.

The application was built on an SQL server database that contained all records for review and stored the recommended data changes. Editing programs built in SAS read the SQL server database to obtain the edits and applied the edits to the questionnaire data. Questionnaire data were stored at multiple stages across cleaning and editing programs, so comparison across each stage of data cleaning could be easily confirmed with the documentation on recommended edits. Raw data were never directly updated, so changes were always stored cumulatively and applied each time a cleaned dataset was produced. This process provided the ability to document all changes and easily fix errors or reverse decisions upon further review.

Editing programs also contained procedures that output inconsistent items across logical patterns within the questionnaire. For example, instructions to skip items could be based on previously answered questions; however, the respondent may not have followed the proper pattern based on the previous answers. These items were reviewed, and rules were written to either correct previously answered (or unanswered) questions to match the dependent items or blank out subsequent items to stay consistent with previously answered items.

5.6 Data Capture and Editing for CATI

For the out-of-school data collection effort, the following CATI instruments were developed to administer to sample members: student (developed from the TELEform abbreviated version), transfer, not currently in school (dropout), early graduate, and homeschool. A screener at the beginning of the CATI survey was responsible for determining which questionnaire module a respondent was to be administered.

CATI logic was designed such that the TELEform and CATI records could be concatenated into one data file. CATI instruments were developed with logic based on the skip patterns in the questionnaires. Questions were automatically skipped during administration. The questionnaire development program (Blaise) stored data for each item answered, but respondents were allowed to go back to previously answered items. In rare cases, a previously answered item could be changed in such a way that the questionnaire logic was inconsistent with data already answered from a different logical path. Blaise automatically corrected the previously administered responses so that the skip logic was consistent.

5.7 Data Processing and File Preparation

All TELEform questionnaire scans were stored in an SQL server database. CATI data were exported nightly to ASCII files. Cleaning programs were designed to concatenate CATI and TELEform SQL server data into SAS datasets, adjusting and cleaning variables when formats were not consistent. Special attention was focused on this concatenation to verify that results stayed consistent and to rule out possible format problems.

Once questionnaire data were concatenated and cleaned across modes and versions, the following cleaning and editing steps were implemented:

- anomalous data cleaning based on review of data with original questionnaire image (e.g., scanning errors);

- rule-based cleaning (changes that were made based on patterns in data, rather than review of images);
- hard-coded edits based on changes recommended by a reviewer if respondents misunderstood the questionnaire (e.g., respondent was instructed to enter a percentage, but there was strong evidence that the respondent entered a count rather than the percentage); and
- edits based on logical patterns in questionnaire (e.g., skip pattern relationships between gate and dependent questions).

All respondent records in the final dataset were verified with the SCS to spot inconsistencies. For example, it was possible that data were collected for a respondent who later was set to an ineligible status. It would not be appropriate to include that data, and the SCS served as a safeguard to ensure data integrity. Furthermore, the data files served as a check against the SCS to ensure that all respondent information was included in production reports.

Item documentation procedures were developed to capture variable and value labels for each item. Item wording for each question was also provided as part of the documentation. This information was loaded into a documentation database that could export final data file layouts and format statements used to produce formatted frequencies for review. The documentation database also had tools to produce final electronic codebook input files.

Chapter 6
Data File Contents

This chapter provides a concise account of the Education Longitudinal Study of 2002 (ELS:2002/04) base-year to first follow-up longitudinal data file contents. It addresses the following six topics: (1) structure of the electronic codebook (ECB) system, (2) analysis populations, (3) weights and flags, (4) composite and classification variables, (5) variable naming conventions, and (6) the hardcopy student component codebook.

6.1 Data Structure

ELS:2002/04 first follow-up data have been made available in public- and (for licensed users) restricted-use versions[29] in an ECB format on CD-ROM. The ECB is designed to be run in a Windows environment. The ECB (NCES 2006–346) is available at no cost from the National Center for Education Statistics (NCES). Appendix A supplies a brief introduction to the ECB, including its installation.

The ECB system serves as an electronic version of a fully documented survey codebook. It allows the data user to browse through all ELS:2002/04 variables contained on the data files, search variable and value names for key words related to particular research questions, review the wording of these items along with notes and other pertinent information related to them, examine the definitions and programs used to develop composite and classification variables, and “output” the data for statistical analysis. The ECB also provides an electronic display of the distribution of counts and percentages for each variable in the dataset. Analysts can use the ECB to select or “tag” variables of interest, print hardcopy codebooks that display the distributions of the tagged variables, and generate SAS and SPSS program code (including variable and value labels) that can be used with the analyst’s own statistical software.

The ECB comprises two megafiles, one at the student level (with other data sources supplying contextual data for analysis of the student) and one at the school level. The megafile at the student level encompasses base-year student (student questionnaire and test, parent, and teacher questionnaires) and school (administrator, library, facilities) data in conjunction with first follow-up student (student, transfer, dropout, early graduate, and homeschool questionnaires, and student tests) and school administrator data.

The second megafile, at the school level, encompasses base-year data (facilities checklist, the school administrator questionnaire, and the library media center questionnaire) and first follow-up school administrator questionnaire data. Analysts should be aware that the base-year school data may be used as a stand-alone, nationally representative sample of 2001–02 schools with 10th grades, but that the school data for the 2003–04 school year are *not* generalizable to the nation’s high schools with 12th grades.

[29] A license is required to access the restricted-use ECB (http://nces.ed.gov/statprog/confid6.asp).

6.2 First Follow-up Analysis Populations

There are several first follow-up populations of analytic interest. One may be interested in longitudinal analyses of the sophomore cohort 2 years later or in analyses of selected subsets of the cohort (e.g., dropouts, students who remained in the base-year schools and for whom school effects can be measured). One may also be interested in cross-sectional analysis of the senior class of 2004. In turn, cross-sectional cross-cohort analyses may be undertaken, comparing the ELS:2002 senior cohort (2004) with that of the National Longitudinal Study of the High School Class of 1972 (NLS-72) (1972), the High School and Beyond Longitudinal Study of 1980 (HS&B) (1980), and the National Education Longitudinal Study of 1988 (NELS:88) (1992), and longitudinal cross-cohort analyses, comparing panels of the HS&B sophomore cohort (1980–82), the NELS:88 sophomore cohort (1990–92), and the ELS:2002 sophomore cohort (2002–04).

6.3 First Follow-up Weights and Flags

In addition to the base-year school and student weights (further described in chapter 3), two weights have been created for the public-use file in the ELS:2002 first follow-up: a cross-sectional first follow-up weight for sample members who completed a questionnaire in the first follow-up (F1QWT), and a first follow-up panel weight for sample members who completed a questionnaire in both the base year and first follow-up or who completed a questionnaire in the first follow-up and completed selected base-year items in the first follow-up (the standard classification variables) and had base-year assessment results imputed (F1PNLWT). It should be noted that F1QWT generalizes to no meaningful population. It encompasses both 2002 sophomores 2 years later and 2004 seniors, including freshened seniors (who were not part of the sophomore cohort).

Participation flags (which are always dichotomous) and status variables (which have more than two values), as well as weights, may be used for subsetting—in other words, they can be used to select the subset of respondents that the analyst intends to examine. For example, if one wishes to select only those students for whom there are math assessment data, the status variable F1TSTAT would be invoked (a “1” means a math test was completed; a “2” or “3” reflects imputed test data).

6.4 Composite and Classification Variables

Composite variables—also called constructed, derived, or created variables—are usually generated using responses from two or more questionnaire items or from recoding of a variable (typically for disclosure avoidance reasons). Some are copied from another source (e.g., a variable supplied in sampling or imported from an external database). Examples of composite variables include school variables (school sector, urbanicity, region of the country), math assessment scores (achievement quartile in math), and demographic variables (sex, race, Hispanic ethnicity, and month and year of birth).

Most of the composite variables can be used as classification variables or independent variables in data analysis. For better estimation in cross-sectional analysis, many of the composites have undergone imputation procedures for missing data (all imputed versions of variables have been flagged).

6.5 Naming Conventions

Data users should find naming conventions for variables, flags, and weights intuitive and quite similar to those employed in NELS:88. Most variables begin with an indicator of the wave (e.g., base-year variables begin with BY). Weights follow the same wave-naming convention and also contain the suffix WT (e.g., BYSTUWT is the name for the final student weight for base-year questionnaire completion, F1QWT is the equivalent first follow-up questionnaire completion weight, and BYSCHWT is the name for the base-year final school weight). Just as first follow-up variables begin with the prefix F1, second follow-up (2006) variables will begin with F2, and so on.

Variable names also distinguish (in their third character) among components and questionnaire types. F1S, for example, indicates a first follow-up student questionnaire variable, whereas F1A stands for administrator questionnaire items. Likewise, F1T is used for the transfer questionnaire, F1D for the dropout questionnaire, F1E for the early graduate questionnaire, F1H for the homeschool questionnaire, and F1N for new participant supplement items. Variables that reflect specific items in the questionnaire carry the question number in the variable name, immediately after the component indicator. Hence, F1S58 would be item 58 from the first follow-up student questionnaire, and F1D19 would be item 19 in the dropout instrument.

The round-specific constructed variables are typically not anchored in a single questionnaire item and may sometimes reflect nonquestionnaire sources of information, such as the assessments. First follow-up test scores carry the prefix F1TX. F1TXMQU, for example, indicates the quartile score for the first follow-up mathematics test. Flags are indicated by the suffix FLG or FG. Variable names also distinguish between the public (P) and restricted (R) use forms, where variables differ between them.

6.6 Guide to the Hardcopy Codebooks

Although for most purposes the flexibility of the ECB will best meet users' needs, in some situations it may be helpful to have access to a specialized hardcopy codebook of the student data. The hardcopy codebooks appear as PDF files for the web-published version of this manual (see http://nces.ed.gov/surveys/els2002) and correspond to appendix G of this document. The codebook supplies a comprehensive description of the student data file. For each variable on the student component data file, the codebook provides a summary of the related information, including the question number and wording, the variable name, and the responses to the item, along with their unweighted frequency and percent and weighted percent. It also provides missing data frequencies sorted by the following reserve codes:[30]

[30] The reserve codes are used throughout the ECB. The description is added to the first variable of each section to help users understand the meaning of each code.

- -1: “Don’t know” represents respondents who indicated that they did not know the answer to the question.
- -2: “Refused” represents respondents who indicated that they refused to answer the question.
- -3: “Item legitimate skip/NA” is filled for questions that are not answered because prior answers route the respondent elsewhere.
- -4: “Nonrespondent” is filled for all variables across the entire questionnaire when a sample member did not respond to the questionnaire.
- -5: “Out of range” represents hardcopy questionnaire respondents who reported values that are out of range.
- -6: “Multiple response” represents hardcopy questionnaire respondents who clearly reported more than one response for an item that requires only one response.
- -7: “Partial interview-breakoff” is filled for questions that are not answered because the respondent does not wish to continue the interview or they have run out of time. This also includes particular items that are not included on an abbreviated version questionnaire.
- -8: “Survey component legitimate skip/NA” is filled for all items within a survey component for sample members who were not administered that component by design for one of the following reasons: (1) the component was not administered based on their status (e.g., transfer students did not receive certain items on the in-school survey), (2) the sample member was not yet included in the study at the time of administration (e.g., first follow-up freshened sample members did not participate in the base-year survey), or (3) the sample member was not capable of completing the survey component (e.g., students who were ineligible due to a language barrier or disability at the time of the survey were not administered a questionnaire).
- -9: “Missing” is filled for questions that are not answered within the hardcopy questionnaire when the routing suggests that they should have filled a response.

Information on obtaining the ELS:2002/04 Base-Year to First Follow-up ECB (and other NCES ECBs) can be found by reviewing the data products for the study at http://nces.ed.gov/pubsearch. Information on applying for a restricted-use license also appears on the NCES website at http://nces.ed.gov/pubsearch/licenses.asp.

References

Burns, L.J., Heuer, R., Ingels, S.J., Pollack, J.M., Pratt, D.J., Rock, D., Rogers, J., Scott, L.A., Siegel, P., and Stutts, E. (2003). *ELS:2002 Base Year Field Test Report* (NCES Working Paper 2003–03). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Carlson, B.L., Johnson, A.E., and Cohen, S.B. (1993). An Evaluation of the Use of Personal Computers for Variance Estimation with Complex Survey Data. *Journal of Official Statistics*, *9*(4): 795–814.

Chromy, J.R. (1981). Variance Estimators for a Sequential Sample Selection Procedure. In D. Krewski, R. Platek, and J.N.K. Rao (Eds.), *Current Topics in Survey Sampling* (pp. 329–347). New York: Academic Press.

Cohen, S.B. (1997). An Evaluation of Alternative PC-Based Software Packages Developed for the Analysis of Complex Survey Data. *The American Statistician*, *57*(13): 285–292.

Cox, B.G. (1980). The Weighted Sequential Hot Deck Imputation Procedure. *Proceedings of the Section on Survey Research Methods* (pp. 721–726). The American Statistical Association.

Curtin, T.R., Ingels, S.J., Wu, S., and Heuer, R. (2002). *NELS:88 Base Year to Fourth Follow-up Data File User's Manual* (NCES 2002–323). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Deville, J.C., and Särndal, C-E. (1992). Calibration Estimating in Survey Sampling. *Journal of the American Statistical Association*, *87*: 376–382.

Fetters, W.B., Stowe, P.S., and Owings, J.A. (1984). *Quality of Responses of High School Students to Questionnaire Items, High School and Beyond* (NCES 84–216). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Folsom, R.E., and A.C. Singh. (2000). The Generalized Exponential Model for Sampling Weight Calibration for Extreme Values, Nonresponse, and Poststratification. *Proceedings of the Section on Survey Research Methods* (pp. 598–603). The American Statistical Association.

Hambleton, R.K. (1989). Principles and Selected Applications of Item Response Theory. In R.L. Linn (Ed.), *Educational Measurement*, 3rd ed. (pp. 147–200). New York: MacMillan.

Hambleton, R.K., Swaminathan, H., and Rogers, H.J. (1991). *Fundamentals of Item Response Theory*. Newbury Park, CA: Sage.

Hurst, D., Tan, A., Meek, A., and Sellers, J. (2003). *Overview and Inventory of State Education Reforms: 1990 to 2000* (NCES 2003–020). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Ingels, S.J. (1996). *Sample Exclusion in NELS:88—Characteristics of Base Year Ineligible Students: Changes in Eligibility Status After Four Years* (NCES 96–723). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Ingels, S.J., Burns, L.J., Chen, X., Cataldi, E.F., and Charleston, S. (2005). *A Profile of the American High School Sophomore in 2002* (NCES 2005–338). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Ingels, S.J., Curtin, T.R., Kaufman, P., Alt, M.N., and Chen, X. (2002). *Coming of Age in the 1990s: The Eighth-Grade Class of 1988 12 Years Later* (NCES 2002–321). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Ingels, S.J., Dowd, K.L., Baldridge, J.D., Stipe, J.L., Bartot, V.H., and Frankel, M.R. (1994). *NELS:88 Second Follow-up: Student Component Data File User's Manual* (NCES 94–374). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Ingels, S.J., Pratt, D.J., Rogers, J., Siegel, P.H., and Stutts, E.S. (2004). *Education Longitudinal Study of 2002: Base Year Data File User's Manual* (NCES 2004–405). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Available: http://nces.ed.gov/pubsearch.

Kaufman, P., and Rasinski, K. (1991). *Quality of the Responses of Eighth-Grade Students in NELS:88* (NCES 91–487). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Kish, L., and Frankel, M.R. (1974). Inference from Complex Samples. *Journal of the Royal Statistical Society*, Series B (Methodological), *36*: 2–37. Reprinted: G. Kalton and S. Heeringa, eds., *Leslie Kish: Selected Papers* (New York: Wiley, 2003).

Lemke, M., Lippman, L., Bairu, G., Calsyn, C., Kruger, T., Jocelyn, L., Kastberg, D., Liu, Y., Roey, S., and Williams, T. (2001). *Outcomes of Learning: Results from the 2000 Program for International Student Assessment of 15-Year-Olds in Reading, Mathematics, and Science Literacy* (NCES 2002–115). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

McLaughlin, D.H., and Cohen, J. (1997). *NELS:88 Survey Item Evaluation Report* (NCES 97–052). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Rasinski, K., Ingels, S.J., Rock, D.A., and Pollack, J. (1993). *America's High School Sophomores: A Ten-Year Comparison* (NCES 93–087). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Riccobono, J.A., Henderson, L.B., Burkheimer, G.J., Place, C., and Levinsohn, J.R. (1981). *National Longitudinal Study: Base Year (1972) through Fourth Follow-up (1979) Data File User's Manual*. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Rock, D.A., and Pollack, J.M. (1995a). *Psychometric Report for the NELS:88 Base Year Through Second Follow-up* (NCES 95–382). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Rock, D.A., and Pollack, J.M. (1995b). *Mathematics Course-Taking and Gains in Mathematics Achievement* (NCES 95–714). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Scott, L.A., Rock, D.A., Pollack, J.M., and Ingels, S.J. (1995). *Two Years Later: Cognitive Gains and School Transitions for NELS:88 Eighth Graders* (NCES 95–436). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Seastrom, M. (2003). *NCES Statistical Standards* (NCES 2003–601). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Available: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003601.

Spencer, B.D., Frankel, M.R., Ingels, S.J., Rasinski, K., and Tourangeau, R. (1990). *NELS:88 Base Year Sample Design Report* (NCES 90–463). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Spencer, B.D., Sebring, P., and Campbell, B. (1987). *High School and Beyond Third Follow-up (1986) Sample Design Report* (NCES 88402). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Tourangeau, R., Sebring, P., Campbell, B., Glusberg, M., Spencer, B.D., and Singleton, M. (1987). *The National Longitudinal Study of the High School Class of 1972 (NLS-72) Fifth Follow-up (1986) Data File User's Manual* (NCES 87–406c). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Wolter, K. (1985). *Introduction to Variance Estimation*. New York: Springer-Verlag.

Woodruff, R.S. (1971). A Simple Method for Approximating the Variance of a Complicated Estimate. *Journal of the American Statistical Association*, *66*: 411–414.

Zahs, D., Pedlow, S., Morrissey, M., Marnell, P., and Nichols, B. (1995). *High School and Beyond Fourth Follow-up Methodology Report* (NCES 95–426). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Appendix A
Introduction to the Electronic Codebook

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Introduction to the Electronic Codebook

This appendix supplies a brief introduction to the Education Longitudinal Study of 2002 (ELS:2002/04) base-year to first follow-up data in electronic codebook (ECB) format. General instructions are provided for using the ELS:2002/04 data, along with an orientation to ECB and variance estimation software that can be used to manipulate the data.

A.1 Obtaining the ELS:2002/04 ECB

The ELS:2002/04 base-year to first follow-up ECB on CD-ROM carries the National Center for Education Statistics (NCES) product/publication number NCES 2006–346. This data product contains

- ELS:2002/04 data from the base year and first follow-up;
- ECB software; and
- documentation.

A single copy of an ELS:2002/04 public-use CD-ROM may be obtained without cost from the Education Publications Center (ED Pubs), until supplies are exhausted. This group can be contacted by telephone at 1-877-4ED-PUBS or by writing

ED Pubs
P.O. Box 1398
Jessup, MD 20794–1398

Requests can also be made electronically to http://www.edpubs.org/ or to customerservice@edpubs.org. Requesters will need the title of the data product and the NCES number (NCES 2006–346 for the ELS:2002/04 base-year to first follow-up ECB).

A restricted-use version of the ECB is available to institutionally based users in the United States whose research requires this additional level of information. A restricted-use license agreement is required for this version. Contact NCES at http://nces.ed.gov/pubsearch/licenses.asp.

A.2 Features and Content of the ELS:2002/04 ECB

ECBs allow the user to

- search a list of variables based on keywords or labels;
- tag (i.e., select) variables for analysis;
- generate SAS and SPSS syntax for system files;
- produce printed codebooks of selected variables;

- import tag files; and
- access database files for extraction.

The overall organization of data reflects two integrated and comprehensive data files, or megafiles. One megafile is at the student level; the other is at the school level. School-level variables include information collected in the base-year school administrator questionnaire, library media center questionnaire, and facilities checklist, as well as data from the first follow-up school administrator questionnaire. Users are cautioned that only the base-year school-level files generalize to the nation's high schools (specifically, to regular high schools with a 10th grade in the 2001–02 school year). First follow-up school-level data do not provide national estimates for the nation's high schools with a 12th grade in the 2003–04 school year. Nonetheless, because the first follow-up returned to the base-year schools, the first follow-up school data permit analysis of the nation's high schools 2 years later, in 2002 (also, of course, providing contextual data that can be attached to the student record).

At the student level, data from the base-year and first follow-up student (and related[1]) questionnaires, the base-year and first follow-up assessments, the base-year teacher and parent questionnaires, and school-level variables at the individual level are represented. Universe variables, weights, participation flags and status indicators, and composite variables (also called constructed variables, derived variables, or created variables) are located at the beginning of the file, followed by the questionnaire variables.

Some important variable naming conventions (typically embedded in the first three to four characters of each variable name) may be noted. Normally, the first three to four characters of each variable name identify the instrument from which the variable is taken. BYS stands for base-year student; BYS21 stands for question 21 in the student questionnaire. BYP stands for base-year parent, BYA for the base-year administrator questionnaire, and so on. Likewise, F1 is the prefix used for first follow-up variables (hence, F1S45 represents question 45 in the first follow-up student questionnaire). A label with the terminal characters WT is indicative of a weight (e.g., BYSTUWT is the final or nonresponse-adjusted student weight for the base year). Test variables contain the characters TX, while flags are indicated by FLG or FG and status variables by STAT (e.g., BYTXSTAT refers to test completion status in the base year). The contents of the student and school megafiles are described more specifically in the sections below.

A.2.1 Student Megafile

The student-level file contains variables from the base-year student, parent, and teacher questionnaires, as well as scores for the assessments in reading and mathematics. The student-level file also contains questionnaire and assessment data for the first follow-up sample. School-level data are also included, attached to the student record.

The main contents of the student file, in order of appearance, and associated naming conventions are as follows:

[1] The first follow-up data represent two student cohorts: sophomores in 2002 and seniors in 2004. Not all sophomore cohort members were high school students 2 years later. Some were dropouts, some were early graduates, and some were being homeschooled. Data for these individuals are provided on the "student" file regardless of whether the individual was a student, dropout, or early graduate or was being homeschooled in 2004.

- *IDs and universe variables*. Student and school identifications (IDs) and universe variables are at the beginning of the data file.
- *BY weights and composites*. The weights (BYSCHWT, BYSTUWT) lead this section. They are followed by student-level composites, participation flags, status flags, imputation flags, school-level composites, and Common Core of Data (CCD) and Private School Study (PSS) data, as well as confidential geocode data and linkages to external sources.
- *F1 weights and composites*. The weights (F1QWT and F1PNLWT) lead this section. They are followed by student-level composites, participation flags, status flags, imputation flags, school-level composites, and CCD/PSS data, as well as confidential geocode data and linkages to external sources.
- *BY student questionnaire (BYS*)*. These data come from scanned forms filled out by the student or from the computer-assisted telephone interview (CATI).
- *F1 student questionnaire (F1S*, F1D*, F1T*, F1E*, F1N*)*. These data come from currently enrolled students, dropouts, transfer students, early graduates, or homeschoolers. Data come from completed forms or from the CATI interview.
- *BY school (BYA*, BYL*, BYF*).* These data come from BY school administrator questionnaires, library and facilities questionnaires, and facilities checklists. The data are linked to BY eligible students and replicated at the student level.
- *F1 school (F1A*).* These data come from F1 school administrator questionnaires. The data are linked to F1 currently enrolled students and replicated at the student level.
- *BY parent questionnaire (BYP*)*. These data come from scanned forms filled out by the parent or from the CATI interview.
- *BY teacher questionnaire—English (BYTE*)*. These data come from scanned teacher questionnaires filled out by the student sample member's English teacher. English teacher data have been linked to the appropriate student(s).
- *BY teacher questionnaire—math (BYTM*)*. These data come from the scanned teacher questionnaire and have been linked to the appropriate student(s).

A.2.2 School Megafile

The school-level file contains all questionnaires administered at the school level. This includes the school administrator questionnaires (base year and first follow-up) and the base-year library media center questionnaire and facilities checklist.

Variable prefixes on the school file identify the contents:

- *IDs and weights.* Student and school IDs and the school weight (BYSCHWT) are at the beginning of the data file. Note that there is no first follow-up school weight.
- *BY school-level composites.* School-level composites are produced from questionnaire data, allowing an analyst access to data in an easier format.

- *BY data from outside sources*. Licensed users of the restricted-use file will have access to CCD/PSS data via the NCES identification number (NCESID), geocodes, and other information for linking to external sources.
- *F1 school-level composites*. School-level composites are produced from questionnaire data, allowing an analyst access to data in an easier format.
- *F1 data from outside sources*. Licensed users of the restricted-use file will have access to CCD/PSS data via the NCESID, geocodes, and other information for linking to external sources.
- *BY school administrator data (BYA*)*. These data come from scanned forms filled out by the BY school principal and other administrative staff.
- *F1 school administrator data (F1A*)*. These data come from scanned forms filled out by the F1 school principal and other administrative staff.
- *BY library section data (BYL*)*. These data come from scanned forms filled out by the librarian or library media center specialist.
- *BY school facilities data (BYF*)*. These data come from scanned forms filled out by the survey administrator during the student surveys at the school.

The school ID is constructed such that student file records can merge with the school data.

A.3 Installing the ECB

A.3.1 Hardware/Software Requirements

The ECB program is designed to run on a PC with Windows 95 or higher versions.

A.3.2 Installation Procedures

To install the ECB, complete the following steps:

1. Close all applications on your computer.
2. Place the CD-ROM into the CD-ROM drive.
3. From Windows, click on "START" and then "RUN."
4. Browse through the CD-ROM drive for the "ecbw" folder and open the "SETUP.exe" file.
5. Setup will guide you through the installation of the ECB.
6. Click on the ECB icon to run.

A.4 Using the ECB

A.4.1 Understanding the File Structure and Capacity

The ECB is ready to use once it is installed. Familiarity with the "hot" keys and some practice can help the user to more quickly understand the structure of the file and the power provided by the ECB to produce data files:

1. On the toolbar found at the top of the ECB screen, click on each "hot" key.
2. Consult the "Electronic Codebook Help Guide" available on the CD-ROM (file named "HELP.pdf") for an overview of the ECB functions.

A.4.2 Examining the Frequencies Available for Each Variable on the ECB

By examining these data descriptions, the ELS:2002 user will begin to appreciate the complexity of collecting data from respondents (legitimate values, legitimate skips, refusals, etc.). It is important to realize that some respondents

- did not respond to an entire instrument;
- skipped individual items;
- refused to complete selected items;
- did not reach the end of the questionnaire in the time they were given;
- completed abbreviated versions of the instrument;
- made illegal skips; and/or
- responded outside predefined valid ranges.

The following reserve code conventions are used in the ELS:2002 data files:

- –1 = *"Don't know"*

  This reserve code applies to questions in the hardcopy questionnaires that allow a "Don't know" response. The CATI interview by default allows "Don't know" for most questions that a respondent does not know so that the subsequent question can be administered.

- –2 = "*Refused"*

  Respondents are free to refuse to answer any question. In the hardcopy questionnaire, such refusals are explicitly captured only for critical items (items that, because of their importance, are subject to onsite edit and retrieval). CATI interviews, by default, allow refusals to be recorded on a question-by-question basis.

- –3 = *"Item legitimate skip/NA"*

  Questions that are not answered because prior answers route the respondent elsewhere are filled with "Legitimate skip/NA." This value applies to variables from all data collection modes.

- –4 = *"Nonrespondent"*

  "Nonrespondent" variables from questionnaires that have no respondent are filled with the "Nonrespondent" reserve code. This code applies to both the student file and the school file, because each file is composed of multiple interviews. For example, the school file may contain school administrator questionnaire data and facilities data, but the school's librarian may not have responded to the library media questionnaire; hence, all library media variables appear with the "Nonrespondent" reserve code.

- –5 = *"Out of range"*

  This code applies to values reported by the respondent that are out of range. Responses are set to this value if they are beyond the reasonable limits for the given item. For example, a teacher may have indicated teaching at a particular school for a longer period of time than he/she taught overall.

- –6 = *"Multiple response"*

  Non-CATI applications are unable to prevent respondents from giving multiple responses to a question that requires one answer. The scanning process for hardcopy questionnaires routes these instances to a verifier to determine whether the respondent "intended" to choose one answer (e.g., eraser marks interpreted by the optical scanning equipment as a second answer). If the verifier cannot determine a single unique answer, the item is assigned the reserve code for "Multiple response."

- –7 = *"Partial interview-breakoff"*

  Questions that are not answered because the respondent does not wish to continue the interview, or, in timed sessions, because they have run out of time, are filled with a "Partial/not reached" reserve code. This code is also used for CATI interviews that encounter breakoffs during the interview (and the respondent cannot be reached for completion of the interview). The code is also used for an abbreviated version of the questionnaire in which particular items are not included.

- –8 = *"Survey component legitimate skip/NA"*

  Survey components that do not apply to the sample member will have questions with values of -8. For example, a student who is currently enrolled would not be administered the early graduate questionnaire, so questions that are specific to that questionnaire will have values of -8. Another example are freshened students, who will have values of -8 for questions that were administered in BY questionnaires.

- –9 = *"Missing"*

  This code applies to questions that are not answered in the scanned hardcopy questionnaires. These questions are typically missed accidentally (e.g., respondent did not understand the routing pattern) and are not an indication of the respondent filling out only part of the questionnaire. This reserve code can also apply to CATI data where, for reasons associated with different versions, an item is not administered.

A.4.3 Creating a Taglist, Extracting Data, and Generating Program Code

The following procedures can be used to tag variables, extract data, and generate program codes on the ECB:

1. Tag variables of interest by clicking on the "tag box" next to each variable.
2. Choose the appropriate weights and flags for the population of interest. In each megafile, flags can be selected to identify a particular part of the population. For example, flags are available to identify whether a student questionnaire completer also completed a test. Weights are variables placed on the dataset to compensate for the unequal probabilities of selection and to adjust for nonresponse. When used with flags, weights allow the analyst to make generalizations about the national populations represented by the various ELS:2002 samples (e.g., schools versus students within schools). When weights are not used or a flag is used inappropriately, the estimates generated will not be representative of the population.
3. After tagging the variables of interest, go to "File" and then "Output."
4. Select the program (e.g., SPSS to generate SPSS program code).
5. Specify the directory and the name of the program code file.
6. Select the appropriate button in the "Confirmation" box.
7. To view the program code, select "File" and then "View Output."
8. Open the program code in the appropriate software (e.g., SPSS) to generate a working system file and run analyses. It may be necessary to modify the program slightly (check for "execute" statements, period locations, and file names). The code should identify the ASCII data file location, which will be the CD-ROM. Users should be aware of a possible SPSS syntax error associated with continuous variables: the "VALUE LABELS" statement is missing when the first tagged item for a data file is continuous and has no reserve codes.

A.4.4 Variance Estimation

Because the ELS:2002 sample design involved stratification, disproportionate sampling of certain strata (e.g., oversampling of Asians and of private schools), and clustered (e.g., students within a school) probability sampling, the resulting statistics are more variable than they would have been had they been based on data collected from a simple random sample of the same size. A number of statistical packages (e.g., SUDAAN, WesVar, Stata, and AM) take account of complex sampling designs in the calculation of standard errors. (For an assessment of strengths and limitations of SUDAAN, Stata, and WesVar, see Broene and Rust 2000.) AM variance estimation software can be downloaded for free from the following website: http://am.air.org/.

A.5 Additional Sources of Information (NCES Reports, Bibliographic Resources)

A number of reports using ELS:2002 data have been produced to date. ELS:2002 reports can be found in electronic format on the NCES website under http://nces.ed.gov/surveys/els2002/. From that website, documents can be searched and downloaded. The NCES website also includes an ELS:2002 Bibliography (http://nces.ed.gov/surveys/els2002/), noting these and additional reports, articles, and conference papers on or using the study. In addition, many of the National Education Longitudinal Study of 1988 (NELS:88) reports may be of interest, both for what they suggest about possible cross-cohort analyses and for issues that can be examined cross-sectionally and longitudinally in ELS:2002 and NELS:88. In addition to the ELS:2002 Bibliography, the NELS:88 Bibliography may be of interest to data users (http://nces.ed.gov/surveys/nels88/).

A.6 Appendix A Reference

Broene, P., and Rust, K. (2000). *Strengths and Limitations of Using SUDAAN, Stata, and WesVarPC for Computing Variances from NCES Data Sets* (NCES 2000–03). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Appendix B
Base-Year and First Follow-up Questionnaires

Appendix B
Base-Year and First Follow-up Questionnaires

Web-published PDF files of the Education Longitudinal Study of 2002 (ELS:2002) base-year and first follow-up questionnaires are available at http://nces.ed.gov/surveys/els2002/index.asp.

Appendix C
Documentation for Imputed Variables

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C.1 Introduction

Appendix C comprises tables that provide further documentation of imputation procedures. Table C-1 reports on the imputation status of eight groups of sample members, based on their combined base-year and first follow-up response and eligibility status. (Note that the expanded "contextual" sample members are individuals deemed incapable, owing to limited English proficiency or a severe disability, of completing the questionnaire. For these students, only contextual information, such as parent or school or teacher reports, was collected.) With the imputation variables forming the rows and sample disposition the columns, the table indicates whether imputation for these cases was performed in the base year or the first follow-up.

Table C-2 provides further information about the questionnaire variables imputed through the weighted sequential hotdeck method. It lists each imputation variable, the imputation class, and the sort variables.

Table C-3 provides further information about the assessment variables (the ability estimate, or theta) that were approached through multiple imputation. Specifically, the table lists all variables included in the multiple imputation model.

Table C-4 shows before-and-after distributions (sample size and weighted percent) for all imputed questionnaire variables.

Finally, tables C-5 through C-39B show the comparisons between unimputed and imputed point estimates for select variables and the respective standard errors. A discussion outlining the analytical approach and general findings follows on page C-12. The comparisons are based on the forthcoming report: *United States High School Sophomores: A Twenty-Two Year Comparison, 1980-2002.*

Table C-1. ELS:2002 imputation variables, by respondent status: 2004

Imputation variable	Sample disposition							
	BY nonrespondent/ F1 respondent	BY respondent/ F1 respondent	BY contextual/ F1 respondent	Freshened respondent	BY contextual/ F1 contextual	BY nonrespondent/ F1 contextual	BY respondent/ F1 contextual	Freshened contextual
Sample size[1]	651	14,062	105	171	53	2	14	31
Student sex	X	X	X	X	X	X	X	X
Student race/ethnicity	X	X	X	X	X	X	X	X
Student language minority status	X	X	X	X	X	X	X	X
Student Hispanic subgroup	X	X	X	X	X	X	X	X
Student Asian subgroup	X	X	X	X	X	X	X	X
School program type	X	O	Ø	Ø	Ø	Ø	O	Ø
Student postsecondary educational expectations	X	X	X	X	Ø	Ø	Ø	Ø
Parental aspirations for student postsecondary achievement	X	O	X	Ø	X	X	O	Ø
Family composition	X	X	X	X	X	X	X	X
Mother's educational attainment	X	X	X	X	X	X	X	X
Mother's occupation	X	X	X	X	X	X	X	X
Father's educational attainment	X	X	X	X	X	X	X	X
Father's occupation	X	X	X	X	X	X	X	X
Family income (2001)	X	O	X	X	X	X	O	X
Enrollment status (in school vs. out, grade)	X	X	X	X	X	X	X	X
12th-grade student ability estimates (theta) for mathematics	X	X	X	X	Ø	Ø	Ø	Ø
10th-grade student ability estimates (theta) for mathematics	X	O	Ø	Ø	Ø	Ø	O	Ø
10th-grade student ability estimates (theta) for reading	X	O	Ø	Ø	Ø	Ø	O	Ø

[1] Total sample size is 15,089.

NOTE: BY = base year; F1 = first follow-up. X denotes that these cases were imputed in the first follow-up study, O denotes that these cases were imputed in the base-year study, and Ø denotes that these cases were not imputed in either the base-year or first follow-up study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

Table C-2. ELS:2002 imputation variables, by imputation class and sort variables: 2004

Imputation variable	Imputation class variables	Sort variables
Student race (F1RACE)	School identifier (SCHOOLID)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL)
English as native language (F1STLANG)	Student race (F1RACE)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Student Hispanic origin (F1HISPAN)	Student race (F1RACE) English as native language (F1STLANG)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Student Asian origin (F1ASIAN)	Student race (F1RACE) English as native language (F1STLANG)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Type of school program (BYSCHPRG)	School coed status (BYA11) Percent 10th-graders in general high school (BYA14A) Percent 10th-graders in college prep (BY14B) Percent 10th-graders in voc/tech (BYA14D)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Student postsecondary aspirations (F1STEXP)	Student sex (F1SEX) PROGTYPE (program)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Parental aspirations for student postsecondary achievement (BYPARASP)	Student race (F1RACE) Student postsecondary aspirations (F1STEXP)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)

See note at end of table.

Table C-2. ELS:2002 imputation variables, by imputation class and sort variables: 2004—Continued

Imputation variable	Imputation class variables	Sort variables
Family composition (F1FCOMP)	Student race (F1RACE) English as native language (F1STLANG)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Mother's educational attainment (F1MOTHED)	Student race (F1RACE) Student postsecondary aspirations (F1STEXP)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Father's educational attainment (F1FATHED)	Student race (F1RACE) Student postsecondary aspirations (F1STEXP)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Mother's occupation (F1OCCUM)	Student race (F1RACE) Mother's educational attainment (F1MOTHED)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Father's occupation (F1OCCUF)	Student race (F1RACE) Father's educational attainment (F1FATHED)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Household income (BYINCOME)	Mother's educational attainment (F1MOTHED) Father's educational attainment (F1FATHED) Family composition (F1FCOMP)	Census region (BYREGION) Urbanicity (BYURBAN) School type (BYSCTRL) Student race (F1RACE)
Student enrollment status (F1RISTAT)	Student grade (GRADE) Student final F1 enrollment status (F1ENRFIN)	IMPGRP School identifier (SCHOOLID)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

Table C-3. Variables included in multiple imputation model for student ability estimates for reading and mathematics: 2002 and 2004

Imputation variable	Variables included in multiple imputation model
Student ability estimates (theta) for base-year mathematics and reading and first follow-up mathematics	School type (BYSCTRL) Census region (BYREGION) Census urbanicity (BYURBAN) Student sex (F1SEX) Student race (F1RACE) Student language (F1STLANG) Mother's occupation (F1OCCUM) Father's occupation (F1OCCUF) Student postsecondary aspirations (F1STEXP) Parental aspirations for student postsecondary achievement (BYPARASP) Mother's educational attainment (F1MOTHED) Father's educational attainment (F1FATHED) Household income (BYINCOME) Family composition (F1FCOMP) 10th-grade student ability estimates for math and reading 12th-grade student ability estimates for math

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002" and "First Follow-up, 2004."

Table C-4. ELS:2002 imputation variable distributions before and after imputation: 2004

Characteristic	Before imputation Sample size	Before imputation Weighted percent	After imputation Sample size	After imputation Weighted percent
Student sex (F1SEX)	15,086	100.00	15,089	100.00
Male	7,537	50.64	7,538	50.63
Female	7,549	49.36	7,551	49.37
Student race (F1RACE)	15,074	100.00	15,089	100.00
American Indian	127	0.98	127	0.98
Asian	1,536	4.23	1,537	4.23
Black	1,996	14.32	1,999	14.34
Hispanic, no race specified	1,004	7.27	1,005	7.27
Hispanic, race specified	1,229	9.15	1,232	9.18
Multiracial, non-Hispanic	679	4.02	679	4.02
White	8,503	60.02	8,510	60.00
English as native language (F1STLANG)	14,970	100.00	15,089	100.00
No	2,608	14.49	2,632	14.47
Yes	12,362	85.51	12,457	85.53
Student Hispanic origin (F1HISPAN)	14,274	100.00	15,089	100.00
Not applicable	12,066	82.84	12,077	78.26
Mexican, Mexican-American, Chicano	1,423	11.55	1,907	14.39
Cuban	87	0.64	116	0.83
Dominican	81	0.79	102	0.90
Puerto Rican	286	1.93	413	2.71
Central American	161	1.16	226	1.41
South American	170	1.08	248	1.50
Student Asian origin (F1ASIAN)	14,270	100.00	15,089	100.00
Not applicable	12,459	93.97	12,473	87.33
Chinese	402	1.30	554	2.53
Filipino	277	1.17	482	2.78
Japanese	131	0.46	225	1.27
Korean	277	0.89	391	1.81
Southeast Asian	450	1.28	568	2.28
South Asian	274	0.92	396	2.00
Type of school program (BYSCHPRG)	14,438	100.00	15,089	100.00
Missing	362	2.99	362	2.84
General	4,845	37.06	5,088	37.10
College preparatory, academic	7,888	49.79	8,229	49.84
Vocational, including technical/business	1,343	10.16	1,410	10.22

See note at end of table.

Table C-4. ELS:2002 imputation variable distributions before and after imputation: 2004—Continued

Characteristic	Before imputation: Sample size	Before imputation: Weighted percent	After imputation: Sample size	After imputation: Weighted percent
Student postsecondary aspirations (F1STEXP)	14,998	100.00	15,089	100.00
Missing	100	0.69	100	0.69
Less than high school graduation	48	0.42	50	0.44
GED only	182	1.68	185	1.70
High school graduation	669	4.95	679	4.99
Attend or complete a 2-year school	2,041	15.34	2,055	15.33
Attend college, but not complete a 4-year degree	500	3.90	506	3.90
Graduate from college	4,780	31.23	4,796	31.14
Obtain a master's degree or equivalent	3,286	20.12	3,294	20.05
Obtain a PhD, MD, or other advanced degree	2,089	12.06	2,100	12.07
Other	1,303	9.61	1,324	9.69
Parental aspirations for student postsecondary achievement (BYPARASP)	14,367	100.00	15,089	100.00
Missing	202	1.93	202	1.82
Less than high school graduation	11	0.08	12	0.07
High school graduation or GED only	473	3.77	504	3.83
Attend or complete a 2-year school	1,061	8.54	1,117	8.53
Attend college, but not complete a 4-year degree	132	1.04	142	1.05
Graduate from college	6,278	44.29	6,596	44.36
Obtain a master's degree or equivalent	3,003	19.80	3,162	19.86
Obtain a PhD, MD, or other advanced degree	3,207	20.56	3,354	20.48
Family composition (F1FCOMP)	14,959	100.00	15,089	100.00
Mother and father	9,066	57.66	9,138	57.62
Mother and male guardian	1,752	13.03	1,763	12.96
Father and female guardian	454	3.12	458	3.13
Two guardians	240	1.73	243	1.73
Mother only	2,612	18.54	2,642	18.61
Father only	445	3.19	450	3.20
Female guardian only	190	1.37	194	1.39
Male guardian only	48	0.29	49	0.29
Lives with student less than half time	152	1.07	152	1.06

See note at end of table.

Table C-4. ELS:2002 imputation variable distributions before and after imputation: 2004—Continued

Characteristic	Before imputation: Sample size	Before imputation: Weighted percent	After imputation: Sample size	After imputation: Weighted percent
Mother's educational attainment (F1MOTHED)	14,911	100.00	15,089	100.00
Did not finish high school	1,872	13.31	1,909	13.43
Graduated from high school or GED	3,960	27.84	4,016	27.88
Attended 2-year school, no degree	1,789	12.77	1,813	12.78
Graduated from 2-year school	1,574	11.04	1,587	11.04
Attended college, no 4-year degree	1,517	10.06	1,526	9.99
Graduated from college	2,801	16.82	2,821	16.72
Completed master's degree or equivalent	1,088	6.37	1,106	6.39
Completed PhD, MD, advanced degree	310	1.79	311	1.77
Father's educational attainment (F1FATHED)	14,839	100.00	15,089	100.00
Did not finish high school	1,946	14.01	1,998	14.12
Graduated from high school or GED	4,175	30.22	4,249	30.26
Attended 2-year school, no degree	1,366	9.65	1,384	9.58
Graduated from 2-year school	1,144	7.93	1,159	7.93
Attended college, no 4-year degree	1,346	8.97	1,364	8.94
Graduated from college	2,705	17.14	2,741	17.13
Completed master's degree or equivalent	1,296	7.60	1,323	7.60
Completed PhD, MD, advanced degree	861	4.48	871	4.45
Mother's occupation (F1OCCUM)	14,846	100.00	15,089	100.00
No job	567	3.08	582	3.11
Clerical	2,400	16.46	2,442	16.52
Craftsperson	331	2.34	338	2.33
Farmer, farm manager	73	0.53	75	0.54
Homemaker	768	5.39	785	5.43
Laborer	632	4.56	652	4.65
Manager, administrator	1,590	10.77	1,612	10.76
Military	27	0.17	27	0.17
Operative	605	4.42	623	4.47
Professional A	2,158	13.87	2,181	13.77
Professional B	568	3.64	575	3.62
Proprietor, owner	348	2.27	357	2.29
Protective service	107	0.70	108	0.70
Sales	640	4.36	654	4.36
Schoolteacher	999	6.37	1,004	6.27
Service	2,282	16.03	2,317	16.02
Technical	742	4.93	748	4.88
Other	9	0.10	9	0.09

See note at end of table.

Table C-4. ELS:2002 imputation variable distributions before and after imputation: 2004—Continued

Characteristic	Before imputation: Sample size	Before imputation: Weighted percent	After imputation: Sample size	After imputation: Weighted percent
Father's occupation (F1OCCUF)	14,794	100.00	15,089	100.00
No job	162	0.75	167	0.75
Clerical	349	2.51	358	2.52
Craftsperson	1,860	13.62	1,904	13.69
Farmer, farm manager	284	2.07	296	2.14
Homemaker	354	2.45	360	2.45
Laborer	1,519	10.68	1,561	10.76
Manager, administrator	2,206	14.88	2,248	14.82
Military	187	1.26	191	1.25
Operative	1,696	12.23	1,728	12.24
Professional A	1,599	9.94	1,624	9.94
Professional B	892	4.90	906	4.91
Proprietor, owner	902	5.90	910	5.83
Protective service	503	3.41	512	3.40
Sales	772	5.18	783	5.15
Schoolteacher	213	1.45	216	1.44
Service	600	3.96	614	3.95
Technical	685	4.65	700	4.64
Other	11	0.14	11	0.14
Household income (BYINCOME)	14,154	100.00	15,089	100.00
None	67	0.41	73	0.46
$1,000 or less	154	1.13	161	1.09
$1,001–$5,000	252	1.73	273	1.78
$5,001–$10,000	293	2.17	318	2.22
$10,001–$15,000	594	4.24	630	4.27
$15,001–$20,000	668	4.86	707	4.83
$20,001–$25,000	872	6.55	933	6.61
$25,001–$35,000	1,625	12.07	1,725	11.98
$35,001–$50,000	2,652	19.81	2,826	19.74
$50,001–$75,000	2,929	21.19	3,132	21.17
$75,001–-$100,000	1,922	12.99	2,057	13.08
$100,001–$200,000	1,611	10.15	1,710	10.10
$200,001 or more	515	2.67	544	2.68
Student enrollment status (F1RISTAT)	15,944	100.00	16,374	100.00
In school and in grade 12	13,899	85.50	14,305	85.72
In school and not in grade 12	1,015	7.33	1,033	7.25
Out of school	909	6.49	915	6.36
Out of scope	121	0.68	121	0.67

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

C.2 Examining the Effects of Imputation

Surveys often produce an incomplete data record due to respondent item nonresponse. Even though most of the questionnaire was completed, the respondent may choose to ignore some items, refuse to answer a particular question, provide an improbable response, break off an interview, fail to complete the last items of a timed interview, or mistakenly skip a question. The greatest concern with item nonresponse is that respondent answers are systematically different from nonrespondent answers, resulting in biased estimates of means, proportions, variances, and covariances (Federal Committee on Statistical Methodology 2001; Groves 1989; Seastrom 2003).

For items with some level of nonresponse, the researchers can address the potential for bias after the collection process has ended through imputation. Imputation is the process of estimating the value that a respondent might have reported. Typically, the information used to impute data is based on other responses the respondent gave during the interview or from information based on other respondents.

Following the standards developed by the National Center for Education Statistics (NCES), key items for the Education Longitudinal Study of 2002 (ELS:2002) were statistically or logically imputed for missing data. Although past studies, such as the National Education Longitudinal Study of 1988 (NELS:88) and the High School and Beyond Study (HS&B), had data editing and some logical imputations, statistical imputations (the multiple imputations and hotdeck imputations of ELS:2002 provide relevant examples) were generally not performed (see chapter 3 for more detail on the ELS:2002 imputation strategy).

To assess the impact that imputation has on point estimates, the distributions for key items were compared before and after imputation. The organization and selection of the variables were driven in part by the intercohort comparisons between ELS:2002, NELS:88, and HS&B made in the forthcoming NCES report, *United States High School Sophomores: A Twenty-Two Year Comparison, 1980-2002.* The reason for employing the tables in this particular report reflects the concern with whether, for cross-cohort comparisons, ELS:2002 imputed data should be used. The imputed data should be the most precise and accurate but may not be as strictly comparable as the unimputed version of the ELS:2002 data, in that imputation was not performed in the prior studies. (Tables C-39A and C-39B speak in particular to this issue.)

Because the variables (unimputed and imputed) are dependent and can be thought of as paired, the difference of these two variables is treated as if it were a single sample. In other words, the two variables are treated as repeated measures. The comparisons were tested in SUDAAN using *t*-test statistics. To guard against errors of inference based upon multiple comparisons, the Bonferroni procedure adjusts significance tests for multiple contrasts. This method corrects the significance (or alpha) level for the total number of contrasts made with a particular classification variable. For each classification variable, there are $\left(K*(K-1)\right)/2$ possible contrasts (or nonredundant pairwise comparisons), where K is the number of categories. For example, if a classification variable such as race has six categories, K=6 and there are (6*5)/2=15 possible comparisons between the categories. The Bonferroni procedure divides the alpha-level for a single *t*-test (in this case, .05) by the number of possible pairwise comparisons (15) to derive a new alpha corrected for the fact that multiple contrasts are being made.

The reader should recognize that because of the dependent observations and large sample size, many small differences were found to be statistically significant. As presented in the tables below, these small differences would not normally be thought of as having substantive or practical significance. The sample sizes between the two variables being compared differed by only the amount of missing data. Table C-4 presents the sample sizes and weighted distributions for key variables.

The analysis was divided by item topic: student demographics (tables C-6A to C-12B), school experiences (C-13A to C-17B), tested achievement (C-18A to C-26B), afterschool activities (C-27A to C-30B), life values (C-31A to C-34B), and plans and expectations (C-35A to C-38B). A sample of items was selected from the questionnaire for each topic. Summary statistics for the differences between imputed and unimputed estimates are presented in table C-5 by topic area. A final analysis shown in tables C-39A and 39B compares the NELS:88 and HS&B sophomore cohorts with both the imputed and unimputed ELS:2002 sophomore cohort data. These comparisons demonstrate to some degree the potential impact that imputation has on bivariate statistics in intercohort analysis.

An important analytical variable is the socioeconomic status indicator (SES). This variable is not imputed directly but contains elements from five other variables that were imputed. As with the other comparisons, SES was recomputed using the unimputed values, and these estimates were compared to the imputed estimates, testing for differences.

Table C-5 summarizes the general findings for the imputation comparisons by ELS:2002 topical area. Generally, differences were very small, ranging from an average of 0.01 percent for life value items to 0.06 percent for tested achievement. Of these differences, only a fraction of comparisons, were statistically significant. For example, out of 53 student demographics comparisons, only 9 percent (or 5) were statistically significant, the largest being a 0.6 percentage point difference (mother and father family living arrangement and Asian/Pacific Islander race categories).

However, for one variable in particular, there were significant and large differences for students by parents' education level, especially those students who had at least one parent with a graduate/professional degree. Table C-16A shows a moderate decline (-5.1 percentage points) in the percentage of students in this category who felt disruptions interfered with learning. Larger differences between imputed and unimputed estimates for this group of students were seen in the use of calculators (table C-17A, -14.2 percentage points) and in tested achievement (C-20A, C-21A, C-23A, C-24A, C-25A, C-26A). For example, students who had a least one parent with a graduate or professional degree saw significant differences in the probability of proficiency in reading level 2 (18.7 percentage points or a 40 percent increase from the unimputed score), reading level 3 (10.7 percentage points or a 153 percent increase), math level 2 (12.4 percentage points or an 18 percent increase), math level 3 (21.9 percentage points or a 47 percent increase), math level 4 (19.6 percentage points or a 107 percent increase), and math level 5 (2.5 percentage points or a 417 percent increase). In each case, the imputed mean was significantly greater than the unimputed mean. It is of interest to note that the univariate distributions for mother's and father's education levels (tables C-8A and C-9A) did not show any large differences. These findings must be tempered by the fact that they are the exception. Most comparisons did not reveal any difference between imputed and unimputed estimates, and any difference that was detected was usually very small (< 1 percentage point).

An important issue is how imputation affected SES, particularly whether the results would differ greatly depending on whether it was constructed in accordance with the earlier (e.g., NELS:88) specifications or constructed in accord with the new ELS:2002 specifications. This composite variable is critical for research on tested achievement and other educational outcomes as a major nonschool factor that correlates highly with school success. For ELS:2002 and for its predecessor studies as well, the five components of the SES variable are mother's and father's education, mother's and father's occupation, and family income. In prior studies (such as NELS:88), a student-derived household items index was substituted when parent-reported income data were missing. In addition, when parent-reported data were missing for parent education or occupation, student-reported data were substituted.

In ELS:2002 (unlike NELS:88), the household items index was not used in the construction of SES. If missing from the parent survey, family income was directly imputed. However, as in NELS:88, if parental occupation and education reports were missing from the parent survey, student-reported data were substituted. Only if the occupation and education variables were missing from both the parent and student surveys were these data elements imputed.

Examination of the relationships between SES and race, and SES and school sector, reveals no statistically significant differences between SES in ELS:2002 when constructed according to the NELS:88 criteria (inclusion of the household index when income data are missing) versus the ELS:2002 criteria (direct imputation of missing income data (see tables C-11A and C-12A). Other tables using SES as a row variable show small differences—all smaller than 2 percentage points (and most below 1 percentage point).

Finally, to demonstrate to some degree the potential impact that imputation has on bivariate statistics in intercohort analysis, tables C-39A and C-39B provide comparisons between imputed and unimputed point estimates from ELS:2002 to NELS:88 and HS&B data files. Of the 36 comparisons between the unimputed ELS:2002 and NELS:88, only 2 changed in statistical significance (one became significantly different and the other was no longer significant). For the ELS:2002 and HS&B comparisons, no changes in the number of statistically significant comparisons or in the direction of these differences were detected. This limited analysis suggests that imputation has a limited impact on intercohort comparisons.

This appendix examines the potential impact that imputation had on point estimates and intercohort comparisons. The general findings reveal a number of differences, but these differences were very small and in most cases lack any practical or substantive magnitude. Some estimates experienced significant differences, but these estimates were not part of a larger pattern and usually involved a relatively small, select population, suggesting a limited impact from imputation. Although this analysis cannot specify how well the imputation worked, it demonstrates, in general, that the imputation did not introduce large shifts from unimputed point estimates, allowing analysts to take advantage of the larger sample sizes when conducting statistical analyses.

C.3 Appendix C References

Federal Committee on Statistical Methodology. (2001). *Measuring and Reporting Sources of Error in Surveys* (Statistical Policy Working Paper 31). Washington, DC: Office of Management and Budget.

Groves, R.M. (1989). *Survey Errors and Survey Costs*. New York: Wiley.

Seastrom, M. (2003). *NCES Statistical Standards* (NCES 2003–601). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Available: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003601

Table C-5. Summary of differences between imputed and unimputed data, by topic: 2002

Topic	Mean relative difference (percent)	Median relative difference (percent)	Number of comparisons made	Percentage of significant differences	Percentage of unimputed estimates > imputed estimates (all estimates)	Percentage of unimputed estimates > imputed estimates (estimates with significant differences)
Student demographics	0.0158	0.0082	53	9.4	49.1	40.0
School experiences	0.0256	0.0053	219	12.8	60.7	67.9
Tested achievement	0.0617	0.0163	192	57.8	55.7	49.5
Afterschool activity	0.0068	0.0025	117	0.9	46.2	100.0
Life values	0.0058	0.0026	108	12.0	54.6	30.8
Plans and expectations	0.0092	0.0011	146	4.8	49.3	28.6

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-6A. Percentage of high school sophomores, by sex: 2002

Sex	Unimputed	Imputed	Difference
Male	50.5	50.5	#
Female	49.5	49.5	#

Rounds to zero.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-6B. Standard errors for table C-6A estimates (percentage of high school sophomores, by sex): 2002

Sex	Unimputed	Imputed
Male	0.53	0.53
Female	0.53	0.53

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-7A. Percentage of high school sophomores, by family living arrangement: 2002

Family living arrangement	Unimputed	Imputed	Difference
Mother and father	57.4	56.8	-0.6*
Mother and guardian	13.3	13.4	0.1
Father and guardian	3.1	3.2	0.1
Mother only	18.9	19.0	0.1
Father only	3.2	3.2	#
Other relative or nonrelative	4.1	4.3	0.2

Rounds to zero.
* Denotes statistical significance at $p < .05$.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-7B. Standard errors for table C-7A estimates (percentage of high school sophomores, by family living arrangement): 2002

Family living arrangement	Unimputed	Imputed
Mother and father	0.58	0.57
Mother and guardian	0.37	0.36
Father and guardian	0.18	0.16
Mother only	0.46	0.44
Father only	0.21	0.20
Other relative or nonrelative	0.22	0.21

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-8A. Percentage of high school sophomores, by mother's highest level of education: 2002

Highest level of education	Unimputed	Imputed	Difference
Did not finish high school	12.9	13.2	0.3*
Graduated from high school or GED	27.8	27.9	0.1
Some postsecondary education (PSE)	34.8	34.6	-0.2*
Graduated from college	16.7	16.6	-0.1
Completed master's or equivalent	6.0	6.0	#
Completed Ph.D., M.D., or other advanced degree	1.7	1.7	#

Rounds to zero.
* Denotes statistical significance at $p < .05$.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-8B. Standard errors for table C-8A estimates (percentage of high school sophomores, by mother's highest level of education): 2002

Highest level of education	Unimputed	Imputed
Did not finish high school	0.53	0.54
Graduated from high school or GED	0.50	0.49
Some postsecondary education (PSE)	0.54	0.53
Graduated from college	0.48	0.46
Completed master's or equivalent	0.28	0.27
Completed Ph.D., M.D., or other advanced degree	0.15	0.15

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-9A. Percentage of high school sophomores, by father's highest level of education: 2002

Highest level of education	Unimputed	Imputed	Difference
Did not finish high school	13.6	13.9	0.3*
Graduated from high school or GED	29.9	30.1	0.2
Some postsecondary education (PSE)	27.7	27.4	-0.2
Graduated from college	16.9	16.7	-0.2
Completed master's or equivalent	7.5	7.4	-0.1
Completed Ph.D., M.D., or other advanced degree	4.5	4.4	-0.1

* Denotes statistical significance at $p < .05$.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-9B. Standard errors for table C-9A estimates (percentage of high school sophomores, by father's highest level of education): 2002

Highest level of education	Unimputed	Imputed
Did not finish high school	0.57	0.54
Graduated from high school or GED	0.59	0.53
Some postsecondary education (PSE)	0.52	0.48
Graduated from college	0.46	0.43
Completed master's or equivalent	0.33	0.30
Completed Ph.D., M.D., or other advanced degree	0.28	0.26

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-10A. Percentage of high school sophomores whose native language is English, by race/ethnicity: 2002

Race/ethnicity[1]	Unimputed	Imputed	Difference
American Indian or Alaska Native	83.8	83.7	-0.1
Asian or Pacific Islander	36.3	36.9	0.6*
Black or African American	94.5	94.4	-0.1
Hispanic or Latino	47.6	47.7	0.1
More than one race	92.8	92.5	-0.3
White	97.0	97.0	#

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-10B. Standard errors for table C-10A estimates (percentage of high school sophomores whose native language is English, by race/ethnicity): 2002

Race/ethnicity[1]	Unimputed	Imputed
American Indian or Alaska Native	4.55	4.46
Asian or Pacific Islander	2.07	2.01
Black or African American	0.62	0.64
Hispanic or Latino	1.97	1.93
More than one race	0.99	1.04
White	0.28	0.28

[1] All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-11A. Percentage of high school sophomores, by socioeconomic status and race/ethnicity: 2002

Race/ethnicity[1]	Unimputed			Imputed			Difference		
	Low	Middle	High	Low	Middle	High	Low	Middle	High
American Indian or Alaska Native	33.8	52.7	13.5	31.4	54.9	13.7	-2.4	2.3	0.2
Asian or Pacific Islander	28.5	39.9	31.6	28.0	40.5	31.5	-0.5	0.6	-0.1
Black or African American	36.5	50.5	13.0	35.2	51.9	12.9	-1.3	1.4	-0.1
Hispanic or Latino	49.9	40.4	9.7	50.1	40.2	9.7	0.2	-0.2	#
More than one race	23.2	55.4	21.4	23.6	56.0	20.4	0.4	0.6	-1.0
White	15.5	52.7	31.8	15.6	52.3	32.0	0.1	-0.3	0.2

Rounds to zero.
[1] All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-11B. Standard errors for table C-11A estimates (percentage of high school sophomores, by socioeconomic status and race/ethnicity): 2002

Race/ethnicity[1]	Unimputed			Imputed		
	Low	Middle	High	Low	Middle	High
American Indian or Alaska Native	4.73	4.87	3.78	5.42	4.87	3.48
Asian or Pacific Islander	2.24	1.91	2.34	2.16	1.69	2.15
Black or African American	1.44	1.30	0.95	1.38	1.37	0.89
Hispanic or Latino	1.78	1.46	0.87	1.86	1.54	0.86
More than one race	2.01	2.41	1.95	2.01	2.33	1.76
White	0.66	0.79	0.95	0.63	0.80	0.94

[1] All race categories exclude individuals of Hispanic or Latino origin.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-12A. Percentage of high school sophomores, by school sector and socioeconomic status: 2002

Socioeconomic status	Unimputed			Imputed			Difference		
	Public	Catholic	Other private	Public	Catholic	Other private	Public	Catholic	Other private
Lowest quarter	98.1	0.9	1.0	98.0	1.0	1.0	-0.1	0.1	#
Middle quarters	94.0	3.5	2.5	94.0	3.5	2.6	#	-0.1	0.1
Highest quarter	83.3	9.1	7.6	83.5	9.0	7.5	0.2	-0.1	-0.2

Rounds to zero.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-12B. Standard errors for table C-12A estimates (percentage of high school sophomores, by school sector and socioeconomic status): 2002

Socioeconomic status	Unimputed			Imputed		
	Public	Catholic	Other private	Public	Catholic	Other private
Lowest quarter	0.23	0.14	0.18	0.24	0.16	0.17
Middle quarters	0.30	0.19	0.23	0.31	0.19	0.25
Highest quarter	1.00	0.60	0.82	0.98	0.59	0.81

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-13A. Percentage of high school sophomores, by high school program and selected student characteristics: 2002

Characteristic	Unimputed			Imputed			Difference		
	General	Academic/ college preparatory	Vocational	General	Academic/ college preparatory	Vocational	General	Academic/ college preparatory	Vocational
Sex									
Male	39.0	48.1	12.9	39.3	47.9	12.8	0.3	-0.2	-0.1
Female	37.7	53.7	8.5	37.8	53.5	8.7	0.1	-0.2	0.1
Socioeconomic status									
Lowest quarter	43.8	39.9	16.4	42.8	41.6	15.7	-1.0	1.7*	-0.7
Middle quarters	40.2	49.0	10.8	40.8	48.3	10.9	0.6	-0.7	0.2
Highest quarter	29.0	65.9	5.0	29.9	64.5	5.5	0.9	-1.4*	0.5
Composite achievement test score									
Lowest quarter	48.6	34.1	17.3	48.0	35.0	17.0	-0.6	0.9*	-0.3
Second quarter	44.8	41.8	13.4	44.5	42.4	13.1	-0.3	0.6	-0.3
Third quarter	36.3	56.1	7.7	36.8	55.3	7.9	0.5	-0.7*	0.2
Highest quarter	24.4	70.7	4.8	24.9	69.9	5.1	0.5	-0.8*	0.3

* Denotes statistical significance at $p < .05$.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-13B. Standard errors for table C-13A estimates (percentage of high school sophomores, by high school program and selected student characteristics): 2002

Characteristic	Unimputed			Imputed		
	General	Academic/college preparatory	Vocational	General	Academic/college preparatory	Vocational
Sex						
Male	0.80	0.88	0.66	0.79	0.88	0.67
Female	0.80	0.81	0.44	0.79	0.80	0.43
Socioeconomic status						
Lowest quarter	1.10	1.07	0.93	1.04	1.01	0.86
Middle quarters	0.82	0.86	0.56	0.77	0.83	0.55
Highest quarter	1.11	1.19	0.50	1.13	1.21	0.52
Composite achievement test score						
Lowest quarter	1.06	0.94	0.90	1.01	0.90	0.88
Second quarter	1.12	1.08	0.76	1.07	1.06	0.75
Third quarter	1.07	1.17	0.60	1.07	1.15	0.58
Highest quarter	1.06	1.16	0.55	1.04	1.15	0.54

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-14A. Percentage of high school sophomores who report having been in various kinds of courses or programs in high school, by selected student characteristics: 2002

Characteristic	Unimputed				Imputed				Difference			
	Remedial English	Remedial math	Bilingual or bicultural education	Advanced Placement	Remedial English	Remedial math	Bilingual or bicultural education	Advanced Placement	Remedial English	Remedial math	Bilingual or bicultural education	Advanced Placement
Sex												
Male	10.1	11.5	26.9	17.1	10.1	11.5	26.9	17.1	-0.002	#	#	#
Female	6.9	8.4	29.5	18.3	6.9	8.4	29.5	18.3	0.006	#	#	#
Socioeconomic status												
Lowest quarter	10.5	12.4	19.1	12.6	10.1	12.0	20.0	13.2	-0.408	-0.4	0.9*	0.6
Middle quarters	8.1	9.4	28.9	16.5	8.4	9.7	28.3	16.1	0.267	0.3	-0.6*	-0.4
Highest quarter	7.0	8.5	35.9	25.2	7.2	8.4	36.0	25.1	0.162	#	#	-0.2
Composite achievement test score												
Lowest quarter	14.5	16.0	12.8	9.5	14.6	16.0	12.8	9.5	0.017	#	#	#
Second quarter	7.3	9.6	21.1	11.6	7.4	9.6	20.9	11.5	0.037	#	-0.2	#
Third quarter	6.8	8.6	34.6	17.9	6.7	8.5	34.3	17.9	-0.099*	#	-0.2	#
Highest quarter	5.4	5.7	44.2	31.6	5.4	5.7	44.1	31.4	-0.050	#	-0.1	-0.1

Rounds to zero.
* Denotes statistical significance at $p < .05$.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-14B. Standard errors for table C-14A estimates (percentage of high school sophomores who report having been in various kinds of courses or programs in high school, by selected student characteristics): 2002

Characteristic	Unimputed				Imputed			
	Remedial English	Remedial math	Bilingual or bicultural education	Advanced Placement	Remedial English	Remedial math	Bilingual or bicultural education	Advanced Placement
Sex								
Male	0.44	0.51	0.76	0.60	0.44	0.51	0.76	0.60
Female	0.37	0.44	0.80	0.68	0.37	0.44	0.80	0.68
Socioeconomic status								
Lowest quarter	0.66	0.74	0.83	0.71	0.66	0.76	0.87	0.73
Middle quarters	0.43	0.47	0.76	0.62	0.43	0.46	0.76	0.62
Highest quarter	0.52	0.58	1.02	1.06	0.51	0.55	1.04	1.03
Composite achievement test score								
Lowest quarter	0.77	0.89	0.71	0.60	0.76	0.88	0.70	0.60
Second quarter	0.50	0.61	0.91	0.70	0.49	0.60	0.89	0.69
Third quarter	0.51	0.57	1.05	0.88	0.50	0.56	1.04	0.87
Highest quarter	0.48	0.48	1.10	1.26	0.47	0.48	1.10	1.25

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-15A. Percentage of high school sophomores saying they usually or often come to school unprepared, by selected student characteristics: 2002

Characteristic	Unimputed				Imputed				Difference			
	Come to school without books	Come to school without paper, pen, or pencil	Come to school without homework	Come to school without books and/or homework	Come to school without books	Come to school without paper, pen, or pencil	Come to school without homework	Come to school without books and/or homework	Come to school without books	Come to school without paper, pen, or pencil	Come to school without homework	Come to school without books and/or homework
Sex												
Male	18.5	22.0	30.5	35.2	18.5	22.0	30.5	35.2	#	#	#	#
Female	15.1	13.1	21.3	25.6	15.1	13.1	21.3	25.6	#	#	#	#
Socioeconomic status												
Lowest quarter	22.0	21.8	31.7	37.3	21.8	21.1	31.8	37.1	-0.2	-0.7	#	-0.2
Middle quarters	16.2	16.9	25.8	30.4	16.1	17.1	25.8	30.4	-0.1	0.3	#	-0.1
Highest quarter	12.9	14.6	20.1	23.7	13.4	14.9	20.2	24.0	0.5	0.3	0.1	0.3
Composite achievement test score												
Lowest quarter	29.6	29.6	37.9	44.4	29.5	29.6	37.8	44.4	#	#	-0.1	#
Second quarter	16.0	16.2	26.1	30.7	15.9	16.4	26.1	30.6	#	0.2	#	-0.1
Third quarter	12.3	13.0	22.1	26.2	12.2	13.0	22.1	26.1	-0.1	#	#	#
Highest quarter	9.7	11.0	17.7	20.8	9.7	11.1	17.7	20.8	#	#	#	#

Rounds to zero.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-15B. Standard errors for table C-15A estimates (percentage of high school sophomores saying they usually or often come to school unprepared, by selected student characteristics): 2002

Characteristic	Unimputed				Imputed			
	Come to school without books	Come to school without paper, pen, or pencil	Come to school without homework	Come to school without books and/or homework	Come to school without books	Come to school without paper, pen, or pencil	Come to school without homework	Come to school without books and/or homework
Sex								
Male	0.57	0.60	0.71	0.77	0.57	0.60	0.71	0.77
Female	0.57	0.51	0.64	0.69	0.57	0.51	0.64	0.69
Socioeconomic status								
Lowest quarter	0.90	0.78	0.99	1.06	0.88	0.78	0.97	1.03
Middle quarters	0.54	0.54	0.66	0.70	0.55	0.54	0.66	0.70
Highest quarter	0.70	0.82	0.89	0.92	0.71	0.78	0.90	0.95
Composite achievement test score								
Lowest quarter	1.01	0.93	1.09	1.14	1.01	0.93	1.09	1.13
Second quarter	0.80	0.82	1.02	1.04	0.78	0.81	1.01	1.03
Third quarter	0.66	0.64	0.82	0.87	0.65	0.64	0.81	0.86
Highest quarter	0.57	0.62	0.75	0.80	0.57	0.62	0.75	0.79

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-16A. Percentage of high school sophomores who agreed or strongly agreed with various statements about the school's climate and teaching, by selected student characteristics: 2002

Characteristic	Unimputed: I don't feel safe at this school	Unimputed: Disruptions by other students get in the way of my learning	Unimputed: The teaching is good	Imputed: I don't feel safe at this school	Imputed: Disruptions by other students get in the way of my learning	Imputed: The teaching is good	Difference: I don't feel safe at this school	Difference: Disruptions by other students get in the way of my learning	Difference: The teaching is good
Sex									
Male	12.7	43.6	79.0	12.7	43.6	79.0	#	#	#
Female	11.1	47.8	82.2	11.1	47.8	82.2	#	#	#
Socioeconomic status									
Lowest quarter	17.0	52.5	79.3	16.4	51.9	79.4	-0.5	-0.7	0.1
Middle quarters	11.5	44.9	79.7	12.0	45.4	79.6	0.5	0.4	-0.1
Highest quarter	7.5	40.3	84.0	7.3	40.2	83.9	-0.2	#	-0.2
Parents' education									
High school or less	18.5	53.7	84.3	15.2	50.4	79.7	-3.4*	-3.3	-4.5
Some college	13.1	48.7	78.8	12.0	45.6	79.4	-1.1*	-3.1	0.5
College graduation	12.3	44.8	79.6	9.7	42.5	82.2	-2.6*	-2.3	2.6
Graduate or professional degree	11.1	47.4	78.3	9.2	42.3	82.7	-1.9*	-5.1*	4.3
Native language[1]									
English	11.0	44.0	80.2	11.1	44.3	80.1	0.2*	0.3*	#
Non-English	16.4	54.3	83.8	16.7	54.4	83.6	0.2	#	-0.2
Student's educational expectations									
High school or less	22.6	50.2	68.5	22.8	50.7	68.6	0.2	0.5	0.1
Some college	16.6	46.2	76.1	16.7	46.6	76.2	#	0.5	0.1
College graduation	9.3	44.5	81.7	9.6	44.7	81.5	0.3*	0.2	-0.2
Graduate or professional degree	9.1	44.8	85.6	9.1	45.0	85.4	#	0.3*	-0.1
Don't know	16.4	46.4	74.6	16.2	46.6	74.5	-0.1	0.2	-0.1

See notes at end of table.

Table C-16A. Percentage of high school sophomores who agreed or strongly agreed with various statements about the school's climate and teaching, by selected student characteristics: 2002—Continued

	Unimputed			Imputed			Difference		
Characteristic	I don't feel safe at this school	Disruptions by other students get in the way of my learning	The teaching is good	I don't feel safe at this school	Disruptions by other students get in the way of my learning	The teaching is good	I don't feel safe at this school	Disruptions by other students get in the way of my learning	The teaching is good
Composite achievement test score									
Lowest quarter	21.1	55.2	73.8	21.1	55.3	73.9	-0.1	#	0.1
Second quarter	12.4	48.9	78.5	12.7	49.0	78.3	0.3	0.2	-0.2
Third quarter	8.7	42.7	82.5	8.6	42.5	82.5	#	-0.2	#
Highest quarter	5.2	35.8	87.7	5.2	35.9	87.7	#	0.1	#

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-16B. Standard errors for table C-16A estimates (percentage of high school sophomores who agreed or strongly agreed with various statements about the school's climate and teaching, by selected student characteristics): 2002

Characteristic	Unimputed			Imputed		
	I don't feel safe at this school	Disruptions by other students get in the way of my learning	The teaching is good	I don't feel safe at this school	Disruptions by other students get in the way of my learning	The teaching is good
Sex						
Male	0.5	0.8	0.7	0.5	0.8	0.7
Female	0.5	0.8	0.6	0.5	0.8	0.6
Socioeconomic status						
Lowest quarter	0.8	0.9	0.9	0.8	1.0	0.8
Middle quarters	0.5	0.8	0.7	0.5	0.8	0.7
Highest quarter	0.6	1.1	0.8	0.6	1.1	0.9
Parents' education						
High school or less	1.5	1.8	1.4	0.7	1.0	0.8
Some college	0.8	1.2	1.0	0.6	0.8	0.8
College graduation	1.0	1.5	1.3	0.7	1.1	1.0
Graduate or professional degree	1.0	1.6	1.4	0.7	1.3	1.1
Native language[1]						
English	0.4	0.6	0.6	0.4	0.6	0.6
Non-English	1.1	1.2	0.9	1.1	1.2	1.0
Student's educational expectations						
High school or less	1.6	1.7	1.7	1.6	1.7	1.7
Some college	1.2	1.8	1.4	1.2	1.8	1.4
College graduation	0.5	0.9	0.8	0.5	0.9	0.7
Graduate or professional degree	0.5	0.9	0.7	0.5	0.9	0.7
Don't know	1.2	1.6	1.4	1.2	1.5	1.4
Composite achievement test score						
Lowest quarter	0.8	1.0	1.0	0.8	1.0	1.0
Second quarter	0.7	1.0	0.9	0.7	1.0	0.8
Third quarter	0.6	1.1	0.8	0.6	1.1	0.8
Highest quarter	0.5	1.0	0.7	0.5	1.0	0.7

[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-17A. Percentage of high school sophomores' use of calculators and computers, by selected student characteristics: 2002

Characteristic	Unimputed			Imputed			Difference		
	Use calculators	Use graphic calculators	Use computers	Use calculators	Use graphic calculators	Use computers	Use calculators	Use graphic calculators	Use computers
Sex									
Male	7.4	31.6	58.5	7.4	31.6	58.5	#	#	#
Female	4.6	33.7	62.8	4.6	33.7	62.8	#	#	#
Socioeconomic status									
Lowest quarter	8.6	38.5	54.8	8.7	38.1	54.8	0.1	-0.5	0.1
Middle quarters	5.9	34.4	62.4	5.8	34.7	62.1	#	0.2	-0.3
Highest quarter	3.4	22.9	63.2	3.7	23.1	63.5	0.2	0.3	0.3
Parents' education									
High school or less	13.2	40.7	57.2	8.5	37.6	57.8	-4.7	-3.0	0.6*
Some college	7.1	36.8	59.4	5.7	35.5	60.3	-1.4	-1.3	0.9*
College graduation	5.9	35.5	60.3	5.0	28.2	62.6	-0.9	-7.3*	2.3
Graduate or professional degree	5.7	38.0	61.9	3.8	23.8	63.5	-1.9	-14.2*	1.6
Native language[1]									
English	5.2	31.7	61.9	5.3	31.7	61.6	0.1	#	-0.3*
Non-English	10.6	38.4	55.1	10.6	38.3	54.8	#	-0.1	-0.3
Student's educational expectations									
High school or less	12.9	42.9	54.8	13.3	42.6	54.0	0.4	-0.2	-0.8
Some college	8.1	40.3	57.7	8.0	40.2	57.0	#	-0.2	-0.7*
College graduation	4.7	32.5	61.6	4.7	32.4	61.2	#	-0.1	-0.4*
Graduate or professional degree	3.9	26.2	62.1	4.0	26.3	61.7	0.1	0.1	-0.3*
Don't know	10.0	40.2	64.1	9.9	40.1	63.8	-0.1	-0.1	-0.3
Composite achievement test score									
Lowest quarter	10.9	39.7	48.4	10.9	39.6	48.4	#	#	#
Second quarter	5.8	36.5	61.4	5.7	36.5	61.1	-0.1*	#	-0.3*
Third quarter	4.2	33.3	65.1	4.2	32.9	64.7	-0.1*	-0.3	-0.3
Highest quarter	3.3	21.7	68.7	3.3	21.6	68.4	#	-0.1	-0.2

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-17B. Standard errors for table C-17A estimates (percentage of high school sophomores' use of calculators and computers, by selected student characteristics): 2002

Characteristic	Unimputed			Imputed		
	Use calculators	Use graphic calculators	Use computers	Use calculators	Use graphic calculators	Use computers
Sex						
Male	0.46	0.94	0.92	0.46	0.94	0.92
Female	0.34	1.01	0.86	0.34	1.01	0.86
Socioeconomic status						
Lowest quarter	0.66	1.17	1.11	0.68	1.19	1.12
Middle quarters	0.40	1.06	0.94	0.39	1.03	0.90
Highest quarter	0.43	1.10	1.24	0.44	1.09	1.24
Parents' education						
High school or less	1.54	2.20	2.13	0.61	1.18	1.14
Some college	0.68	1.34	1.33	0.41	1.13	1.02
College graduation	0.76	1.74	1.62	0.47	1.16	1.26
Graduate or professional degree	0.72	1.84	1.76	0.47	1.33	1.35
Native language[1]						
English	0.32	0.91	0.82	0.32	0.90	0.82
Non-English	1.01	1.63	1.50	1.02	1.61	1.50
Student's educational expectations						
High school or less	1.27	1.82	1.99	1.24	1.76	1.95
Some college	0.90	1.92	1.77	0.89	1.90	1.75
College graduation	0.42	1.08	1.02	0.41	1.07	1.02
Graduate or professional degree	0.32	0.96	1.02	0.32	0.95	1.01
Don't know	1.09	1.91	1.68	1.06	1.86	1.66
Composite achievement test score						
Lowest quarter	0.67	1.13	1.24	0.67	1.13	1.23
Second quarter	0.50	1.16	1.19	0.50	1.14	1.18
Third quarter	0.44	1.32	1.26	0.44	1.31	1.26
Highest quarter	0.42	1.15	1.24	0.41	1.14	1.24

[1] The first language students learned to speak when they were children.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-18A. Item Response Theory (IRT)-estimated number-right scores for mathematics, by selected student characteristics: 2002

Characteristic	Unimputed (mean)	Imputed (mean)	Difference (mean)
Sex			
Male	37.6	38.0	0.5
Female	38.0	37.1	-1.0
Socioeconomic status			
Lowest quarter	31.2	31.5	0.3*
Middle quarters	37.6	37.3	-0.3*
Highest quarter	44.1	44.0	-0.1
High school program			
General	35.1	35.0	-0.1
Academic/college preparatory	40.8	40.5	-0.4*
Vocational	33.0	33.0	0.1

* Denotes statistical significance at $p < .05$.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-18B. Standard errors for table C-18A estimates (Item Response Theory [IRT]-estimated number-right scores for mathematics, by selected student characteristics): 2002

Characteristic	Unimputed SE (mean)	Imputed SE (mean)
Sex		
Male	0.24	0.24
Female	0.25	0.25
Socioeconomic status		
Lowest quarter	0.29	0.28
Middle quarters	0.19	0.21
Highest quarter	0.25	0.25
High school program		
General	0.26	0.26
Academic/college preparatory	0.24	0.24
Vocational	0.46	0.44

NOTE: SE = standard error.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-19A. High school sophomore probability of proficiency at reading level 1, by selected student characteristics: 2002

Characteristic	Unimputed (mean)	Imputed (mean)	Difference (mean)
Sex			
Male	87.1	87.6	0.5*
Female	91.0	91.3	0.3*
Socioeconomic status			
Lowest quarter	79.0	80.7	1.7*
Middle quarters	90.9	90.4	-0.5*
Highest quarter	95.8	96.2	0.4
Parents' education			
High school or less	77.5	83.5	6.0
Some college	85.9	89.8	3.9*
College graduation	89.4	92.5	3.1*
Graduate or professional degree	91.7	94.5	2.8*
Student's educational expectations			
High school or less	68.5	69.8	1.3*
Some college	82.6	82.7	0.1
College graduation	91.9	91.6	-0.2
Graduate or professional degree	95.4	95.2	-0.2
Don't know	84.7	84.0	-0.7*
Native language[1]			
English	91.5	91.5	-0.1
Non-English	76.7	76.8	0.1
Composite achievement test score			
Lowest quarter	59.5	60.1	0.5*
Second quarter	97.7	97.8	0.1*
Third quarter	99.9	99.9	#*
Highest quarter	100.0	100.0	#*
High school program			
General	87.4	87.1	-0.3
Academic/college preparatory	93.1	92.5	-0.6*
Vocational	82.9	83.1	0.2

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-19B. Standard errors for table C-19A estimates (high school sophomore probability of proficiency at reading level 1, by selected student characteristics): 2002

Characteristic	Unimputed SE (mean)	Imputed SE (mean)
Sex		
Male	0.50	0.48
Female	0.45	0.44
Socioeconomic status		
Lowest quarter	0.83	0.77
Middle quarters	0.36	0.39
Highest quarter	0.42	0.38
Parents' education		
High school or less	1.46	0.70
Some college	0.78	0.46
College graduation	0.74	0.53
Graduate or professional degree	0.69	0.56
Student's educational expectations		
High school or less	1.46	1.37
Some college	0.96	0.93
College graduation	0.48	0.47
Graduate or professional degree	0.34	0.34
Don't know	1.01	0.99
Native language[1]		
English	0.33	0.33
Non-English	1.16	1.13
Composite achievement test score		
Lowest quarter	0.83	0.82
Second quarter	0.15	0.14
Third quarter	0.02	0.02
Highest quarter	#	#
High school program		
General	0.56	0.55
Academic/college preparatory	0.40	0.41
Vocational	1.00	0.96

Rounds to zero.
[1] The first language students learned to speak when they were children.
NOTE: SE = standard error.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-20A. High school sophomore probability of proficiency at reading level 2, by selected student characteristics: 2002

Characteristic	Unimputed (mean)	Imputed (mean)	Difference (mean)
Sex			
Male	43.6	44.2	0.5*
Female	48.3	48.2	-0.1
Socioeconomic status			
Lowest quarter	25.0	26.2	1.2*
Middle quarters	46.1	45.2	-0.9*
Highest quarter	67.6	68.0	0.4
Parents' education			
High school or less	21.6	30.5	8.8*
Some college	34.6	43.6	9.0*
College graduation	42.7	56.2	13.5*
Graduate or professional degree	46.3	65.0	18.7*
Student's educational expectations			
High school or less	15.7	15.5	-0.2
Some college	26.8	27.1	0.3
College graduation	46.9	46.4	-0.5*
Graduate or professional degree	62.0	61.9	-0.1
Don't know	35.1	34.2	-0.9*
Native language[1]			
English	49.7	49.2	-0.5*
Non-English	27.3	27.6	0.3
Composite achievement test score			
Lowest quarter	2.6	2.6	#
Second quarter	22.7	22.6	-0.2
Third quarter	65.3	65.5	0.2*
Highest quarter	93.8	94.0	0.1*
High school program			
General	38.6	38.5	-0.1
Academic/college preparatory	56.7	55.6	-1.1*
Vocational	28.9	29.2	0.4

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-20B. Standard errors for table C-20A estimates (high school sophomore probability of proficiency at reading level 2, by selected student characteristics): 2002

Characteristic	Unimputed SE (mean)	Imputed SE (mean)
Sex		
Male	0.80	0.78
Female	0.88	0.85
Socioeconomic status		
Lowest quarter	0.85	0.84
Middle quarters	0.70	0.68
Highest quarter	0.89	0.88
Parents' education		
High school or less	1.37	0.80
Some college	0.98	0.83
College graduation	1.29	0.96
Graduate or professional degree	1.32	1.17
Student's educational expectations		
High school or less	1.07	0.98
Some college	1.11	1.07
College graduation	0.89	0.85
Graduate or professional degree	0.89	0.85
Don't know	1.27	1.22
Native language[1]		
English	0.70	0.68
Non-English	1.21	1.18
Composite achievement test score		
Lowest quarter	0.12	0.12
Second quarter	0.45	0.42
Third quarter	0.56	0.53
Highest quarter	0.22	0.21
High school program		
General	0.86	0.83
Academic/college preparatory	0.82	0.79
Vocational	1.46	1.39

[1] The first language students learned to speak when they were children.

NOTE: SE = standard error.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-21A. High school sophomore probability of proficiency at reading level 3, by selected student characteristics: 2002

Characteristic	Unimputed (mean)	Imputed (mean)	Difference (mean)
Sex			
Male	8.2	8.1	-0.1
Female	8.8	8.5	-0.3*
Socioeconomic status			
Lowest quarter	2.5	2.5	#
Middle quarters	6.7	6.3	-0.4*
Highest quarter	18.2	17.8	-0.3
Parents' education			
High school or less	1.3	3.0	1.7*
Some college	3.8	6.1	2.2*
College graduation	6.0	11.5	5.4*
Graduate or professional degree	7.0	17.7	10.7*
Student's educational expectations			
High school or less	0.8	0.8	#
Some college	2.1	2.1	-0.1
College graduation	7.6	7.2	-0.4*
Graduate or professional degree	13.9	13.5	-0.4*
Don't know	5.8	5.6	-0.2
Native language[1]			
English	9.4	9.0	-0.4*
Non-English	3.9	3.8	-0.1
Composite achievement test score			
Lowest quarter	#	#	#*
Second quarter	0.1	0.1	#*
Third quarter	2.2	2.1	-0.1*
Highest quarter	31.4	30.9	-0.5*
High school program			
General	4.9	4.8	-0.1
Academic/college preparatory	12.7	12.1	-0.6*
Vocational	2.8	2.8	#

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-21B. Standard errors for table C-21A estimates (high school sophomore probability of proficiency at reading level 3, by selected student characteristics): 2002

Characteristic	Unimputed SE (mean)	Imputed SE (mean)
Sex		
Male	0.34	0.32
Female	0.39	0.37
Socioeconomic status		
Lowest quarter	0.25	0.23
Middle quarters	0.26	0.25
Highest quarter	0.72	0.71
Parents' education		
High school or less	0.33	0.24
Some college	0.34	0.28
College graduation	0.53	0.57
Graduate or professional degree	0.60	0.84
Student's educational expectations		
High school or less	0.23	0.20
Some college	0.31	0.29
College graduation	0.39	0.36
Graduate or professional degree	0.51	0.48
Don't know	0.62	0.59
Native language[1]		
English	0.31	0.29
Non-English	0.44	0.41
Composite achievement test score		
Lowest quarter	#	#
Second quarter	0.01	0.01
Third quarter	0.11	0.11
Highest quarter	0.66	0.63
High school program		
General	0.30	0.28
Academic/college preparatory	0.46	0.43
Vocational	0.42	0.39

Rounds to zero.
[1] The first language students learned to speak when they were children.
NOTE: SE = standard error.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-22A. High school sophomore probability of proficiency at math level 1, by selected student characteristics: 2002

Characteristic	Unimputed (mean)	Imputed (mean)	Difference (mean)
Sex			
Male	91.4	91.7	0.3*
Female	91.3	91.6	0.3*
Socioeconomic status			
Lowest quarter	83.2	84.5	1.4*
Middle quarters	92.8	92.5	-0.3
Highest quarter	97.2	97.1	-0.1
Parents' education			
High school or less	81.6	87.4	5.7
Some college	89.5	91.6	2.2*
College graduation	90.4	94.3	3.9*
Graduate or professional degree	93.8	95.6	1.8*
Student's educational expectations			
High school or less	77.0	77.6	0.6
Some college	86.0	85.7	-0.2
College graduation	93.7	93.6	-0.1
Graduate or professional degree	96.0	95.9	-0.1
Don't know	87.9	87.5	-0.4
Native language[1]			
English	93.0	93.0	-0.1
Non-English	83.8	83.7	-0.1
Composite achievement test score			
Lowest quarter	69.1	69.5	0.4*
Second quarter	97.5	97.6	0.1*
Third quarter	99.7	99.7	#*
Highest quarter	100.0	100.0	#*
High school program			
General	89.8	89.5	-0.2
Academic/college preparatory	94.7	94.3	-0.4*
Vocational	87.1	87.1	0.1

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-22B. Standard errors for table C-22A estimates (high school sophomore probability of proficiency at math level 1, by selected student characteristics): 2002

Characteristic	Unimputed SE (mean)	Imputed SE (mean)
Sex		
Male	0.36	0.35
Female	0.36	0.35
Socioeconomic status		
Lowest quarter	0.66	0.56
Middle quarters	0.30	0.33
Highest quarter	0.26	0.26
Parents’ education		
High school or less	1.24	0.48
Some college	0.53	0.37
College graduation	0.68	0.37
Graduate or professional degree	0.52	0.46
Student’s educational expectations		
High school or less	1.11	1.05
Some college	0.87	0.85
College graduation	0.34	0.33
Graduate or professional degree	0.30	0.30
Don’t know	0.72	0.72
Native language[1]		
English	0.25	0.26
Non-English	0.84	0.81
Composite achievement test score		
Lowest quarter	0.67	0.66
Second quarter	0.09	0.09
Third quarter	0.01	0.01
Highest quarter	#	#
High school program		
General	0.42	0.41
Academic/college preparatory	0.30	0.30
Vocational	0.80	0.76

Rounds to zero.
[1] The first language students learned to speak when they were children.
NOTE: SE = standard error.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-23A. High school sophomore probability of proficiency at math level 2, by selected student characteristics: 2002

Characteristic	Unimputed (mean)	Imputed (mean)	Difference (mean)
Sex			
Male	68.0	68.4	0.4*
Female	65.3	65.7	0.5*
Socioeconomic status			
Lowest quarter	44.9	46.4	1.4*
Middle quarters	68.2	67.8	-0.4
Highest quarter	86.3	86.2	-0.1
Parents’ education			
High school or less	41.6	52.0	10.5*
Some college	57.0	65.9	8.9*
College graduation	64.1	76.1	11.9*
Graduate or professional degree	70.5	82.9	12.4*
Student’s educational expectations			
High school or less	32.2	32.4	0.2
Some college	48.1	48.3	0.3
College graduation	70.7	70.1	-0.6*
Graduate or professional degree	81.0	80.9	-0.1
Don’t know	55.3	54.4	-0.9*
Native language[1]			
English	70.2	69.9	-0.3*
Non-English	49.7	49.7	0.1
Composite achievement test score			
Lowest quarter	9.9	9.8	-0.2*
Second quarter	63.4	63.2	-0.2
Third quarter	95.1	95.3	0.2*
Highest quarter	99.9	99.9	#*
High school program			
General	59.2	59.2	-0.1
Academic/college preparatory	77.5	76.4	-1.1*
Vocational	50.9	51.2	0.3

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-23B. Standard errors for table C-23A estimates (high school sophomore probability of proficiency at math level 2, by selected student characteristics): 2002

Characteristic	Unimputed SE (mean)	Imputed SE (mean)
Sex		
Male	0.86	0.84
Female	0.90	0.89
Socioeconomic status		
Lowest quarter	1.19	1.15
Middle quarters	0.73	0.75
Highest quarter	0.75	0.73
Parents’ education		
High school or less	2.00	1.02
Some college	1.19	0.88
College graduation	1.40	0.91
Graduate or professional degree	1.31	1.09
Student’s educational expectations		
High school or less	1.50	1.42
Some college	1.53	1.48
College graduation	0.92	0.89
Graduate or professional degree	0.83	0.81
Don’t know	1.51	1.46
Native language[1]		
English	0.71	0.71
Non-English	1.66	1.62
Composite achievement test score		
Lowest quarter	0.46	0.44
Second quarter	0.75	0.72
Third quarter	0.28	0.26
Highest quarter	0.01	0.01
High school program		
General	0.99	0.99
Academic/college preparatory	0.76	0.75
Vocational	1.83	1.77

[1] The first language students learned to speak when they were children.
NOTE: SE = standard error.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-24A. High school sophomore probability of proficiency at math level 3, by selected student characteristics: 2002

Characteristic	Unimputed (mean)	Imputed (mean)	Difference (mean)
Sex			
Male	48.0	48.0	#
Female	44.7	44.7	-0.1
Socioeconomic status			
Lowest quarter	24.8	25.1	0.3
Middle quarters	45.5	44.7	-0.8*
Highest quarter	70.7	70.9	0.2
Parents' education			
High school or less	20.8	29.5	8.7*
Some college	34.3	42.9	8.6*
College graduation	41.7	56.6	14.9*
Graduate or professional degree	46.9	68.8	21.9*
Student's educational expectations			
High school or less	13.7	13.2	-0.4
Some college	24.0	23.9	-0.1
College graduation	48.4	47.5	-1.0*
Graduate or professional degree	63.4	63.1	-0.3
Don't know	33.7	32.9	-0.7*
Native language[1]			
English	49.6	49.0	-0.6*
Non-English	30.2	30.1	-0.1
Composite achievement test score			
Lowest quarter	0.7	0.7	#*
Second quarter	17.3	16.4	-0.9*
Third quarter	69.5	69.6	0.1
Highest quarter	98.6	98.6	0.1*
High school program			
General	36.5	36.3	-0.2
Academic/college preparatory	59.0	57.5	-1.5*
Vocational	29.7	29.8	0.1

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-24B. Standard errors for table C-24A estimates (high school sophomore probability of proficiency at math level 3, by selected student characteristics): 2002

Characteristic	Unimputed SE (mean)	Imputed SE (mean)
Sex		
Male	0.93	0.92
Female	0.95	0.92
Socioeconomic status		
Lowest quarter	0.96	0.96
Middle quarters	0.82	0.81
Highest quarter	1.04	1.02
Parents' education		
High school or less	1.57	0.95
Some college	1.17	0.93
College graduation	1.48	1.13
Graduate or professional degree	1.50	1.32
Student's educational expectations		
High school or less	1.22	1.13
Some college	1.39	1.33
College graduation	1.04	1.00
Graduate or professional degree	1.04	1.00
Don't know	1.50	1.44
Native language[1]		
English	0.80	0.79
Non-English	1.48	1.44
Composite achievement test score		
Lowest quarter	0.11	0.11
Second quarter	0.62	0.59
Third quarter	0.79	0.76
Highest quarter	0.14	0.13
High school program		
General	0.98	0.97
Academic/college preparatory	0.94	0.91
Vocational	1.76	1.64

[1] The first language students learned to speak when they were children.
NOTE: SE = standard error.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-25A. High school sophomore probability of proficiency at math level 4, by selected student characteristics: 2002

Characteristic	Unimputed (mean)	Imputed (mean)	Difference (mean)
Sex			
Male	22.7	22.3	-0.3*
Female	18.9	18.5	-0.4*
Socioeconomic status			
Lowest quarter	7.5	7.6	0.1
Middle quarters	18.6	17.7	-0.9*
Highest quarter	39.1	38.7	-0.4
Parents' education			
High school or less	5.3	9.8	4.5*
Some college	12.2	16.4	4.2*
College graduation	16.5	27.4	10.8*
Graduate or professional degree	18.4	38.0	19.6*
Student's educational expectations			
High school or less	3.2	3.1	-0.1
Some college	6.6	6.5	-0.1
College graduation	20.2	19.4	-0.9*
Graduate or professional degree	32.4	31.7	-0.7*
Don't know	13.0	12.7	-0.3
Native language[1]			
English	22.4	21.7	-0.7*
Non-English	12.8	12.6	-0.2
Composite achievement test score			
Lowest quarter	0.1	0.1	#*
Second quarter	1.5	1.4	-0.1*
Third quarter	14.7	14.1	-0.6*
Highest quarter	66.6	66.1	-0.5*
High school program			
General	13.9	13.6	-0.2
Academic/college preparatory	28.9	27.7	-1.2*
Vocational	10.7	10.6	-0.1

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-25B. Standard errors for table C-25A estimates (high school sophomore probability of proficiency at math level 4, by selected student characteristics): 2002

Characteristic	Unimputed SE (mean)	Imputed SE (mean)
Sex		
Male	0.65	0.63
Female	0.66	0.63
Socioeconomic status		
Lowest quarter	0.46	0.45
Middle quarters	0.52	0.52
Highest quarter	1.01	0.95
Parents' education		
High school or less	0.66	0.54
Some college	0.73	0.56
College graduation	0.97	0.86
Graduate or professional degree	1.03	1.19
Student's educational expectations		
High school or less	0.46	0.43
Some college	0.65	0.61
College graduation	0.70	0.66
Graduate or professional degree	0.85	0.82
Don't know	0.99	0.95
Native language[1]		
English	0.57	0.55
Non-English	0.95	0.91
Composite achievement test score		
Lowest quarter	0.01	0.01
Second quarter	0.10	0.09
Third quarter	0.45	0.43
Highest quarter	0.68	0.67
High school program		
General	0.59	0.56
Academic/college preparatory	0.77	0.73
Vocational	0.90	0.87

[1] The first language students learned to speak when they were children.

NOTE: SE = standard error.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-26A. High school sophomore probability of proficiency at math level 5, by selected student characteristics: 2002

Characteristic	Unimputed (mean)	Imputed (mean)	Difference (mean)
Sex			
Male	1.4	1.3	-0.1*
Female	0.6	0.6	#*
Socioeconomic status			
Lowest quarter	0.2	0.2	#
Middle quarters	0.5	0.5	-0.1
Highest quarter	2.7	2.6	-0.1
Parents' education			
High school or less	0.2	0.2	#*
Some college	0.3	0.4	0.1*
College graduation	0.3	1.2	0.9
Graduate or professional degree	0.6	3.1	2.5*
Student's educational expectations			
High school or less	#	#	#
Some college	0.1	#	#
College graduation	0.6	0.6	#*
Graduate or professional degree	2.0	1.9	-0.1*
Don't know	0.6	0.6	#*
Native language[1]			
English	1.0	0.9	-0.1*
Non-English	1.2	1.1	-0.1*
Composite achievement test score			
Lowest quarter	#	#	#
Second quarter	#	#	#
Third quarter	#	#	#*
Highest quarter	3.9	3.8	-0.1*
High school program			
General	0.4	0.4	#*
Academic/college preparatory	1.6	1.5	-0.1*
Vocational	0.3	0.3	#*

Rounds to zero.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-26B. Standard errors for table C-26A estimates (high school sophomore probability of proficiency at math level 5, by selected student characteristics): 2002

Characteristic	Unimputed SE (mean)	Imputed SE (mean)
Sex		
Male	0.14	0.13
Female	0.07	0.07
Socioeconomic status		
Lowest quarter	0.05	0.05
Middle quarters	0.06	0.06
Highest quarter	0.25	0.23
Parents' education		
High school or less	0.12	0.05
Some college	0.06	0.06
College graduation	0.07	0.17
Graduate or professional degree	0.14	0.31
Student's educational expectations		
High school or less	0.03	0.02
Some college	0.03	0.02
College graduation	0.08	0.07
Graduate or professional degree	0.18	0.17
Don't know	0.17	0.16
Native language[1]		
English	0.09	0.08
Non-English	0.21	0.19
Composite achievement test score		
Lowest quarter	#	#
Second quarter	#	#
Third quarter	0.01	0.01
Highest quarter	0.28	0.27
High school program		
General	0.07	0.06
Academic/college preparatory	0.14	0.13
Vocational	0.12	0.11

Rounds to zero.
[1] The first language students learned to speak when they were children.
NOTE: SE = standard error.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-27A. Percentage of high school sophomores who participate in academic clubs, athletics, and cheerleading/drill team, by selected student characteristics: 2002

Characteristic	Unimputed			Imputed			Difference		
	Academic clubs	Athletics	Cheerleading/ drill team	Academic clubs	Athletics	Cheerleading/ drill team	Academic clubs	Athletics	Cheerleading/ drill team
Sex									
Male	6.8	61.0	8.1	6.8	61.0	8.1	#	#	#
Female	9.9	48.5	19.2	9.9	48.5	19.2	#	#	#
Socioeconomic status									
Lowest quarter	5.5	44.1	13.0	5.6	44.9	13.5	0.1	0.8	0.4
Middle quarters	7.2	55.4	14.1	7.2	54.9	14.2	#	-0.5	0.1
Highest quarter	13.6	64.0	13.1	13.3	64.3	12.8	-0.3	0.3	-0.3
Composite achievement test score									
Lowest quarter	4.2	47.9	15.0	4.3	47.7	15.0	0.1	-0.2*	#
Second quarter	5.0	52.6	14.7	5.2	52.5	14.5	0.2	-0.1	-0.2
Third quarter	7.8	56.6	13.8	8.2	56.5	13.7	0.4	-0.1	-0.2
Highest quarter	15.6	62.2	11.7	15.5	62.3	11.6	-0.1	0.2	-0.1

Rounds to zero.
* Denotes statistical significance at $p < .05$.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-27B. Standard errors for table C-27A estimates (percentage of high school sophomores who participate in academic clubs, athletics, and cheerleading/drill team, by selected student characteristics): 2002

Characteristic	Unimputed			Imputed		
	Academic clubs	Athletics	Cheerleading/ drill team	Academic clubs	Athletics	Cheerleading/ drill team
Sex						
Male	0.38	0.81	0.52	0.38	0.81	0.52
Female	0.46	0.85	0.63	0.46	0.85	0.63
Socioeconomic status						
Lowest quarter	0.46	1.13	0.72	0.46	1.09	0.73
Middle quarters	0.38	0.86	0.58	0.38	0.82	0.60
Highest quarter	0.73	1.08	0.78	0.74	1.05	0.78
Composite achievement test score						
Lowest quarter	0.42	1.04	0.83	0.42	1.03	0.82
Second quarter	0.42	1.05	0.75	0.44	1.03	0.75
Third quarter	0.55	1.07	0.75	0.55	1.06	0.74
Highest quarter	0.83	1.04	0.74	0.80	1.04	0.73

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-28A. Percentage of high school sophomores who participate in hobby clubs, music, and vocational clubs, by selected student characteristics: 2002

Characteristic	Unimputed			Imputed			Difference		
	Hobby clubs	Music	Vocational clubs	Hobby clubs	Music	Vocational clubs	Hobby clubs	Music	Vocational clubs
Sex									
Male	8.1	16.2	7.6	8.1	16.3	7.6	#	#	#
Female	10.9	26.8	9.1	10.9	26.8	9.1	#	#	#
Socioeconomic status									
Lowest quarter	6.5	15.2	9.1	6.7	15.6	9.2	0.2	0.4	0.1
Middle quarters	8.8	21.6	8.6	8.8	21.6	8.6	0.1	#	#
Highest quarter	13.8	27.4	7.0	13.5	27.1	7.0	-0.3	-0.3	-0.1
Composite achievement test score									
Lowest quarter	6.3	15.4	8.8	6.4	15.4	8.8	#	#	#
Second quarter	7.0	19.1	9.3	7.2	18.8	9.5	0.2	-0.2	0.2
Third quarter	10.3	22.7	7.8	10.8	22.7	7.7	0.4	#	-0.1
Highest quarter	13.1	28.9	7.5	13.4	28.7	7.4	0.4	-0.2	-0.1

Rounds to zero.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-28B. Standard errors for table C-28A estimates (percentage of high school sophomores who participate in hobby clubs, music, and vocational clubs, by selected student characteristics): 2002

Characteristic	Unimputed			Imputed		
	Hobby clubs	Music	Vocational clubs	Hobby clubs	Music	Vocational clubs
Sex						
Male	0.41	0.60	0.53	0.41	0.60	0.53
Female	0.50	0.71	0.53	0.50	0.71	0.53
Socioeconomic status						
Lowest quarter	0.47	0.74	0.72	0.50	0.75	0.76
Middle quarters	0.40	0.67	0.54	0.39	0.64	0.50
Highest quarter	0.80	1.02	0.56	0.79	1.02	0.57
Composite achievement test score						
Lowest quarter	0.53	0.79	0.63	0.52	0.79	0.63
Second quarter	0.50	0.82	0.73	0.49	0.79	0.72
Third quarter	0.63	0.92	0.68	0.64	0.86	0.65
Highest quarter	0.75	1.04	0.70	0.75	1.02	0.67

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-29A. Percentage of high school sophomores, by employment status and selected student characteristics: 2002

Characteristic	Unimputed				Imputed				Difference			
	Ever worked for pay or employed	Worked for pay or employed at time of survey	Worked more than 10 hours per week at time of survey	Worked more than 15 hours per week at time of survey	Ever worked for pay or employed	Worked for pay or employed at time of survey	Worked more than 10 hours per week at time of survey	Worked more than 15 hours per week at time of survey	Ever worked for pay or employed	Worked for pay or employed at time of survey	Worked more than 10 hours per week at time of survey	Worked more than 15 hours per week at time of survey
Sex												
Male	62.9	27.6	66.2	57.2	62.9	27.7	66.2	57.2	#	#	#	#
Female	56.6	23.6	57.0	44.4	56.6	23.6	57.0	44.5	#	#	0.1	0.1
Socioeconomic status												
Lowest quarter	54.0	22.9	70.2	61.4	55.1	23.4	69.9	60.5	1.0	0.5	-0.3	-0.9
Middle quarters	62.2	27.3	65.3	53.2	61.8	27.2	65.3	53.4	-0.4	-0.1	#	0.2
Highest quarter	59.7	24.6	47.6	38.4	59.8	24.5	47.8	38.7	0.1	-0.1	0.2	0.3
Composite achievement test score												
Lowest quarter	56.1	25.3	69.8	61.9	56.1	25.3	69.8	61.7	0.1	#	#	-0.2
Second quarter	60.2	26.3	70.8	60.4	59.9	26.2	71.0	60.6	-0.3	-0.1	0.2	0.1
Third quarter	60.9	25.8	61.1	49.9	60.9	25.8	61.3	50.0	-0.1	#	0.3	0.2
Highest quarter	61.3	25.0	47.2	34.7	61.3	25.1	47.1	34.8	#	0.1	-0.1	#

Rounds to zero.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-29B. Standard errors for table C-29A estimates (percentage of high school sophomores, by employment status and selected student characteristics): 2002

Characteristic	Unimputed				Imputed			
	Ever worked for pay or employed	Worked for pay or employed at time of survey	Worked more than 10 hours per week at time of survey	Worked more than 15 hours per week at time of survey	Ever worked for pay or employed	Worked for pay or employed at time of survey	Worked more than 10 hours per week at time of survey	Worked more than 15 hours per week at time of survey
Sex								
Male	0.82	0.71	1.45	1.52	0.82	0.71	1.45	1.52
Female	0.80	0.69	1.50	1.55	0.80	0.69	1.50	1.54
Socioeconomic status								
Lowest quarter	1.31	1.00	2.08	2.21	1.26	0.98	1.98	2.25
Middle quarters	0.75	0.72	1.34	1.39	0.77	0.73	1.35	1.39
Highest quarter	1.05	0.93	2.29	2.23	1.05	0.91	2.38	2.27
Composite achievement test score								
Lowest quarter	1.24	1.01	1.95	2.01	1.25	1.01	1.94	2.01
Second quarter	1.08	0.96	1.82	1.93	1.07	0.94	1.81	1.92
Third quarter	1.05	0.92	2.21	2.03	1.04	0.91	2.19	2.02
Highest quarter	1.05	0.97	2.06	2.07	1.04	0.97	2.04	2.05

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-30A. Percentage of high school sophomores who report that they engage in various activities at least once or twice a week, by selected student characteristics: 2002

Characteristic	Unimputed			Imputed			Difference		
	Driving or riding around	Visiting with friends or meeting at a hangout	Talking with friends on the telephone	Driving or riding around	Visiting with friends or meeting at a hangout	Talking with friends on the telephone	Driving or riding around	Visiting with friends or meeting at a hangout	Talking with friends on the telephone
Sex									
Male	59.5	80.3	64.9	59.5	80.3	64.9	#	#	#
Female	57.1	78.6	83.3	57.1	78.6	83.3	#	#	#
Socioeconomic status									
Lowest quarter	56.3	73.5	69.6	56.6	74.3	69.7	0.2	0.8	0.1
Middle quarters	60.6	81.1	75.9	60.5	80.5	75.9	-0.1	-0.6	#
Highest quarter	55.9	82.2	75.0	55.7	82.2	74.7	-0.2	0.1	-0.3
Composite achievement test score									
Lowest quarter	59.4	74.4	72.1	59.2	74.3	72.1	-0.2	#	#
Second quarter	63.7	81.9	76.2	63.6	81.7	75.9	#	-0.2	-0.2
Third quarter	59.5	82.6	75.1	59.4	82.6	75.1	#	#	#
Highest quarter	51.0	79.1	73.0	51.2	79.1	73.2	0.2	0.1	0.2

Rounds to zero.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-30B. Standard errors for table C-30A estimates (percentage of high school sophomores who report that they engage in various activities at least once or twice a week, by selected student characteristics): 2002

Characteristic	Unimputed			Imputed		
	Driving or riding around	Visiting with friends at a hangout	Talking with friends on the telephone	Driving or riding around	Visiting with friends at a hangout	Talking with friends on the telephone
Sex						
Male	0.76	0.65	0.68	0.76	0.65	0.68
Female	0.84	0.65	0.56	0.84	0.65	0.56
Socioeconomic status						
Lowest quarter	1.05	0.98	0.94	1.07	0.96	0.92
Middle quarters	0.72	0.58	0.69	0.72	0.63	0.67
Highest quarter	1.14	0.81	0.86	1.15	0.82	0.84
Composite achievement test score						
Lowest quarter	1.10	1.02	0.93	1.10	1.02	0.93
Second quarter	1.05	0.81	0.85	1.05	0.81	0.85
Third quarter	1.04	0.80	0.87	1.03	0.79	0.86
Highest quarter	1.14	0.85	0.88	1.13	0.84	0.87

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-31A. Percentage of high school sophomores who report that various life values related to work are very important to them, by selected student characteristics: 2002

Characteristic	Unimputed			Imputed			Difference		
	Being successful in my line of work	Being able to find steady work	Having lots of money	Being successful in my line of work	Being able to find steady work	Having lots of money	Being successful in my line of work	Being able to find steady work	Having lots of money
Sex									
Male	84.1	82.0	51.0	84.1	81.9	51.0	#	#	#
Female	88.5	86.7	33.3	88.5	86.7	33.3	#	#	#
Socioeconomic status									
Lowest quarter	81.9	81.2	46.8	81.9	81.9	47.3	#	0.7	0.5
Middle quarters	86.9	85.2	42.4	86.9	84.6	42.6	#	-0.5	0.2
Highest quarter	89.2	85.7	36.5	89.1	85.9	36.2	-0.1	0.3	-0.3
Composite achievement test score									
Lowest quarter	76.7	76.8	55.8	76.7	76.9	55.5	#	0.2	-0.3
Second quarter	85.9	86.6	47.4	85.8	86.5	46.9	-0.1	-0.1	-0.6
Third quarter	90.6	87.9	38.0	90.6	87.6	37.6	#	-0.2	-0.4
Highest quarter	91.4	85.6	29.4	91.4	85.7	29.5	#	0.2	0.1

Rounds to zero.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-31B. Standard errors for table C-31A estimates (percentage of high school sophomores who report that various life values related to work are very important to them, by selected student characteristics): 2002

Characteristic	Unimputed			Imputed		
	Being successful in my line of work	Being able to find steady work	Having lots of money	Being successful in my line of work	Being able to find steady work	Having lots of money
Sex						
Male	0.52	0.58	0.79	0.52	0.58	0.79
Female	0.49	0.45	0.71	0.49	0.45	0.71
Socioeconomic status						
Lowest quarter	0.81	0.79	0.97	0.82	0.80	0.99
Middle quarters	0.47	0.50	0.75	0.48	0.49	0.79
Highest quarter	0.67	0.77	0.92	0.65	0.77	0.92
Composite achievement test score						
Lowest quarter	0.83	0.85	1.10	0.82	0.85	1.08
Second quarter	0.74	0.66	1.11	0.72	0.63	1.05
Third quarter	0.60	0.69	0.95	0.58	0.68	0.91
Highest quarter	0.61	0.77	1.02	0.60	0.75	0.98

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-32A. Percentage of high school sophomores who report that various life values related to family are very important to them, by selected student characteristics: 2002

Characteristic	Unimputed			Imputed			Difference		
	Finding right person to marry and having a happy family life	Having children	Being able to give my children better opportunities than I've had	Finding right person to marry and having a happy family life	Having children	Being able to give my children better opportunities than I've had	Finding right person to marry and having a happy family life	Having children	Being able to give my children better opportunities than I've had
Sex									
Male	73.4	45.1	78.9	73.4	45.1	78.9	#	#	#
Female	79.3	49.7	81.6	79.3	49.7	81.6	#	#	#
Socioeconomic status									
Lowest quarter	71.6	42.0	83.4	71.4	43.5	83.6	-0.2	1.5*	0.2
Middle quarters	76.5	48.0	81.9	76.6	47.3	81.6	#	-0.7*	-0.3
Highest quarter	81.0	51.3	73.9	80.9	51.2	74.4	-0.2	-0.1	0.5
Composite achievement test score									
Lowest quarter	70.3	44.5	80.3	70.4	44.2	80.6	0.1	-0.3	0.3*
Second quarter	75.3	46.4	84.0	75.2	46.4	84.4	-0.1	-0.1	0.3
Third quarter	79.2	49.0	82.2	79.0	48.7	82.5	-0.2	-0.3	0.3
Highest quarter	80.7	50.2	73.2	80.7	50.0	73.6	#	-0.2	0.4*

Rounds to zero.
* Denotes statistical significance at $p < .05$.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-32B. Standard errors for table C-32A estimates (percentage of high school sophomores who report that various life values related to family are very important to them, by selected student characteristics): 2002

	Unimputed			Imputed		
	Finding right person to marry and having a happy family life	Having children	Being able to give my children better opportunities than I've had	Finding right person to marry and having a happy family life	Having children	Being able to give my children better opportunities than I've had
Sex						
Male	0.68	0.82	0.63	0.68	0.82	0.63
Female	0.60	0.76	0.57	0.60	0.76	0.57
Socioeconomic status						
Lowest quarter	0.87	1.11	0.74	0.89	1.12	0.74
Middle quarters	0.64	0.82	0.58	0.61	0.81	0.58
Highest quarter	0.84	0.97	0.87	0.87	0.96	0.88
Composite achievement test score						
Lowest quarter	0.87	1.00	0.85	0.85	0.99	0.83
Second quarter	0.95	1.09	0.76	0.91	1.05	0.74
Third quarter	0.84	1.04	0.73	0.82	1.02	0.70
Highest quarter	0.86	1.05	0.95	0.84	1.04	0.91

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-33A. Percentage of high school sophomores who report that various life values related to friendships and leisure time are very important to them, by selected student characteristics: 2002

Characteristic	Unimputed			Imputed			Difference		
	Having strong friendships	Having leisure time to enjoy own interests	Getting away from this area of the country	Having strong friendships	Having leisure time to enjoy own interests	Getting away from this area of the country	Having strong friendships	Having leisure time to enjoy own interests	Getting away from this area of the country
Sex									
Male	79.3	68.8	21.5	79.3	68.8	21.5	#	#	#*
Female	86.2	67.4	21.1	86.2	67.4	21.1	#	#	#
Socioeconomic status									
Lowest quarter	75.3	59.1	22.9	76.0	59.6	22.7	0.6	0.5	-0.2
Middle quarters	83.9	68.8	22.5	83.5	69.0	22.6	-0.3	0.3	0.1
Highest quarter	87.7	75.3	17.2	87.7	74.4	17.4	#	-1.0*	0.2
Composite achievement test score									
Lowest quarter	73.5	58.8	27.3	73.8	58.9	27.1	0.3*	0.1	-0.2
Second quarter	82.1	68.2	21.8	81.9	68.1	21.8	-0.2	-0.1	#
Third quarter	86.9	71.3	19.9	86.8	71.0	19.7	-0.2	-0.3	-0.2
Highest quarter	88.2	73.6	17.1	88.0	73.8	17.0	-0.2	0.1	-0.1

Rounds to zero.

* Denotes statistical significance at $p < .05$.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-33B. Standard errors for table C-33A estimates (percentage of high school sophomores who report that various life values related to friendships and leisure time are very important to them, by selected student characteristics): 2002

Characteristic	Unimputed			Imputed		
	Having strong friendships	Having leisure time to enjoy own interests	Getting away from this area of the country	Having strong friendships	Having leisure time to enjoy own interests	Getting away from this area of the country
Sex						
Male	0.58	0.70	0.64	0.58	0.70	0.64
Female	0.51	0.69	0.61	0.51	0.70	0.61
Socioeconomic status						
Lowest quarter	0.84	1.02	0.84	0.91	0.99	0.84
Middle quarters	0.51	0.65	0.68	0.54	0.64	0.67
Highest quarter	0.63	0.84	0.73	0.61	0.87	0.74
Composite achievement test score						
Lowest quarter	0.94	0.96	0.97	0.91	0.97	0.95
Second quarter	0.82	0.91	0.93	0.80	0.88	0.90
Third quarter	0.73	0.93	0.87	0.69	0.89	0.84
Highest quarter	0.61	0.89	0.73	0.59	0.88	0.71

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-34A. Percentage of high school sophomores who report that various life values related to community are very important to them, by selected student characteristics: 2002

Characteristic	Unimputed: Helping other people in community	Unimputed: Working to correct social and economic inequalities	Unimputed: Living close to parents and relatives	Imputed: Helping other people in community	Imputed: Working to correct social and economic inequalities	Imputed: Living close to parents and relatives	Difference: Helping other people in community	Difference: Working to correct social and economic inequalities	Difference: Living close to parents and relatives
Sex									
Male	29.9	18.7	28.0	29.9	18.7	28.0	#*	#	#
Female	42.6	20.0	31.3	42.6	20.0	31.3	#	#	#
Socioeconomic status									
Lowest quarter	38.3	25.5	35.6	38.7	25.2	35.2	0.4	-0.3	-0.3
Middle quarters	35.0	17.9	29.4	35.0	18.2	29.4	#	0.3	0.1
Highest quarter	36.9	16.0	24.3	36.6	16.0	24.8	-0.3	-0.1	0.5
Composite achievement test score									
Lowest quarter	41.6	28.6	40.5	41.9	28.7	40.7	0.3	0.1	0.2
Second quarter	35.3	19.5	31.5	36.7	20.5	31.8	1.3*	1.0*	0.3
Third quarter	32.6	14.9	27.1	33.7	15.3	27.0	1.1*	0.4	-0.2
Highest quarter	32.4	13.1	19.9	33.3	13.5	20.0	0.9*	0.4*	0.1

Rounds to zero.
* Denotes statistical significance at $p < .05$.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-34B. Standard errors for table C-34A estimates (percentage of high school sophomores who report that various life values related to community are very important to them, by selected student characteristics): 2002

Characteristic	Unimputed			Imputed		
	Helping other people in community	Working to correct social and economic inequalities	Living close to parents and relatives	Helping other people in community	Working to correct social and economic inequalities	Living close to parents and relatives
Sex						
Male	0.63	0.60	0.69	0.63	0.60	0.69
Female	0.70	0.65	0.70	0.70	0.65	0.70
Socioeconomic status						
Lowest quarter	0.93	1.00	0.95	0.93	0.97	0.98
Middle quarters	0.71	0.60	0.69	0.71	0.61	0.67
Highest quarter	0.87	0.69	0.88	0.87	0.69	0.89
Composite achievement test score						
Lowest quarter	1.03	0.97	1.07	1.02	0.96	1.05
Second quarter	1.01	0.86	0.96	0.99	0.85	0.91
Third quarter	0.97	0.76	0.95	0.92	0.75	0.91
Highest quarter	0.88	0.64	0.86	0.88	0.64	0.84

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-35A. Percentage of high school sophomores who expect to attain various levels of education, by selected student characteristics: 2002

Characteristic	Unimputed				Imputed				Difference			
	High school diploma or less	Two years or less of college or vocational school	College graduate	Graduate/ professional degree	High school diploma or less	Two years or less of college or vocational school	College graduate	Graduate/ professional degree	High school diploma or less	Two years or less of college or vocational school	College graduate	Graduate/ professional degree
Sex												
Male	11.9	13.3	41.7	33.2	12.5	13.2	41.5	32.8	0.6*	-0.1	-0.2	-0.4*
Female	5.6	9.7	38.0	46.7	5.8	9.7	37.8	46.6	0.2*	#	-0.1	-0.1
Socioeconomic status												
Lowest quarter	17.4	17.7	37.3	27.6	16.8	17.0	38.2	28.0	-0.6	-0.8	0.9	0.4
Middle quarters	8.1	12.1	42.2	37.6	8.9	12.4	41.5	37.2	0.8*	0.3	-0.7	-0.4
Highest quarter	2.0	4.5	37.4	56.1	2.5	4.6	37.6	55.2	0.5	0.1	0.2	-0.8
Composite achievement test score												
Lowest quarter	23.2	20.7	35.2	20.9	24.1	20.1	35.3	20.5	0.9*	-0.6*	0.1	-0.3
Second quarter	8.3	15.7	44.6	31.4	9.1	15.3	44.9	30.8	0.7*	-0.5	0.3	-0.6
Third quarter	3.5	7.8	43.1	45.5	3.7	8.0	43.1	45.2	0.2	0.1	#	-0.3
Highest quarter	1.0	3.4	35.7	59.9	1.0	3.4	35.5	60.1	0.1	#	-0.2	0.2

Rounds to zero.
* Denotes statistical significance at $p < .05$.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-35B. Standard errors for table C-35A estimates (percentage of high school sophomores who expect to attain various levels of education, by selected student characteristics): 2002

Characteristic	Unimputed: High school diploma or less	Unimputed: Two years or less of college or vocational school	Unimputed: College graduate	Unimputed: Graduate/ professional degree	Imputed: High school diploma or less	Imputed: Two years or less of college or vocational school	Imputed: College graduate	Imputed: Graduate/ professional degree
Sex								
Male	0.53	0.53	0.74	0.73	0.52	0.52	0.71	0.72
Female	0.37	0.47	0.70	0.80	0.38	0.47	0.70	0.80
Socioeconomic status								
Lowest quarter	0.89	0.81	1.09	1.00	0.82	0.75	0.99	0.99
Middle quarters	0.41	0.47	0.74	0.78	0.43	0.48	0.77	0.77
Highest quarter	0.32	0.42	0.96	0.98	0.35	0.42	0.95	0.95
Composite achievement test score								
Lowest quarter	1.04	0.91	1.04	1.00	0.98	0.87	0.99	0.94
Second quarter	0.58	0.92	1.15	1.10	0.60	0.85	1.11	1.06
Third quarter	0.40	0.57	1.04	1.07	0.39	0.55	0.97	1.00
Highest quarter	0.20	0.39	1.00	1.07	0.20	0.38	0.96	1.02

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-36A. Percentage of high school sophomores who report various intentions with regard to entering college after high school graduation, by selected student characteristics: 2002

Characteristic	Unimputed				Imputed				Difference			
	Right after high school	After a year	After more than a year	No/don't know	Right after high school	After a year	After more than a year	No/don't know	Right after high school	After a year	After more than a year	No/don't know
Sex												
Male	71.7	16.6	3.2	8.5	71.7	16.6	3.2	8.6	#	#	#	#
Female	78.8	14.3	0.8	6.1	78.8	14.3	0.8	6.1	#	#	#	#
Socioeconomic status												
Lowest quarter	66.9	20.2	2.5	10.4	67.2	20.1	2.6	10.2	0.3	-0.2	#	-0.2
Middle quarters	73.6	16.9	1.9	7.6	73.3	17.2	1.8	7.7	-0.3	0.3	-0.1	0.1
Highest quarter	85.4	9.0	1.4	4.3	85.7	8.7	1.4	4.2	0.4	-0.3	0.1	-0.1
Composite achievement test score												
Lowest quarter	67.9	20.4	3.1	8.6	67.9	20.4	3.1	8.6	0.1	#	#	#
Second quarter	68.7	21.4	1.8	8.1	68.7	21.4	1.8	8.1	#	-0.1	#	#
Third quarter	76.4	14.7	1.7	7.2	76.4	14.7	1.7	7.2	#	-0.1	#	#
Highest quarter	85.3	7.9	1.3	5.5	85.3	7.8	1.3	5.5	#	#	#	#

Rounds to zero.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-36B. Standard errors for table C-36A estimates (percentage of high school sophomores who report various intentions with regard to entering college after high school graduation, by selected student characteristics): 2002

	Unimputed				Imputed			
Characteristic	Right after high school	After a year	After more than a year	No/don't know	Right after high school	After a year	After more than a year	No/don't know
Sex								
Male	0.75	0.60	0.31	0.49	0.75	0.60	0.31	0.49
Female	0.67	0.57	0.13	0.35	0.67	0.57	0.13	0.35
Socioeconomic status								
Lowest quarter	1.16	1.05	0.35	0.78	1.21	1.05	0.37	0.72
Middle quarters	0.75	0.63	0.21	0.45	0.79	0.67	0.21	0.46
Highest quarter	0.74	0.61	0.28	0.44	0.70	0.58	0.28	0.44
Composite achievement test score								
Lowest quarter	1.24	1.06	0.46	0.72	1.23	1.04	0.45	0.72
Second quarter	1.08	0.97	0.28	0.63	1.07	0.96	0.27	0.62
Third quarter	1.02	0.82	0.26	0.57	1.00	0.81	0.26	0.57
Highest quarter	0.80	0.58	0.28	0.53	0.80	0.57	0.28	0.53

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-37A. Percentage of high school sophomores who report that fathers, mothers, school counselors, and teachers think college is the most important thing for them to do right after high school, by selected student characteristics: 2002

Characteristic	Unimputed				Imputed				Difference			
	Father	Mother	School counselor	Teacher or favorite teacher	Father	Mother	School counselor	Teacher or favorite teacher	Father	Mother	School counselor	Teacher or favorite teacher
Sex												
Male	67.5	72.4	60.7	61.3	67.5	72.4	60.7	61.3	#	#	#	#
Female	74.2	78.6	68.8	70.4	74.2	78.5	68.8	70.5	#	#	#	#
Socioeconomic status												
Lowest quarter	61.1	68.6	59.9	62.9	60.8	67.9	59.7	63.0	-0.3	-0.7	-0.2	0.2
Middle quarters	69.3	74.4	63.8	64.2	69.5	74.9	63.8	64.0	0.2	0.5	#	-0.2
Highest quarter	82.5	83.7	71.6	72.5	82.3	83.5	71.6	72.6	-0.2	-0.2	#	0.1
Composite achievement test score												
Lowest quarter	58.7	65.4	57.5	58.4	58.6	65.2	57.4	58.2	-0.1	-0.1	-0.1	-0.2
Second quarter	67.6	73.4	65.4	64.4	67.6	73.5	65.4	64.5	#	#	0.1	0.1
Third quarter	76.1	79.9	67.5	68.8	76.0	79.7	67.5	68.7	-0.1	-0.2	#	-0.1
Highest quarter	79.1	81.9	68.1	71.2	79.1	81.9	68.1	71.2	#	#	#	#

Rounds to zero.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-37B. Standard errors for table C-37A estimates (percentage of high school sophomores who report that fathers, mothers, school counselors, and teachers think college is the most important thing for them to do right after high school, by selected student characteristics): 2002

	Unimputed				Imputed			
Characteristic	Father	Mother	School counselor	Teacher or favorite teacher	Father	Mother	School counselor	Teacher or favorite teacher
Sex								
Male	0.80	0.74	0.83	0.76	0.80	0.74	0.83	0.76
Female	0.68	0.67	0.72	0.63	0.68	0.67	0.72	0.63
Socioeconomic status								
Lowest quarter	1.13	1.09	1.08	1.06	1.08	1.08	1.14	1.09
Middle quarters	0.70	0.67	0.79	0.70	0.68	0.65	0.78	0.70
Highest quarter	0.81	0.86	1.02	0.95	0.80	0.88	1.05	0.98
Composite achievement test score								
Lowest quarter	1.28	1.18	1.23	1.13	1.28	1.17	1.22	1.12
Second quarter	1.04	1.01	1.03	1.04	1.02	0.99	1.01	1.03
Third quarter	0.92	0.83	1.03	1.02	0.92	0.82	1.03	1.01
Highest quarter	0.86	0.90	1.03	1.01	0.85	0.89	1.03	1.00

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002.”

Table C-38A. Percentage of high school sophomores' expected occupation at age 30, by sex: 2002

Occupation	Unimputed		Imputed		Difference	
	Male	Female	Male	Female	Male	Female
Clerical	0.1	0.4	0.1	0.4	#	#
Craftsman	4.6	0.8	4.6	0.8	#	#
Farmer, farm manager	0.2	#	0.2	#	#	#
Homemaker	#	0.2	#	0.2	#	#
Laborer	0.7	#	0.7	#	#	#
Manager, administrator	2.2	1.7	2.2	1.7	#	#
Military	1.7	0.2	1.7	0.2	#	#
Operative	1.1	0.1	1.1	0.1	#	#
Professional (1)	25.5	23.9	25.5	23.9	#	#
Professional (2)	11.6	28.5	11.6	28.5	#	#
Proprietor or owner	2.6	1.6	2.6	1.6	#	#
Protective service	3.3	1.2	3.3	1.2	#	#
Sales	0.8	0.3	0.8	0.3	#	#
School teacher	0.6	2.6	0.6	2.6	#	#
Service	0.4	4.6	0.4	4.6	#	#
Technical	4.5	2.2	4.5	2.2	#	#
Plan not to work	0.5	0.5	0.5	0.5	#	#
Other	1.1	0.9	1.1	0.9	#	#
Don't know	38.4	30.3	38.4	30.3	#	#

Rounds to zero.

NOTE: The occupational list given to sophomores was as follows: Clerical such as bank teller, bookkeeper, secretary, typist, mail carrier, ticket agent; Craftsman such as baker, automobile mechanic, machinist, painter, plumber, telephone installer, carpenter; Farmer, farm manager; Homemaker or housewife only; Laborer such as construction worker, car washer, sanitary worker, farm laborer; Manager, administrator such as sales manager, office manager, school administrator, buyer, restaurant manager, government official; Military such as career officer, enlisted man or woman in the Armed Forces; Operative such as meat cutter, assembly worker, machine operator, welder, taxicab, bus or truck driver; Professional (1) such as accountant, artist, registered nurse, engineer, librarian, writer, social worker, actor, actress, athlete, politician, but not including school teacher; Professional (2) such as clergyman, dentist, physician, lawyer, scientist, college teacher; Proprietor or owner such as owner of small business, contractor, restaurant owner; Protective service such as detective, police officer or guard, sheriff, fire fighter; Sales such as salesperson, advertising or insurance agent, real estate broker; School teacher such as elementary or secondary; Service such as barber, beautician, practical nurse, private household worker, janitor, waiter; Technical such as draftsman, medical or dental technician, computer programmer; Plan not to work; and Other.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-38B. Standard errors for table C-38A estimates (percentage of high school sophomores' expected occupation at age 30, by sex): 2002

Occupation	Unimputed		Imputed	
	Male	Female	Male	Female
Clerical	0.04	0.10	0.04	0.10
Craftsman	0.32	0.13	0.32	0.13
Farmer, farm manager	0.06	0.03	0.06	0.03
Homemaker	0.01	0.06	0.01	0.06
Laborer	0.12	#	0.12	#
Manager, administrator	0.22	0.19	0.22	0.19
Military	0.19	0.08	0.19	0.08
Operative	0.19	0.04	0.19	0.04
Professional (1)	0.70	0.61	0.70	0.61
Professional (2)	0.49	0.61	0.49	0.61
Proprietor or owner	0.23	0.19	0.23	0.19
Protective service	0.32	0.15	0.32	0.15
Sales	0.14	0.08	0.14	0.08
School teacher	0.12	0.24	0.12	0.24
Service	0.09	0.33	0.09	0.33
Technical	0.32	0.22	0.32	0.22
Plan not to work	0.11	0.10	0.11	0.10
Other	0.14	0.16	0.14	0.16
Don't know	0.73	0.68	0.73	0.68

Rounds to zero.

NOTE: The occupational list given to sophomores was as follows: Clerical such as bank teller, bookkeeper, secretary, typist, mail carrier, ticket agent; Craftsman such as baker, automobile mechanic, machinist, painter, plumber, telephone installer, carpenter; Farmer, farm manager; Homemaker or housewife only; Laborer such as construction worker, car washer, sanitary worker, farm laborer; Manager, administrator such as sales manager, office manager, school administrator, buyer, restaurant manager, government official; Military such as career officer, enlisted man or woman in the Armed Forces; Operative such as meat cutter, assembly worker, machine operator, welder, taxicab, bus or truck driver; Professional (1) such as accountant, artist, registered nurse, engineer, librarian, writer, social worker, actor, actress, athlete, politician, but not including school teacher; Professional (2) such as clergyman, dentist, physician, lawyer, scientist, college teacher; Proprietor or owner such as owner of small business, contractor, restaurant owner; Protective service such as detective, police officer or guard, sheriff, fire fighter; Sales such as salesperson, advertising or insurance agent, real estate broker; School teacher such as elementary or secondary; Service such as barber, beautician, practical nurse, private household worker, janitor, waiter; Technical such as draftsman, medical or dental technician, computer programmer; Plan not to work; and Other.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "Base Year, 2002."

Table C-39A. Comparison of estimates between ELS:2002 imputed and unimputed data, NELS:88 data, and HS&B data, by selected student characteristics: 1980, 1990, and 2002

	ELS:2002									
Variable	Unimputed	Imputed	NELS:88	HS&B	ELS:2002 unimputed –NELS:88	ELS:2002 imputed– NELS:88	Change in significance?	ELS:2002 unimputed –HS&B	ELS:2002 imputed– HS&B	Change in significance?
Father's education (composite)										
Did not finish high school	13.6	13.9	15.2	22.6	-1.6	-1.3	No	-9.0*	-8.7*	No
Graduated from high school or GED	29.9	30.1	25.8	31.1	4.1*	4.3*	No	-1.2	-1.0	No
Some postsecondary education (PSE)	27.7	27.4	33.3	23.5	-5.6*	-5.9*	No	4.2*	3.9*	No
Graduated from college	16.9	16.7	14.2	12.3	2.7*	2.5*	No	4.6*	4.4*	No
Completed master's or equivalent	7.5	7.4	6.5	6.2	1.0	0.9	No	1.3*	1.2*	No
Completed Ph.D., M.D., or other advanced degree	4.5	4.4	5.0	4.3	-0.5	-0.6	No	0.2	0.1	No
Mother's education (composite)										
Did not finish high school	12.9	13.2	13.0	17.8	-0.1	0.2	No	-4.9*	-4.6*	No
Graduated from high school or GED	27.8	27.9	30.8	46.5	-3.0*	-2.9*	No	-18.7*	-18.6*	No
Some postsecondary education (PSE)	34.8	34.6	39.0	21.9	-4.2*	-4.4*	No	12.9*	12.7*	No
Graduated from college	16.7	16.6	11.9	9.1	4.8*	4.7*	No	7.6*	7.5*	No
Completed master's or equivalent	6.0	6.0	4.5	3.4	1.5*	1.5*	No	2.6*	2.6*	No
Completed Ph.D., M.D., or other advanced degree	1.7	1.7	0.7	1.3	1.0*	1.0*	No	0.4	0.4	No
Native language[1]										
English	86.2	86.0	90.2	94.6	-4.0*	-4.2*	No	-8.4*	-8.6*	No
Non-English	13.8	14.0	9.8	5.4	4.0*	4.2*	No	8.4*	8.6*	No
IRT-estimated number-right score in mathematics	37.2	37.2	36.5	32.8	0.7*	0.7*	No	4.4*	4.4*	No
Probability of proficiency in reading[2]										
Level 1	89.0	89.4	91.1	†	-2.1*	-1.7*	No	†	†	†
Level 2	46.0	46.2	49.9	†	-3.9*	-3.7*	No	†	†	†
Level 3	8.5	8.3	12.7	†	-4.2*	-4.4*	No	†	†	†

See notes at end of table.

Table C-39A. Comparison of estimates between ELS:2002 imputed and unimputed data, NELS:88 data, and HS&B data, by selected student characteristics: 1980, 1990, and 2002—Continued

Variable	ELS:2002 Unimputed	ELS:2002 Imputed	NELS:88	HS&B	ELS:2002 unimputed –NELS:88	ELS:2002 imputed–NELS:88	Change in significance?	ELS:2002 unimputed –HS&B	ELS:2002 imputed–HS&B	Change in significance?
Probability of proficiency in mathematics[3]										
Level 1	91.4	91.7	90.7	†	0.7	1.0*	Yes	†	†	†
Level 2	66.6	67.1	63.0	†	3.6*	4.1*	No	†	†	†
Level 3	46.4	46.4	43.5	†	2.9*	2.9*	No	†	†	†
Level 4	20.8	20.4	19.0	†	1.8*	1.4*	No	†	†	†
Level 5	1.0	1.0	0.4	†	0.6*	0.6*	No	†	†	†
Family composition										
Mother and father	57.4	56.8	67.2	70.2	-9.8*	-10.4*	No	-12.8*	-13.4*	No
Mother and guardian	13.3	13.4	11.2	6.9	2.1*	2.2*	No	6.4*	6.5*	No
Father and guardian	3.1	3.2	2.7	2.1	0.4	0.5	No	1.0*	1.1*	No
Mother only	18.9	19.0	13.9	15.5	5.0*	5.1*	No	3.4*	3.5*	No
Father only	3.2	3.2	2.5	3.1	0.7	0.7	No	0.1	0.1	No
Other relative or nonrelative	4.1	4.3	2.5	2.2	1.6*	1.8*	No	1.9*	2.1*	No
Student's educational expectations										
High school or less	8.7	9.2	10.2	26.5	-1.5*	-1.0	Yes	-17.8*	-17.3*	No
Some college	11.5	11.5	30.3	32.9	-18.8*	-18.8*	No	-21.4*	-21.4*	No
College graduation	39.8	39.7	32.1	22.7	7.7*	7.6*	No	17.1*	17.0*	No
Graduate or professional degree	40.0	39.7	27.4	17.9	12.6*	12.3*	No	22.1*	21.8*	No
High school program										
General	38.4	38.6	49.6	46.0	-11.2*	-11.0*	No	-7.6*	-7.4*	No
Academic/college preparatory	50.9	50.7	39.3	33.1	11.6*	11.4*	No	17.8*	17.6*	No
Vocational	10.8	10.8	11.1	21.0	-0.3	-0.3	No	-10.2*	-10.2*	No

† Not applicable.
* Denotes statistical significance at $p < .05$.
[1] The first language students learned to speak when they were children.
[2] Level 1 = simple comprehension; level 2 = simple inference; level 3 = complex inference.
[3] Level 1 = simple arithmetic operations on whole numbers; level 2 = simple operations with decimals, fractions, powers, and roots; level 3 = simple problem solving, requiring the understanding of low-level mathematical concepts; level 4 = understanding of intermediate-level mathematical concepts and/or having the ability to formulate multistep solutions to word problems; level 5 = proficiency in solving complex multistep word problems and/or the ability to demonstrate knowledge of mathematics material found in advanced mathematics courses.
NOTE: IRT = Item Response Theory.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002); National Education Longitudinal Study of 1988 (NELS:88); High School and Beyond (HS&B).

Table C-39B. Standard errors for table C-39A estimates (comparison of estimates between ELS:2002 imputed and unimputed data, NELS:88 data, and HS&B data, by selected student characteristics): 1980, 1990, and 2002

Variable	ELS:2002 Unimputed	ELS:2002 Imputed	NELS:88	HS&B
Father's education (composite)				
Did not finish high school	0.57	0.54	0.62	0.53
Graduated from high school or GED	0.59	0.53	0.61	0.49
Some postsecondary education (PSE)	0.52	0.48	0.63	0.40
Graduated from college	0.46	0.43	0.49	0.38
Completed master's or equivalent	0.33	0.30	0.41	0.25
Completed Ph.D., M.D., or other advanced degree	0.28	0.26	0.38	0.26
Mother's education (composite)				
Did not finish high school	0.53	0.54	0.54	1.14
Graduated from high school or GED	0.50	0.49	0.64	1.28
Some postsecondary education (PSE)	0.54	0.53	0.68	1.00
Graduated from college	0.48	0.46	0.46	0.75
Completed master's or equivalent	0.28	0.27	0.25	0.44
Completed Ph.D., M.D., or other advanced degree	0.15	0.15	0.08	0.30
Native language[1]				
English	0.60	0.60	0.68	0.31
Non-English	0.60	0.60	0.68	0.31
IRT-estimated number-right score in mathematics	0.23	0.23	0.21	0.22
Probability of proficiency in reading[2]				
Level 1	0.40	0.39	0.40	†
Level 2	0.72	0.70	0.70	†
Level 3	0.29	0.28	0.50	†
Probability of proficiency in mathematics[3]				
Level 1	0.31	0.30	0.30	†
Level 2	0.77	0.77	0.80	†
Level 3	0.82	0.81	0.80	†
Level 4	0.56	0.54	0.50	†
Level 5	0.08	0.08	#	†
Family composition				
Mother and father	0.58	0.57	0.72	0.49
Mother and guardian	0.37	0.36	0.45	0.29
Father and guardian	0.18	0.16	0.32	0.10
Mother only	0.46	0.44	0.48	0.37
Father only	0.21	0.20	0.31	0.12
Other relative or nonrelative	0.22	0.21	0.22	0.12

See notes at end of table.

Table C-39B. Standard errors for table C-39A estimates (comparison of estimates between ELS:2002 imputed and unimputed data, NELS:88 data, and HS&B data, by selected student characteristics): 1980, 1990, and 2002—Continued

Variable	ELS:2002 Unimputed	ELS:2002 Imputed	NELS:88	HS&B
Student's educational expectations				
High school or less	0.36	0.36	0.42	0.50
Some college	0.38	0.37	0.65	0.39
College graduation	0.50	0.50	0.59	0.38
Graduate or professional degree	0.62	0.60	0.64	0.40
High school program				
General	0.63	0.63	0.95	0.71
Academic/college preparatory	0.68	0.68	0.96	0.74
Vocational	0.46	0.46	0.37	0.61

† Not applicable.
# Rounds to zero.
[1] The first language students learned to speak when they were children.
[2] Level 1 = simple comprehension; level 2 = simple inference; level 3 = complex inference.
[3] Level 1 = simple arithmetic operations on whole numbers; level 2 = simple operations with decimals, fractions, powers, and roots; level 3 = simple problem solving, requiring the understanding of low-level mathematical concepts; level 4 = understanding of intermediate-level mathematical concepts and/or having the ability to formulate multistep solutions to word problems; level 5 = proficiency in solving complex multistep word problems and/or the ability to demonstrate knowledge of mathematics material found in advanced mathematics courses.
NOTE: IRT = Item Response Theory.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002); National Education Longitudinal Study of 1988 (NELS:88); High School and Beyond (HS&B).

Appendix D
Public-Use Masked/Suppressed Variables Available on Restricted Files for Licensed Users

Appendix D
Public-Use Masked/Suppressed Variables Available on Restricted Files for Licensed Users

The restricted-use electronic codebook (ECB) files contain all variables on the public-use file. However, to protect confidentiality, versions may differ in the amount of available detail (e.g., a given variable may appear in categorical form in the public-use file but appear in continuous form in the restricted-use file, or it may include additional breakouts of collapsed categories, such as a restricted-use breakout for Native Hawaiians). In addition, a number of variables appear on the restricted file that have no counterpart on the public-use files (e.g., various geocode variables below the level of the four U.S. Census regions reported on the public-use file). The list provided in table D-1 follows the variable position order on the ECB.

Table D-1. Restricted-use unique variables in base-year to first follow-up student-level and school-level megafiles: 2004

Student-level restricted-use only variables	
F1UNIVR1	Sample member status in BY and F1 rounds (restricted)
F1UNIVR2	How sample member entered study
BYEXPWT	Student expanded sample weight
BYRACE_R	Student’s race/ethnicity—composite (restricted)
BYRACE2	Student’s race/ethnicity—64 category
BYSARACE	Student’s race/ethnicity—school roster
BYRACE_1	Student is White—composite
BYRACE_2	Student is Black or African American—composite
BYRACE_3	Student is Asian—composite
BYRACE_4	Student is Native Hawaiian/Pacific Islander—composite
BYRACE_5	Student is American Indian/Alaska Native—composite
BYHISPAN	Student’s Hispanic subgroup—composite
BYASIAN	Student’s Asian subgroup—composite
BYDOB_R	Student’s date of birth: Year-month-day
BYPARACR	Parent’s race/ethnicity—composite (restricted)
BYQXDATR	Date of base-year student questionnaire administration
PISARFLG	Whether included in PISA reading score concordance sample
PISAMFLG	Whether included in PISA math score concordance sample
BYIEPTYP	Federal disability category for base-year IEPs
BYACCTYP	Base-year questionnaire/test accommodations
BYTXMTH	Math test theta T score
BYTXMTI1	Math theta T score—multiple imputation value 1 of 5
BYTXMTI2	Math theta T score—multiple imputation value 2 of 5
BYTXMTI3	Math theta T score—multiple imputation value 3 of 5
BYTXMTI4	Math theta T score—multiple imputation value 4 of 5
BYTXMTI5	Math theta T score—multiple imputation value 5 of 5
BYTXRTH	Reading test theta T score
BYTXRTI1	Reading theta T score—multiple imputation value 1 of 5
BYTXRTI2	Reading theta T score—multiple imputation value 2 of 5
BYTXRTI3	Reading theta T score—multiple imputation value 3 of 5

See note at end of table.

Table D-1. Restricted-use unique variables in base-year to first follow-up student-level and school-level megafiles: 2004—Continued

Student-level restricted-use only variables—Continued

BYTXRTI4	Reading theta T score—multiple imputation value 4 of 5
BYTXRTI5	Reading theta T score—multiple imputation value 5 of 5
BYRESZIP	Residential zip code for student/family
BYSF1R_R	1st friend's race (restricted)
BYSF2R_R	2nd friend's race (restricted)
BYSF3R_R	3rd friend's race (restricted)
BYERAC_R	English teacher's race/ethnicity—composite (restricted)
BYMRAC_R	Math teacher's race/ethnicity—composite (restricted)
BYG10ER	Grade 10 enrollment—2001–02 school roster
BYCENDIV	Census division of school locale
BYSTATE	State code for school locale
BYCOUNTY	County code for school locale
BYSCHZIP	School zip code
BYHISPIM	Imputation flag—HISPANIC
BYASNIM	Imputation flag—ASIAN
F1EXPWT	F1 expanded sample weight
F1XPNLWT	F1 expanded sample panel weight
F1DOB_R	F1 student's date of birth: Year-month-day
F1ESSTAT	F1 expanded sample status
F1EXPFLG	F1 expanded sample member dropout
F1DOFLG	F1 dropout status in spring term 2004
F1RDSTAT	F1 dropout status (restricted)
F1SEPS03	Date separated from BY school—spring 2003
F1SEPF03	Date separated from BY school—fall 2003
F1SEPS04	Date separated from BY school—spring 2004
F1TXMTH	F1 math theta T score (restricted)
F1TXMTI1	F1 math theta T score—multiple imputation value 1 of 5
F1TXMTI2	F1 math theta T score—multiple imputation value 2 of 5
F1TXMTI3	F1 math theta T score—multiple imputation value 3 of 5
F1TXMTI4	F1 math theta T score—multiple imputation value 4 of 5
F1TXMTI5	F1 math theta T score—multiple imputation value 5 of 5
F1RESZIP	F1 residential zip code for student/family
F1TRSZIP	F1 zip code of the spring 2004 destination schools of transfer students
F1QXDATR	Date completed interview
F1HISPIM	Imputation flag—F1HISPAN
F1ASNIM	Imputation flag—F1ASIAN
BYS16	Student's Hispanic subgroup
BYS17A	Student is White
BYS17B	Student is Black/African American
BYS17C	Student is Asian
BYS17D	Student is Native Hawaiian/Pacific Islander
BYS17E	Student is American Indian/Alaska Native
BYS18	Student's Asian subgroup
BYS25CAA	1st friend is White
BYS25CAB	1st friend is Black/African American
BYS25CAC	1st friend is Asian

See note at end of table.

Table D-1. Restricted-use unique variables in base-year to first follow-up student-level and school-level megafiles: 2004—Continued

Student-level restricted-use only variables—Continued

BYS25CAD	1st friend is Native Hawaiian/Pacific Islander
BYS25CAE	1st friend is American Indian/Alaska Native
BYS25CBA	2nd friend is White
BYS25CBB	2nd friend is Black/African American
BYS25CBC	2nd friend is Asian
BYS25CBD	2nd friend is Native Hawaiian/Pacific Islander
BYS25CBE	2nd friend is American Indian/Alaska Native
BYS25CCA	3rd friend is White
BYS25CCB	3rd friend is Black/African American
BYS25CCC	3rd friend is Asian
BYS25CCD	3rd friend is Native Hawaiian/Pacific Islander
BYS25CCE	3rd friend is American Indian/Alaska Native
BYS63	Occupation expects to have after high school—verbatim
BYS64	Occupation expects to have at age 30—verbatim
BYS68	Student’s native language
BYS81A	Mother/female guardian’s occupation—verbatim
BYS81B	Mother/female guardian’s main job duties—verbatim
BYS82A	Father/male guardian’s occupation—verbatim
BYS82B	Father/male guardian’s main job duties—verbatim
F1N14A	Mother/female guardian’s occupation—verbatim
F1N14B	Mother/female guardian’s main job duties—verbatim
F1N15A	Father/male guardian’s occupation—-verbatim
F1N15B	Father/male guardian’s main job duties—verbatim
F1S51A	1st postsecondary school applied to
F1S51B	City of 1st postsecondary school applied to
F1S51D	2nd postsecondary school applied to
F1S51E	City of 2nd postsecondary school applied to
F1S56	Occupation expects to have after high school—verbatim
F1S57	Occupation expects to have at age 30—verbatim
F1T16EA	Other reasons for transferring
F1E24A	Other way in which GED was earned (EG)
F1E50	Current/most recent job or occupation (EG)
F1D42	Program in which GED was earned (DO)
F1D42A	Other way in which GED was earned (DO)
F1D60	Current/most recent job or occupation (DO)
F1D66	Occupation expects to have at age 30—verbatim (DO)
BYP14	Parent’s Hispanic subgroup
BYP15A	Parent is White
BYP15B	Parent is Black or African American
BYP15C	Parent is Asian
BYP15D	Parent is Native Hawaiian/Pacific Islander
BYP15E	Parent is American Indian/Alaska Native
BYP16	Parent’s Asian subgroup
BYP19A	Mother’s occupation before coming to US
BYP19B	Mother’s main job duties outside US
BYP22A	Father’s occupation before coming to US
BYP22B	Father’s job main duties outside US
BYP29	Native language of parent respondent

See note at end of table.

Table D-1. Restricted-use unique variables in base-year to first follow-up student-level and school-level megafiles: 2004—Continued

Student-level restricted-use only variables—Continued	
BYP39A	Parent's current/most recent job for pay in US
BYP39B	Parent's main job duties
BYP43A	Spouse/partner's current/most recent job for pay in US
BYP43B	Spouse/partner's main job duties
BYTE24A	Teacher is White (English)
BYTE24B	Teacher is Black/African American (English)
BYTE24C	Teacher is Asian (English)
BYTE24D	Teacher is Native Hawaiian/Pacific Islander (English)
BYTE24E	Teacher is American Indian/Alaska Native (English)
BYTM24A	Teacher is White (math)
BYTM24B	Teacher is Black/African American (math)
BYTM24C	Teacher is Asian (math)
BYTM24D	Teacher is Native Hawaiian/Pacific Islander (math)
BYTM24E	Teacher is American Indian/Alaska Native (math)
School-level restricted-use only variables	
BYSCMDST	Base-year library media center questionnaire status
BYG10ER	Grade 10 enrollment—2001–02 school roster
BYCENDIV	Census division of school locale
BYSTATE	State code for school locale
BYCOUNTY	County code for school locale
BYSCHZIP	School zip code
BYNCESDI	NCES school district ID number
BYNCESSI	School identification number from CCD or PSS
BYA01	Total student enrollment as of October 2001
BYA02A	School has prekindergarten
BYA02B	School has kindergarten
BYA02C	School has 1st grade
BYA02D	School has 2nd grade
BYA02E	School has 3rd grade
BYA02F	School has 4th grade
BYA02G	School has 5th grade
BYA02H	School has 6th grade
BYA02I	School has 7th grade
BYA02J	School has 8th grade
BYA02K	School has 9th grade
BYA02L	School has 10th grade
BYA02M	School has 11th grade
BYA02N	School has 12th grade
BYA02O	School has 13th grade or higher
BYA03A	Comprehensive public school
BYA03B	Public magnet school
BYA03C	Public magnet school with theme
BYA03D	Public school of choice
BYA03E	Year-round school
BYA03F	Area vocational school/center
BYA03G	Full-time technical/vocational school
BYA03H	Other technical or vocational school
BYA03I	Catholic diocesan school

See note at end of table.

Table D-1. Restricted-use unique variables in base-year to first follow-up student-level and school-level megafiles: 2004—Continued

School-level restricted-use only variables—Continued	
BYA03J	Catholic parish
BYA03K	Catholic religious order
BYA03L	Catholic independent school
BYA03M	Other private school with religious affiliation
BYA03N	Private school without religious affiliation
BYA03O	Boarding school
BYA03P	Indian reservation school
BYA03Q	Military academy
BYA03R	Alternative/dropout prevention/continuation school
BYA03S	Charter school
BYA21	% 10th-graders receive free/reduced-price lunch
BYA22A	# of full-time teachers

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, 2002” and “First Follow-up, 2004.”

Appendix E
Glossary of Terms

Appendix E
Glossary of Terms

Accommodations (testing): In ELS:2002, certain accommodations were offered to students with barriers to participation, such as students with disabilities or English-language learners with limited English proficiency. An accommodation is a change in how a test is presented, in how a test is administered, or in how the test taker is allowed to respond. This term generally refers to changes that do not substantially alter what the test measures. The proper use of accommodations does not substantially change academic level or performance criteria. Appropriate accommodations are made to provide equal opportunity to demonstrate knowledge. Examples of test accommodations include allowing extra time, use of a large-print version of a test, or conveying instructions in sign language. Cases in which accommodations were implemented in ELS:2002 are specially flagged (the indicators are BYTXACC and F1TXACC).

Adaptive testing: In the ELS:2002 base year, multiple test forms of varying levels of difficulty were assigned based on the examinee's score on a routing test. Thus, the specific sequence of questions that each student answered was tailored to that student's ability level. An advantage of adaptive tests is that reliability per unit of testing time is greater than in a nonadaptive test. Adaptive procedures help to minimize floor and ceiling effects (see "Ceiling effect" and "Floor effect"). ELS:2002 adaptive testing relies on Item Response Theory (see "IRT") assumptions to place students who have taken different test forms on the same vertical score scale. In the first follow-up, each student's test form was assigned on the basis of base-year test performance.

American Indian or Alaska Native: An American Indian or Alaska Native is a person who has origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment.

Asian: An Asian is a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.

Base weights: See "Design weights."

Bias: Bias is the difference between the reported value and the true value. Thus, the bias of an estimate is the difference between the expected value of a sample estimate and the corresponding true value for the population. Response bias is the difference between respondent reports and their behavior or characteristics. Nonresponse bias is the difference that occurs when respondents differ as a group from nonrespondents on a characteristic being studied. Sample bias is the unequal selection or the omission of members of the population, without appropriate weighting. Relatedly, undercoverage bias arises because some portion of the potential sampling frame is missed or excluded, or there are duplicate units. For example, if the school list from which a school sample is drawn is incomplete or inaccurate (owing, for example, to the birth of new schools subsequent to the time the list was drawn up), school undercoverage may occur. (See also "Nonresponse bias" and "Bias analysis.")

Bias analysis: Nonresponse bias analysis compares the characteristics of respondents and nonrespondents. Both unit nonresponse (school, student) and item nonresponse on questionnaires were subject to bias analyses in ELS:2002. For example, certain key data items were obtained for both responding and nonresponding schools, so that a school nonresponse analysis could be conducted and bias in school-level estimates quantified.

Black or African American: A person having origins in any of the Black racial groups of Africa.

Burden: Formally, burden is the aggregate hours realistically required for data providers to participate in a data collection. Burden also has a subjective or psychological dimension: the degree to which providing information is regarded as onerous may depend on the salience to the respondent of the questions that are being posed and on other factors, such as competing time demands.

Carnegie unit: A standard of measurement used for secondary education that represents the completion of a course that meets one period per day for 1 year.

CAPI: Computer-assisted personal interviewing, in which the questionnaire is loaded into a field interviewer's laptop computer.

CATI: Computer-assisted telephone interviewing.

CCD: Common Core of Data. Data annually collected from all public schools in the United States by NCES. Data from the CCD supplied the public school sampling frame for the ELS:2002 base year.

CD-ROM: ELS:2002 data are distributed primarily in an optical laser disc medium, specifically, CD-ROM (Compact Disc Read-Only Memory). A CD-ROM is a computer storage disc in the same physical form as an audio CD; it can store approximately 650 megabytes of digital data.

Ceiling effect: The result of a test having insufficient numbers of the more difficult items. In a longitudinal study, ceiling effects in the follow-up can cause change scores to be artificially constrained for high-ability examinees. The measurement problems related to floor and ceiling effects in combination with regression effects found at the extreme score ranges seriously hamper the accuracy of change measures in longitudinal studies. More information (i.e., smaller error of measurement) is obtained with respect to ability level if high-ability individuals receive relatively harder items (and if low-ability individuals receive proportionately easier items). The matching of item difficulty to a person's ability level yields increased reliability at the extremes of the score distribution, where it is most needed for studies of longitudinal change. A strategy employed in ELS:2002 to minimize ceiling (and floor) effects is to employ test forms that are "adaptive" to the ability level of the examinee. Multilevel tests—with second stage test assignment that is based on the first stage (routing test) performance work—minimize the possibility that ceiling effects might bias the estimates of the score gains. (See also "Floor effect" and "Adaptive testing.")

Classical test theory: Classical test theory postulates that a test score can be decomposed into two parts—a true score and an error component; that the error component is random with a mean of zero and is uncorrelated with true scores; and that true scores, observed scores, and error components are linearly related.

Closed-ended: A type of question in which the data provider's responses are limited to given alternatives (as opposed to an open-ended question). (See also "Open-ended.")

Clustering: A sample selection method in which small geographical areas such as schools (as is the case in ELS:2002), school districts, counties, or residential blocks are selected as an initial stage, with individuals selected in a subsequent step. (See also "Primary sampling unit.")

Cluster size: The number of ELS:2002 sample members attending a particular high school.

Codebook: Documentation of each variable being measured, including variable name, columns occupied by each variable in the data matrix, values used to define each variable, unweighted frequencies, unweighted percents, and weighted valid percents. (See "Electronic codebook.")

Coefficient of variation: The ratio of the standard deviation of an estimate to the value of the estimate.

Cognitive test battery: One of the two parts of the student survey (the second part being the student questionnaire). Two achievement areas (mathematics and reading) were measured in the base year. Mathematics achievement will be measured again in the first follow-up.

Cohort: A group of individuals who have a statistical factor in common—for example, year of birth, grade in school, or year of high school graduation. ELS:2002 is a sophomore-grade cohort based on the spring term of the 2001–02 school year. It also contains, however, a nationally representative sample of high school seniors in the spring term of the 2003–04 school year (see "Freshening"). In contrast, the Program for International Student Assessment (PISA) is an age cohort, based on students who were 15.25 years of age in April of 2000 or 2003.

Composite variable: A composite variable is one that is either constructed through the combination of two or more variables (socioeconomic status, for example, combines mother's education, father's education, mother's occupation, father's occupation, and family income) or calculated through the application of a mathematical function or transformation to a variable (e.g., conversion of raw test scores to percentile ranks). Also called a derived variable, created variable, or constructed variable.

Concordance: Concordance is a weaker form of test linkage than equating in that the link is based on population distributions rather than the equivalence of interchangeable scores. Implementation of PISA scale scores in ELS:2002 was through a method of concordance. (See also "Equating" and "Equated test score.")

Confidence interval: A sample-based estimate expressed as an interval or range of values within which the true population value is expected to be located (with a specified degree of confidence).

Confidentiality protections: NCES is required by law to protect individually identifiable data from unauthorized disclosure. To this end, the ELS:2002 data have been subject to a disclosure risk analysis to determine which records require masking to produce the public-use data file from the restricted-use data file. Disclosure coarsening techniques (such as recoding of continuous variables into categorical, top and bottom coding, and so on) and data perturbation techniques (e.g., data swapping) have been used to provide disclosure protection to the ELS:2002 data. (See also "Data swapping" and "Disclosure risk analysis.")

Consent, active (explicit): One variety of informed consent is called active or explicit consent. Typically, in active consent, a signed agreement to participate in a study must be obtained. In ELS:2002, permission of parents was required before students could be surveyed. Some schools required active parental consent (i.e., that a signed permission form be obtained).

Consent, passive (implied): Another variety of informed consent is called passive or implied consent. In passive consent, a permission form is sent to the relevant party (in ELS:2002, normally the parent or guardian of the sampled student), who has the opportunity to return the form to indicate denial of permission. If the form is not returned, it is assumed that the individual has no objection to survey participation. In ELS:2002, most schools allowed passive parental consent for their child's participation in the study.

Constructed response item: In the ELS:2002 assessment battery in the base year, a non-multiple-choice item that required some type of written response.

Contextual data: In ELS:2002, the primary unit of analysis is the student, and information from the other study components, referred to as contextual data, should be viewed as extensions of the student data. For example, observations made in school administrator, teacher, librarian, and parent reports on the student's school learning environment or home situation would be considered contextual data.

Coverage rate: In ELS:2002 base-year contextual samples, the proportion of the responding student sample with a report from a given contextual source (e.g., the parent survey, the teacher survey, or the school administrator survey). For the teacher survey, the student coverage rate can be calculated as either the percentage of participating students with two teacher reports or the percentage with at least one teacher report. The teacher and parent surveys in ELS:2002 are purely contextual. The base-year school-level surveys (school administrator, library media center, facilities checklist) can be used contextually (with the student as the unit of analysis) or in standalone fashion (with the school as the unit of analysis). (See "Response rate.") Finally, test completions (reading assessments, mathematics assessments) are also calculated on a base of the student questionnaire completers (in the first follow-up, for the in-school student sample only), rather than on the entire sample, and thus express a coverage rate. "Coverage" can also refer to the issue of missed target population units on the sampling frame (undercoverage), or duplicated or erroneously enumerated units (overcoverage) (see "Bias" for discussion of undercoverage bias).

Cross-sectional analysis: A cross-sectional design represents events and statuses at a single point in time. For example, a cross-sectional survey may measure the cumulative educational attainment (achievements, attitudes, statuses) of students at a particular stage of schooling, such as 10th or 12th grade. In contrast, a longitudinal survey (or repeated measurement of the same sample units) measures the change or growth in educational attainment that occurs over a particular period of schooling. The longitudinal design of ELS:2002 generates two representative cross sections (high school sophomores in 2002 and, through sample freshening, seniors in 2004). It also permits analysis of individual-level change over time through longitudinal analysis and of group-level and intercohort change through the cross-sectional comparisons to past studies of similarly defined grade cohorts. (See also “Longitudinal or panel survey” and “Cross-cohort analysis.”)

Cross-cohort (or intercohort) analysis: The ELS:2002 base-year and first follow-up surveys contained many data elements that were comparable to items from prior studies. These repeated items will supply a basis for comparison with earlier sophomore cohorts (such as 1980 sophomores in the High School and Beyond [HS&B] longitudinal study and 1990 sophomores in the National Education Longitudinal Study of 1988 [NELS:88]). With a freshened senior sample, the ELS:2002 first follow-up supports comparisons to 1972 (National Longitudinal Study of the High School Class of 1972 [NLS-72]), 1980 (HS&B), and 1992 (NELS:88). The first follow-up academic transcript component will offer a further opportunity for cross-cohort comparisons with the high school transcript studies of HS&B, NELS:88, and the National Assessment of Educational Progress (NAEP). With three or more timepoints, *trend analyses* are possible. With ELS:2002, this condition has now been met for both the sophomore and senior cohorts. Essentially, three kinds of intercohort comparison are possible. First, cohorts can be compared on an *intergenerational or cross-cohort time-lag basis*. Both cross-sectional and longitudinal time-lag comparisons may be made. An example of a cross-sectional time-lag comparison would be looking at the status of HS&B (1980), NELS:88 (1990), and ELS:2002 (2002) sophomores to see how the situation of sophomores has changed over time. An example of longitudinal time-lag comparison would be an examination of the magnitude and correlates of achievement gain of HS&B, NELS:88, and ELS:2002 sophomores over the last 2 years of high school. Second, *fixed-time comparisons* are also possible, in which groups within each study are compared at different ages but the same point in time (e.g., the NLS-72, HS&B senior, and HS&B sophomore cohorts all could be looked at in 1986, some 14, 6, and 4 years after each respective cohort graduated from high school). Such a perspective would permit one to compare, for example, employment rates for 22-, 24-, and 32-year-old high school graduates. Finally, *longitudinal comparative analysis* of the cohorts can be performed by modeling the history of the grade cohorts.

Data element: The most basic unit of information. In data processing, it is the fundamental data structure. It is defined by its size (in characters) and data type (e.g., alphanumeric, numeric only, true/false, date) and may include a specific set of values or range of values.

Data swapping: Data swapping is defined in the *NCES Statistical Standards* (Seastrom 2003) as a perturbation disclosure limitation technique that results in a confidentiality edit. An example of data swapping would be to assume a data file has two potential individual identifying variables, for example, sex and age. If a sample case needs disclosure protection, it is paired with another sampled case so that each element of the pair has the same age, but different sexes. The data on these two records are then swapped. After the swapping, anyone thinking they have identified either one of the paired cases gets the data of the other case, so they have not made an accurate match and the data have been protected. (See also “Confidentiality protections.”)

Design effect: A measure of sample efficiency. The design effect (DEFF) is the variance of an estimate divided by the variance of the estimate that would have occurred if a sample of the same size had been selected using simple random sampling. Sometimes it is more useful to work with standard errors than with variances. The root design effect (DEFT) expresses the relation between the actual standard error of an estimate and the standard error of the corresponding estimates from a simple random sample. (See also "Effective sample size.")

Design weights: Design weights compensate for unequal probabilities of selection. More specifically, the design weight is the inverse of the probability of selection. Design weights are also called raw weights, base weights, unadjusted weights, or sampling weights. Design weights may be contrasted to adjusted weights (adjusted to compensate for nonresponse, and also called final weights or analysis weights). Roughly, the design weight is calculated as the inverse of the probability of selection, taking into account all stages of the sample selection process. More precisely, design weights are the inverses of the expected frequencies with which population units appear in conceptually repeated samples selected using the sampling design developed for the study. Unlike the final weights, design weights are generated for all sample members, respondents and nonrespondents alike. Design weights do not appear on the ELS:2002 public-use files. (See also "Final weights" and "Sampling weights.")

Differential Item Functioning (DIF): DIF exists when examinees of equal ability differ on an item solely because of their membership in a particular group (e.g., if an item favors males over females, or one racial or ethnic group over another, and cannot be explained by relevant factors such as differential coursetaking). DIF for ELS:2002 items was examined in the base-year and first follow-up field tests. Items with DIF problems were revised or deleted.

Disability: A disability is a physical or mental impairment that substantially limits one or more of the major life activities (Title 42 U.S.C. Section 12102).

Disclosure risk analysis: Investigation of study data to evaluate and minimize the risk of identification of individual sample units to preserve the confidentiality of the data. ELS:2002 data have been subjected to a disclosure risk analysis to protect confidential information about individual respondents (see "Public-use data file"). For a more detailed account of disclosure risk analysis, and of means of altering data (including masking, data perturbation, and data swapping) to prevent disclosure, see the *NCES Statistical Standards* (Seastrom 2003).

Domain: A domain refers to a defined universe of knowledge, skills, abilities, attitudes, interests, or other human characteristics.

Dropouts: A dropout was defined as a sophomore cohort member who, during spring term 2004, had not been in school for 4 consecutive weeks or more and was not absent due to accident or illness. Also surveyed as a dropout were students who, at the time of their school's survey day, had been back in school less than 2 weeks after a period in which the student had missed school for 4 or more consecutive weeks not due to accident or illness. (See also "Not currently in school questionnaire [NCSQ].")

Early graduate questionnaire (EGQ): This first follow-up questionnaire was administered to individuals who had graduated or received high school equivalency certification (e.g., the GED) prior to March 15, 2004.

Effective sample size: Effective sample size may be defined as the ratio of the raw sample size divided by the design effect. (For example, the sampling variance of a mean standard score is equal to the reciprocal of the effective sample size, not the reciprocal of the raw sample size.) In essence, then, effective sample size is the sample size under a simple random sample design that is equivalent to the actual sample under the complex sample design, wherein the actual sample size is determined by multiplying the effective sample size by the anticipated design effect. (See also "Design effect.")

Electronic codebook (ECB): While hardcopy codebooks with item stems, response categories, associated response frequency distributions, unweighted percents, and weighted valid percents are contained within the ELS:2002 base-year user's manual, ELS:2002 data are also available on CD-ROM in an electronic codebook (ECB) format. Electronic codebooks are menu-driven systems that allow users to perform functions such as the following: (a) search a list of database variables based upon key words or variable names/labels, (b) display unweighted percentages for each variable in the database, (c) display question text for each variable in the database, (d) select or tag variables for subsequent analysis, (e) generate SAS-PC or SPSS-PC+ program code/command statements for subsequently constructing a system file of the selected variables, and (f) generate a codebook of the selected variables.

Equating: Equating of two tests is established when examinees of every ability level and from every population group can be indifferent about which of two tests they take. Not only should they have the same expected mean score on each test, but they should also have the same errors of measurement. In contrast, test *linkage* results from placing two or more tests on the same scale, so that scores can be used interchangeably. (See also "Equated test score" and "Concordance.")

Equated test score: Test equating takes place in two distinct contexts in ELS:2002. One context is *vertical equating* of forms for use in successive grades, such that the achievement growth of individual ELS:2002 sample members over time can be accurately measured. Another context is *cross-sectional equating* and *linking*, as to other tests (e.g., placing ELS:2002 sophomores and HS&B or NELS:88 sophomores on an equivalent scale).

ETS: Educational Testing Service. RTI's subcontractor for ELS:2002 cognitive test development, scoring, and scaling.

Expanded sample: Although no sophomores were excluded from ELS:2002, those who could not validly be assessed or could not validly complete the student questionnaire (e.g., students with a severe disability or limitation in their knowledge of the English language) were not eligible for these components. Contextual data (parent, teacher, school administrator) reports were collected for this group. Later in the study, their transcripts will be collected. The base-year expanded sample comprises all ELS:2002 sophomores, that is, both those who were eligible to complete the student questionnaire and test and those who were not. The first follow-up expanded sample also includes freshened cases. Some students who were eligible for questionnaire completion in 2002 suffered an impairment that led to their reclassification as ineligible in 2004. With greater frequency, some 2002 sophomores who were not capable of questionnaire completion became eligible in 2004, as their status changed. The expanded sample comprises all sample members regardless of eligibility for questionnaire completion.

Facilities checklist: Completed by the RTI survey administrator in the base year of the study, the facilities checklist is designed to extend the information available about the school by providing data on the school buildings and grounds that will help researchers understand the adequacy and appearance of the school's physical plant, its safety and security features, and its role as a constituent of the school's general environment.

File: Refers to a data file containing a set of related computerized records.

Final weights: Final weights are sometimes called nonresponse-adjusted weights, adjusted weights, or analysis weights. Building on the design (raw) weight, they compensate for nonresponse. (See "Design weights.")

Floor effect: The result of a cognitive test being too difficult for a large number of the examinees, causing the low-ability examinees to receive chance scores on the first testing, and on subsequent testings if the test remains too difficult. Floor effects result in an inability to discriminate among low-ability individuals at time one or time two and, thus, no reliable discrimination among examinees with respect to amounts of change. A possible solution, used in ELS:2002, is to develop test forms that are "adaptive" to the ability level of the examinee, which tends to minimize the possibility of floor effects biasing the estimates of the score gains. (See also "Ceiling effect" and "Adaptive testing.")

Frame: A list of all the sampling units that represent the population. The Common Core of Data (CCD) and Private School Survey (PSS) were drawn upon for the ELS:2002 school frame. For an implicit list of the nation's high school sophomores as of spring term 2002, school rosters from participating schools listing their sophomore class were relied on.

Frame population: The set of elements (e.g., schools) that can be enumerated prior to the selection of a survey sample.

Freshening: A freshened sample includes cases from the longitudinal sample of a dataset, plus new cases added to produce cross-sectional estimates of the population at the time of a subsequent wave of a longitudinal data collection. In the ELS:2002 first follow-up, freshening was the means by which high school seniors were added in who had not been in the 10th grade in the United States 2 years before. A similar freshening procedure was implemented in NELS:88. (See also "Half-open interval.")

Half-open interval: A technique used to increase coverage. It is usually applied to a new list that includes cases that were covered in a previous frame, as well as new in-scope units not included in the previous frame. In this technique, new in-scope units between unit A on the previous frame up to, but not including, unit B (the next unit on the previous frame) are associated with unit A. These new units have the same selection probability as do unit As. This process is repeated for every unit on the previous frame. The new units associated with the actual sample cases are now included in the sample with their respective selection probabilities (freshening). Student sample freshening in the NELS:88 first and second follow-ups, and the freshening conducted in the ELS:2002 first follow-up, relied on such a procedure. The half-open interval procedure was also used for ELS:2002 base-year sample updating prior to survey day. (See also “Freshening” and “Sample updating or *refreshing*.”)

Hispanic or Latino: A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. The term “Spanish origin” can be used in addition to “Hispanic or Latino.”

Homeschool student questionnaire (HSQ): In the first follow-up, this questionnaire was administered to sophomore cohort members who were in a homeschool situation as of the spring term of the 2003–04 school year.

HS&B: High School and Beyond. The second in the series of longitudinal high school cohort studies sponsored by NCES. The HS&B base-year study surveyed sophomore and senior students in 1980. The sophomore cohort was last interviewed in 1992 and their postsecondary transcripts collected in 1993. The senior cohort was last interviewed in 1986.

Imputation: Imputation involves substituting values for missing or inconsistent data in a dataset. Prediction of a missing value is typically based on a procedure that uses a mathematical model in combination with available information. Missing data for key items in ELS:2002 have been imputed.

Individualized Education Program (IEP): A written statement or plan for each individual with a disability that is developed, reviewed, and revised in accordance with Title 42 U.S.C. Section 1414(d).

Individually identifiable data: Data from any record, response form, completed survey, or aggregation about an individual or individuals from which information about particular individuals may be revealed.

Instrument: An evaluative device that includes tests, scales, and inventories to measure a domain using standardized procedures.

IRT: Item Response Theory. A method of estimating achievement level by considering the pattern of right, wrong, and omitted responses on all items administered to an individual student. IRT postulates that the probability of correct responses to a set of test questions is a function of true proficiency and of one or more parameters specific to each test question. Rather than merely counting right and wrong responses, the IRT procedure also considers characteristics of each of the test items, such as their difficulty and the likelihood that they could be guessed correctly by low-ability individuals. IRT scores are less likely than simple number-right or formula scores to be distorted by correct guesses on difficult items if a student’s response vector also contains incorrect answers to easier questions. Another attribute of IRT that makes it useful for ELS:2002 is the calibration of item parameters for all items administered to all students. This makes it possible to obtain scores on the same scale for students who took harder or easier forms of the test. IRT also was used to vertically scale across ELS:2002 rounds, that is, between the two grade levels (10th grade in 2002, 12th grade in 2004). (See, in contrast, “Classical test theory.”)

Item nonresponse: The amount of missing information when a valid response to an item or variable was expected. (See also "Unit nonresponse" and "Bias analysis.")

LEP: Limited English proficient. A concept developed to assist in identifying those language-minority students (individuals from non-English language backgrounds) who need language assistance services, in their own language or in English, in the schools. (See also "NEP" and "LM.") An LEP student is one who meets one or more of the following conditions:

a. the student was born outside of the United States or the student's native language is not English,

b. the student comes from an environment in which a language other than English is dominant, or

c. the student is an American Indian or Alaska Native and comes from an environment in which a language other than English has had a significant impact on his/her level of English language proficiency,

and who has such difficulty speaking, reading, writing, or understanding the English language as to deny him or her the opportunity to learn successfully in English-only classrooms.

LM: Language Minority. A non-, limited-, or fully English-proficient student in whose home a non-English language is typically spoken.

Library media center questionnaire: This base-year instrument supplies information about library/media center organization and staffing, technology resources, extent of library and media holdings, student access to and use of the library/media center, and its role in supporting the school's curriculum.

Longitudinal or panel survey: In a longitudinal design, similar measurements—of the same sample of individuals, institutions, households, or of some other defined unit—are taken at multiple timepoints. ELS:2002 employs a longitudinal design that follows the same individuals over time and permits the analysis of individual-level change. (See also "Cross-sectional analysis.")

Machine editing: Also called forced data cleaning or logical editing. Uses computerized instructions (including logical or deductive imputation) in the data cleaning program that ensure common sense consistency within and across the responses from a data provider.

Microdata (microrecords): Observations of individual sample members, such as those contained on the ELS:2002 data files.

MPR Associates: An RTI subcontractor for the ELS:2002 base-year and first follow-up studies.

NAEP: The National Assessment of Educational Progress. NAEP is a cross-sectional assessment program that measures achievement at the group level for students in 4th, 8th, and 12th grades and provides a time series for measuring trends in academic progress of 9-, 13-, and 17-year-olds. ELS:2002 tests differ from but complement those of NAEP by providing a basis for measuring individual-level achievement growth between 10th and 12th grades in mathematics and relating cognitive gains in this subject to the individual, school, and family factors and processes that are measured in the various ELS:2002 questionnaires and school records (transcript) studies.

Native Hawaiian or Other Pacific Islander: Any person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

NCES: The National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. This governmental agency is the sponsor of ELS:2002 and is also the sponsoring agency for (among other studies) the National Assessment of Educational Progress (NAEP), the U.S. component of the Program for International Student Assessment (PISA), the National Education Longitudinal Study of 1988 (NELS:88), the High School and Beyond (HS&B) longitudinal study, and the National Longitudinal Study of the High School Class of 1972 (NLS-72).

NELS:88: The National Education Longitudinal Study of 1988. Third in the series of longitudinal high school cohort studies sponsored by NCES. The study represents three cohorts: the eighth-grade class of 1988, the sophomore class of 1990, and the senior class of 1992. The study collected questionnaire and test data in 1988, 1990, and 1992 on students' school experiences, as well as background information from school administrators, teachers, parents (in the base year and second follow-up only), and school records. Data on postsecondary and out-of-school experiences were collected in interviews conducted in 1994 and 2000 and through a postsecondary education transcripts study in 2000–01.

NEP: No English proficiency. A student who does not speak English. (See also "LEP.")

New participant student questionnaire (NPSQ): This first follow-up questionnaire was administered to students in the base-year schools 2 years later. The NPSQ elicited responses from two distinct groups: sophomore cohort members who had been base-year nonparticipants, and students brought in through sample freshening. (A small number of students whose eligibility status had changed between rounds completed a NPSQ.) The questionnaire comprised both base-year items (the standard classification variables) and first follow-up items pertaining to students' current school experience.

New participant supplement (NPS): Base-year nonrespondents who responded in the first follow-up but were not enrolled in the base-year schools (e.g., transfers, dropouts, early graduates) completed this supplement in addition to an appropriate questionnaire. The supplement consists wholly of items from the base year, so that the standard classification variables could be captured for all sample members.

Noncoverage: Units of the target population that are missing from the frame population. Includes the problems of incomplete frames and missing units.

Nonresponse: See "Item nonresponse," "Unit nonresponse," "Bias analysis," and "Nonresponse bias."

Nonresponse bias: Nonresponse bias may occur as a result of not obtaining 100 percent response from the selected cases. More specifically, nonresponse bias occurs when the expected observed value deviates from the population parameter. The potential magnitude of nonresponse bias is estimated as the product of the nonresponse rate and the difference in values of a characteristic between respondents and nonrespondents. (See also “Bias” and “Bias analysis.”)

NLS-72: The National Longitudinal Study of the High School Class of 1972. This project was the first in the series of longitudinal high school cohort studies sponsored by NCES. The final round of data collection took place in 1986.

Nonsampling error: An error in sample estimates that cannot be attributed to sampling fluctuations. Such errors may arise from many sources, including imperfect implementation of sampling procedures, differential unit or item nonresponse across subgroups, bias in estimation, or errors in observation and recording.

Not currently in school questionnaire (NCSQ): This first follow-up questionnaire was administered to sophomore cohort dropouts. It includes questions both on present circumstances and retrospective items on schooling experience and school disengagement behaviors. (See also “Dropouts.”)

OMB: The Office of Management and Budget, U.S. Executive Branch. OMB is a federal agency with the responsibility for reviewing all studies funded by executive branch agencies. OMB reviewed, commented on, and approved the ELS:2002 questionnaires, as indicated by their approval number and its expiration date in the top right corner of the questionnaire covers.

Open-ended: A type of question in which the data provider’s responses are not limited to given alternatives.

Optical disc: A disc that is read optically (e.g., by laser technology), rather than magnetically. (See also “CD-ROM.”)

Optical scanning: A system of recording responses that transfers responses into machine-readable data through optical mark reading. Data from base-year and first follow-up in-school survey sessions (and indeed all non-CATI operations across components) were optically scanned.

Oversampling: Deliberately sampling a portion of the population at a higher rate than the remainder of the population. For example, in ELS:2002, private schools have been oversampled. Within schools, Asians have been oversampled.

Parent/guardian questionnaire: The ELS:2002 base-year parent component sought to collect information from parents of all base-year student sample members. The parent or guardian who knew most about his or her child’s educational experience was asked to complete the questionnaire.

PISA: The Program for International Student Assessment. PISA assesses 15-year-olds in reading, mathematics, and science. In 2000, the primary focus of the assessment was reading. The United States and 31 other nations participated, under the aegis of the Organization for

Economic Cooperation and Development (OECD). In 2003, the primary focus was mathematics, and in 2006, the primary focus will be science. A crosswalk (or concordance) has been developed between the ELS:2002 reading test and the PISA reading test, so that the PISA scale can be implemented in ELS:2002. A similar scale linkage will be effected between the ELS:2002 mathematics test (2002) and the PISA math test (2003).

Population: All individuals in the group to which conclusions from a data collection activity are to be applied. Weighted results of ELS:2002 data provide estimates for populations and subgroups.

Population variance: A measure of dispersion defined as the average of the squared deviations between the observed values of the elements of a population or sample and the population mean of those values.

Postsecondary education: The provision of formal instructional programs with a curriculum designed primarily for students who have completed the requirements for a high school diploma or equivalent. This includes programs of an academic, vocational, and continuing professional education purpose and excludes vocational and adult basic education programs.

Poststratification adjustment: A weight adjustment that forces survey estimates to match independent population totals within selected poststrata (adjustment cells).

Practical significance: With large sample sizes, as in ELS:2002 and its predecessor studies, even tiny differences, of little or no substantive or practical import, can be statistically significant. Therefore, measures of practical significance, such as the effect size (expressed in standard deviation units), are sometimes also used. (See the *NCES Statistical Standards*, Seastrom 2003, Guideline 5-1-4F). (Compare "Statistical significance.")

Precision: The difference between a sample-based estimate and its expected value. Precision is measured in terms of the sampling error (or standard error) of an estimate.

Primary sampling unit (PSU): Unit chosen at the first stage of a cluster sample. In ELS:2002, the PSU is the school; in other studies, geographical units such as a county or metropolitan statistical area (MSA) may serve as the PSU.

Probability sample: A sample selected by a method such that each unit has a fixed and determined probability of selection—that is, each population unit has a known, nonzero chance of being included.

Proficiency score: Proficiency scores (or criterion-referenced mastery scores) are based on clusters of items within each test that are of similar content and difficulty. Both normative (e.g., achievement quartiles) and proficiency scores are available from the ELS:2002 database.

PSS: Private School Survey. An NCES universe survey encompassing the nation's private schools. PSS was the private school sampling frame for the ELS:2002 base year.

Public-use data file: A public-use file that includes a subset of data that have been coded, aggregated, or otherwise altered to mask individually identifiable information; it thus is available to all external users. Unique identifiers, geographic detail, and other variables that cannot be suitably altered are not included in public-use data files. Public-use edits are based on an assumption that external users have access to both individual respondent records and secondary data sources that include data that could be used to identify respondents. For this reason, the editing process is relatively extensive. When determining an appropriate masking process, the public-use edit takes into account and guards against matches on common variables from all known files that could be matched to the public-use file. The analysis used to determine which records require masking is called a disclosure risk analysis.

Range check: A determination of whether responses fall within a predetermined set of acceptable values.

Record format: The layout of the information contained in a data record (includes the name, type, and size of each field in the record).

Records: A logical grouping of data elements within a file upon which a computer program acts.

Refreshed student: See "Sample updating or *refreshing*."

Relative bias: Relative bias is the bias of the estimate divided by the estimate. It provides an indication of the order of magnitude of the bias with respect to the estimate.

Reliability: The consistency in results of a test or measurement including the tendency of the test or measurement to produce the same results when applied twice to some entity or attribute believed not to have changed in the interval between measurements.

Reserve code (or **reserved code**)**:** Certain codes have been reserved to represent various situations in which missing data occur in response frequencies. In ELS:2002, the reserve code conventions are as follows: -1 = "Don't know;" -2 = "Refuse;" -3 = "Legitimate skip/NA;" -4 = "Nonrespondent;" -5 = "Out of range;" -6 = "Multiple response;" -7 = "Partial interview—breakoff;" -8 = "Item not applicable to sample member;" and -9 = "Missing."

Response rate: In general, unit response rates are calculated as the ratio of the weighted number of completed instruments to the weighted number of in-scope cases, using the sample base weight (the inverse of the probability of selection). In multistage samples, such as the base year of ELS:2002, overall response is the product of both stages (though for many purposes, the stages are reported separately). Item response rates are calculated as the ratio of the number of respondents for whom an in-scope response was obtained to the number of respondents who are asked to answer a given item. Calculation of unit and item response rates can be a complex matter, and additional considerations arise in reporting in follow-up waves of longitudinal studies, for composite (constructed) variables, and for other cases. More detailed information can be found by consulting NCES Standard 1-3 in the NCES 2002 Statistical Standards document (available at http://nces.ed.gov/statprog/2002/stdtoc.asp). Bias analyses conducted when response rates are below targets help to assess any possible limitations to the generalizability of survey estimates. (See "Bias analysis.")

Restricted-use data file: A restricted-use file includes individually identifiable information that is confidential and protected by law. The file contains all public-use data, as well as additional data. Use of the restricted data requires the researcher to obtain a special license from NCES.

RTI International (RTI): A nonprofit university-affiliated research organization with headquarters at Research Triangle Park, North Carolina, that conducted the base year and first follow-up of ELS:2002 and is currently conducting the second follow-up of the study on behalf of NCES. RTI International is a trade name of Research Triangle Institute.

Sample: Subgroup selected, by a probability method, from the entire population, in order to represent it.

Sample updating or *refreshing***:** Because students can transfer into or out of a school after sampling, the base-year student sample in ELS:2002 (as in HS&B and NELS:88) was updated to remove students who had transferred out and to give sophomores who had transferred in since sampling a chance of selection. The half-open interval procedure was employed for sample updating prior to survey day, using the school 10th-grade enrollment lists.

Sampling error: The part of the difference between a value for an entire population and an estimate of that value derived from a probability sample that results from observing only a sample of values.

Sampling frame. See “Frame” or “Frame population.”

Sampling variance: A measure of dispersion of values of a statistic that would occur if the survey were repeated a large number of times using the same sample design, instrument, and data collection methodology. The square root of the sampling variance is the standard error.

Sampling weight: A multiplicative factor equal to the reciprocal of the probability of a respondent being selected for the study, with adjustment for nonresponse. The sum of the weights provides an estimate of the number of persons in the population represented by a respondent in the sample.

Scaling: Scaling refers to the process of assigning a scale score based on the pattern of responses. (See also “Equated test score” and “IRT.”)

School administrator questionnaire: This questionnaire was administered in both the base year and, with changes, the first follow-up. The questionnaires sought basic information about school policies, curriculum and program offerings, and student and teacher characteristics.

School climate: The social system and ethos or culture of the school, including the organizational structure of the school and values and expectations within it.

School coordinator: A person designated in each school to act as a contact person between the school and RTI. This person assisted with establishing a survey day in the school and preparing for the survey.

Selection probability: The chance that a particular sampling unit has of being selected in the sample.

Simple random sampling (SRS): SRS uses equal probability sampling with no strata or clusters. The ELS:2002 sample is stratified and clustered. Most statistical analysis software assumes SRS and independently distributed errors. For studies such as ELS:2002, special variance estimation software (such as SUDAAN, WesVar, AM, or Stata) is required to compute the standard error of estimates.

Standard deviation: The most widely used measure of dispersion of a frequency distribution. It is equal to the positive square root of the population variance.

Standard error: The positive square root of the sampling variance. It is a measure of the dispersion of the sampling distribution of a statistic. Standard errors are used to establish confidence intervals for the statistics being analyzed.

Statistical significance: The finding (based on a derived probability, rather than a certitude) that two or more estimates are truly different from one another and not a merely apparent difference reflecting chance variation. (See also "Practical significance.")

Stratification: The division of a population into parts, or strata. In a stratified sample, the total population is divided into strata or subgroups. Strata are created by partitioning the frame and are generally defined to include relatively homogeneous units within strata. Stratification is used to reduce sampling error. In ELS:2002, the sampling frame was sorted to create strata or subgroups of schools, and schools were selected independently within each stratum. Schools were stratified by superstrata (combinations of school type or sector and geographic region) and substrata (urban, suburban, rural).

Student questionnaire: One of the two parts of the ELS:2002 base-year and first follow-up student survey (the other part being the assessment). In both rounds, this instrument contained a locator section for tracing sample members for future waves of ELS:2002 and a series of questions about school and home environments, time use, attitudes, values, and aspirations. In the first follow-up, this questionnaire was administered only to participating base-year students who remained in the same school 2 years later. In some instances, an abbreviated version of the student questionnaire was administered (usually in CATI, but sometimes in a hardcopy version).

Survey administrator: A member of RTI's field staff in charge of conducting in-school data collection sessions (see "Survey day"). The individual in this role was called a team leader in NELS:88 and a survey representative in HS&B.

Survey day: A day chosen by the school during the data collection period when an RTI survey administrator and assistant administered the survey to the school's sample of students. The survey day session lasted about 2 hours in the base year and 90 minutes in the first follow-up. Two make-up days were normally offered for students who missed the survey day.

Target population: The finite set of observable or measurable elements that will be studied, or the conceptual population of analytic units for which data are collected and estimates are made.

In the ELS:2002 base year, the target population was spring term 2002 sophomores in all regular public and private schools with 10th grades in the 50 states and the District of Columbia.

Teacher questionnaire: In the base year, mathematics and English teachers of ELS:2002 sophomore participants were asked to complete a teacher questionnaire, which collected data on school and teacher characteristics (including teacher qualifications and experience) and evaluations of student performance.

Teacher sample: In the ELS:2002 base year, two teacher reports were sought for each student: one from the student's mathematics teacher and one from the student's English teacher.

Technical review panel (TRP): A TRP is a specially appointed, independent group of substantive, methodological, and technical experts who offer advice to the study's contractor on issues of study design and content. TRP members are nominated by the contractor and approved by NCES. Typically, TRPs are convened at least once a year within the life of a contract.

Transfer student questionnaire (TSQ): This first follow-up questionnaire was administered to students who moved from their base-year school to a new school between spring 2002 and spring 2004. It collected data both on students' school experience and their reason for transferring to a new school.

Trimming: A process by which extreme weights are reduced (trimmed) to diminish the effect of extreme values on estimates and estimated variances.

Unit nonresponse: Failure of a survey unit (e.g., at the institutional level, a school, or at the individual level, a respondent, such as a student or a teacher) to cooperate or complete a survey instrument. *Overall unit nonresponse* reflects a combination of unit nonresponse across two or more levels of data collection, where participation at the second stage of data collection is conditional upon participation in the first stage of data collection. In ELS:2002, overall nonresponse is the product of school-level nonresponse times student nonresponse. *Total nonresponse* reflects a combination of the overall unit nonresponse and item nonresponse. (See also "Item nonresponse" and "Nonresponse bias.")

Urbanicity (or metropolitan status): The ELS:2002 school sample was stratified by metropolitan status or urbanicity, in accordance with the following three locale codes: (1) Urban: the school is in a large or mid-size central city; (2) Suburban: the school is in a large or small town or is on the urban fringe of a large or mid-size city; and (3) Rural: the school is in a rural area. Locale indicators were taken from the Common Core of Data (CCD) for public schools and the Private School Survey (PSS) for private schools.

Validity: The capacity of an item or instrument to measure what it was designed to measure, stated most often in terms of the correlation between scores in the instrument and measures of performance on some external criterion. It is the extent to which a test or set of operations measures what it is supposed to measure. Reliability, on the other hand, refers to consistency of measurement over time. (See "Reliability.")

Variance: The average of the squared deviations of a random variable from the expected value of the variable. The variance of an estimate is the squared standard error of the estimate. (See also "Population variance" and "Sampling variance.")

Wave: A wave is a round of data collection in a longitudinal survey (e.g., the base year and each successive follow-up are each waves of data collection).

Weighted response rates: Unit response rates are calculated as the ratio of the weighted number of completed interviews to the weighted number of in-scope sample cases. Unit response rates are calculated using the sample base weights (inverse of the probability of selection).

Weighted estimates: Weighted estimates (as in the ELS:2002 codebook) are survey estimates in which the sample data are statistically weighted (multiplied) by factors reflecting the sample design. The general purpose of weighting is to compensate for unequal probabilities of selection into the sample and to adjust for the fact that not all schools or individuals selected into the sample actually participated. The design weights (also known as base weights, and typically equal to the reciprocals of the overall selection probabilities) are multiplied by a nonresponse or poststratification adjustment for a final weight. Thus, for example, in ELS:2002, the 752 participating schools in the base year represent a national population of 24,795 schools. Individual schools may "represent" anywhere from a minimum of 1 school to a maximum of 96 schools. To take an ELS:2002 base-year student-level example, 7,613 base-year questionnaire respondents reported themselves to be male, and 7,688 reported themselves to be female. When these cases are multiplied by the nonresponse-adjusted student weights to yield a weighted percent that reflects the national population of high school sophomores, the estimate for males is 50.5 percent of the 2002 tenth-grade cohort, while females are estimated to comprise 49.5 percent of the nation's 2002 tenth-graders.

White: A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

Appendix E Reference

Seastrom, M. (2003). *NCES Statistical Standards* (NCES 2003–601). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Available: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003601.

Appendix F
Student Questionnaire Critical Items

Appendix F
Student Questionnaire Critical Items

Critical items are data elements deemed to be of special importance (for future locating of the respondent, for research, or as a data quality check on whether skip patterns are being followed correctly). These items were therefore subject to edit and retrieval in the course of the in-school survey session (see tables F-1 and F-2).

Table F-1. ELS:2002 first follow-up student questionnaire critical items: 2004

Variable	Variable description
F1S01	Name, address, phone number[1]
F1S02	Mother's name[1]
F1S03	Is her address and telephone number the same as respondent's?[1]
F1S04	Mother's address and home telephone number[1]
F1S05	Mother's work telephone number[1]
F1S06	Father's name[1]
F1S07	Is his address and telephone number same as respondent's?[1]
F1S08	Father's address and home telephone number[1]
F1S09	Father's work telephone number[1]
F1S10	Name, address, and telephone number of relative or close friend[1]
F1S12	Social security number[1]
F1S13	Interview date[1]
F1S14	Grade level
F1S15	Expected graduation/certification status
F1S45	Educational plans immediately after high school
F1S47	Educational plans for the future
F1S53	Plan to work right after high school

[1] Variable not included in any release file.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Table F-2. ELS:2002 first follow-up new participant student questionnaire additional critical items (base-year classification variables): 2004

Variable	Variable description
F1N01	Date of birth
F1N02	Sex
F1N03	Hispanic ethnicity, yes or no
F1N04	Hispanic subgroup
F1N05	Race
F1N06	Asian subgroup
F1N07	Native language = English, yes or no
F1N08	Native language
F1N09	English language competency
F1N10	In 10th grade in spring term 2002, yes or no
F1N11	Ever held back a grade
F1N12	Grade repeated
F1N13	Household composition
F1N14	Mother's occupation
F1N15	Father's occupation
F1N16(A-B)	Mother's and father's educational attainment
F1N17(A-J)	Household items

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

Appendix G
Base-Year to First Follow-up
Electronic Codebook

Appendix G
Base-Year to First Follow-up Electronic Codebook

A web-published version of the base-year to first follow-up electronic codebook is available as a PDF file at http://nces.ed.gov/surveys/els2002/.

Appendix H
Cross-Cohort Comparisons

Appendix H
Cross-Cohort Comparisons

H.1 Cross-Cohort Comparison Crosswalks

The Education Longitudinal Study of 2002 (ELS:2002) first follow-up (2004) data can be used in cross-cohort (intercohort) comparisons with the senior cohorts of the National Longitudinal Study of the High School Class of 1972 (NLS-72), the High School and Beyond (HS&B) longitudinal study in 1980, and the National Education Longitudinal Study of 1988 (NELS:88) in 1992. The ELS:2002 first follow-up data can also be used in comparisons to HS&B and NELS:88 of the sophomore cohort "2 years later"—including comparisons of sophomore cohort dropouts. This appendix contains crosswalks designed to identify ELS:2002 variables that also appear on the NLS-72 (1972), HS&B (1980) senior cohort,[1] or NELS:88 (1992) datasets. Some items identified in the crosswalks are only approximate matches, and for these, analysts should judge whether they are sufficiently comparable for the analysis at hand. In other cases, question stems and response options correspond exactly across questionnaires. All NLS-72 1972 and HS&B senior cohort 1980 participants are by definition 12th-graders. However, for NELS:88 and ELS:2002, the subset of participants who were seniors at the time must be invoked through use of the senior cohort flag.

Although the four studies have been designed to produce comparable results, there are also differences between them that may affect the comparability as well as the precision of estimates. Analysts should be aware of and take account of these several factors. In particular, there are differences in sample eligibility and sampling rates, differences in response rates, and some differences in key classification variables, such as race/Hispanic ethnicity. Other differences (and possible threats to comparability) are imputation of missing data, differences in test content and reliabilities, differences in questionnaire content, potential mode effects in data collection, and possible questionnaire context and order effects.

H.1.1 Eligibility

Quite similar definitions were used in deciding issues of school eligibility across the studies. Differences in student sampling eligibility, however, are more problematic. Although the target population is highly similar[2] across the studies (all seniors who can validly be assessed or at minimum meaningfully respond to the questionnaire), exclusion rules and their

[1] There were two cohorts in HS&B: a senior cohort and a sophomore cohort. In 1982, most members of the sophomore cohort were seniors. However, the sophomore cohort sample was not freshened in 1982. This means that the sophomore cohort in 1982 does not fully represent high school seniors of that year, since no 1982 seniors who were not 1980 sophomores are included. Therefore, the 1982 seniors should not be compared with the 1972, 1980, 1992, and 2004 seniors, unless some adjustment is made for the "missing" seniors. Although some of the "missing" seniors were out of the country in 1980, most were held back a year or more, making them a very different group from the sophomore cohort members who remained in modal grade sequence. By and large, these missing cases would more closely resemble the HS&B sophomore cohort members who fell behind their classmates and did not become 1982 seniors.

[2] "Similar" seems a more accurate description than "the same" because of differences in emphasis, such as between the importance of test completion and the importance of questionnaire completion. HS&B, for example, regarded impediments to assessment as of overriding importance for determining eligibility, whereas ELS:2002 included students who could not be tested but could complete the questionnaire (in either self- or interviewer-administered interviews).

implementation have varied somewhat, and exclusion rates are known to differ where they are known at all.

Not all students are able to meaningfully respond to research instruments such as the assessments and questionnaires administered in the four studies. Some English language learners are too limited in their English proficiency to do so, whereas others may be precluded from participation by a severe physical or mental disability. HS&B excluded as ineligible students with such barriers to participation, although an overall exclusion rate has not been documented. In NELS:88, 5.3 percent of the base-year 8th-grade sample was excluded for such reasons (this figure is similar to the exclusion rate for 8th grade in the National Assessment of Educational Progress [NAEP] in similar subjects in the same period). However, a sample of the NELS:88 ineligible students was followed over time, and some students whose status changed were incorporated into the first and second follow-ups, from which the NELS:88 sophomore and senior cohorts are drawn. In ELS:2002, no students were classified as ineligible as such, although some were exempted from completing the questionnaire (and others also a test); still others were tested under circumstances in which they were provided with special accommodations. The overall rate of instrument-exempted sophomores in ELS:2002 is quite low, below 1 percent in the ELS:2002 base year. Base-year students incapable of completing a questionnaire were reevaluated in the first follow-up. Although not all were seniors, and the eligibility status of many remained unchanged, others became capable of questionnaire completion, particularly students who had been excluded for language reasons. (Note that the questionnaire-incapable students are considered to be part of the study but do not appear on the ELS:2002 public-use file.)

The fact that a larger proportion of the student population was included in ELS:2002 (99 percent of the potential cohort in ELS:2002 as contrasted to 95 percent in NELS:88) may affect cross-cohort estimates of change. This is the case because the excluded students in NELS:88 tended to be quite different from the included students.[3] At the same time, there are ways to make the samples somewhat more comparable. Thus, while for optimal cross-sectional estimation, all the ELS:2002 cases might be used for comparison of achievement results across cohorts, the ELS:2002 cases that reflect testing accommodations should be dropped.[4]

H.1.2 Sample Design Differences

Differences in sampling rates, sample sizes, and design effects across the studies also affect precision of estimation and comparability. Asian students, for example, were oversampled in NELS:88 and ELS:2002, but not in NLS-72 or HS&B, where their numbers were quite small. Also, although Catholic schools were oversampled in three of the four studies, HS&B had few (only 38) private non-Catholic schools, and NLS-72 had few nonpublic schools of any kind. The base-year (1980) participating sample in HS&B numbered 30,030 sophomores. In contrast,

[3] For example (Ingels 1996), though just 5 percent of the population, inclusion of the ineligible students changes the cohort dropout rate between 1988 and 1990 from 6 percent to 7 percent. Only 62 percent of the base-year ineligibles were still in high school 4 years later, compared with 83 percent of the total sample. Of this 62 percent, 58 percent were in modal grade sequence, and 42 percent were not (80 percent of the overall in-school sample was in modal grade sequence, i.e., seniors 4 years later).

[4] In the same way, adjustments are commonly made to render the HS&B and NELS:88 transcript studies comparable to the NAEP high school transcripts. Specifically, only the subset of the HS&B or NELS:88 senior cohort that in fact graduated is included, while graduates on the NAEP file with special education diplomas are excluded from analysis.

15,362 sophomores participated in the base year of ELS:2002. Cluster sizes within school were much larger for HS&B (on average, 30 sophomores per school) than for ELS:2002 (just over 20 sophomores per school; larger cluster sizes are better for school effects research but carry a penalty in greater sample inefficiency). Mean design effect (a measure of sample efficiency[5]) also is quite variable across the studies: for example, for 10th grade, 2.9 for HS&B and 3.9 for NELS:88 (reflecting high subsampling after the 8th-grade base year), with the most favorable design effect, 2.4, for the ELS:2002 base year. Other possible sources of difference between the cohorts that may impair change measurement are different levels of sample attrition over time and changes in the population of nonrespondents.

H.1.3 Participation Rates

Response rates also differ somewhat across the studies, although nonresponse-adjusted weights were generated for each of the cohorts. At the school level, response rates were somewhat higher in HS&B and NELS:88 (unweighted, around 70 percent) than in ELS:2002 (unweighted, 62 percent). School nonresponse bias analyses were performed for each study and may be found in the study documentation. At the student level, there is even more variation in response rates. In HS&B, 80.7 percent of 1980 senior cohort members completed a questionnaire (Zahs et al. 1995, p. 67). In the NELS:88 second follow-up, 92.5 percent of students participated (Ingels et al. 1994), and in ELS:2002, 93.6 percent of the in-school sample was surveyed in the first follow-up (all response rates are unweighted).

H.1.4 Changing Race Definitions

In some cases, federal race definitions or preferences for the means by which ethnicity and race data are to be collected have changed. In HS&B and NELS:88, students were asked to mark one race only. Based on revised race-reporting guidelines issued by the Office of Management and Budget (OMB), ELS:2002 added a new race category, and, more important, students are now allowed to mark all that apply, thus generating a further category, Multiracial/More than one race.

The new race category is Native Hawaiian or Other Pacific Islander. For purposes of cross-cohort comparisons, cases identified in ELS:2002 as Native Hawaiian or Other Pacific Islander should be combined with the Asian category to achieve comparability with earlier studies.

However, for students who considered themselves to be multiracial and marked more than one race, there is no ready means to map them back into a one-race scheme. With 5 race categories and with values based on a single race reported, none reported, the 10 possible combinations of 2 races, the 10 possible combinations of 3 races, the 5 possible combinations of 4 races, and the possibility of a combination of all 5 races, there are 32 separate race categories. When race is crossed by ethnicity (race by Hispanic or not Hispanic), there are 64 possible race/Hispanic ethnicity combinations. It is impossible to know, for example, whether a student who marked White and Black in ELS:2002 would have marked White or Black in NELS:88, in

[5] Effective sample size can be quite different from the nominal sample size; effective sample size is more meaningful than raw sample size in terms of statistical analysis—for example, the sampling variance of a mean standard score is equal to the reciprocal of the effective sample size, not the reciprocal of the raw sample size. Effective sample size may be defined as the raw sample size divided by the design effect.

which only one race was allowed. There are over 700 non-Hispanic multiracial sophomores recorded in the ELS:2002 base-year dataset, but the distorting effect on cross-cohort estimation is likely to be greatest for small population subgroups with many claimants to multiple race, such as the American Indian category. Analysts should be cautious, then, about conclusions concerning racial subgroup trends between the seniors of 1972, 1980, 1992, and 2004.

H.1.5 Other Classification Variables

Other key classification variables have been constructed *to the extent possible* in the same way in ELS:2002 as in the prior studies, although in many cases (in ELS:2002 only) there are imputed versions of the variable as well as the original version with the various types of missing data categorized by reserve code. The socioeconomic status (SES) variable offers a good example of the subtle differences that may exist between the same variable in different studies, despite efforts to maximize cross-cohort consistency of measures. Continuities and differences in SES constituents and construction in the three prior studies are summarized below in table H-1. Table H-2 summarizes the elements comprising the SES measure in ELS:2002.

Table H-1. Elements of the socioeconomic composite, by study: Selected years, 1972–2002

NLS-72, HS&B (student reported)	NELS:88 (parent reported)	NELS:88 student survey substitutions
Father's occupation	Father's occupation	Father's occupation
	Mother's occupation	Mother's occupation
Father's education	Father's education	Father's education
Mother's education	Mother's education	Mother's education
Family income	Family income	Household items
Household items	—	—

— Not available.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002); National Longitudinal Study of the High School Class of 1972 (NLS-72); High School and Beyond (HS&B) Longitudinal Study (1980); and National Education Longitudinal Study of 1988 (NELS:88).

Table H-2. Elements of socioeconomic composite, by source: 2002

Preferred source (parent reported)	Student report substitution if missing from parent	Imputed if still missing
Father's occupation	Father's occupation	Father's occupation
Mother's occupation	Mother's occupation	Mother's occupation
Father's education	Father's education	Father's education
Mother's education	Mother's education	Mother's education
Family income	—	Family income

— Not available.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

ELS:2002 largely follows the NELS:88 model above. In both studies, the composite is based on five equally weighted, standardized components: father's education, mother's education, family income, father's occupation, and mother's occupation. Parent data are used to construct this variable. Student data are substituted where parent data are missing. However, for parent education and occupation, where both parent and student reports are missing, ELS:2002 education and occupation values are imputed. Family income was not asked of students. While in NELS:88 a student-provided household item index, which served as an income proxy, was substituted when income data were missing, a different procedure was followed in ELS:2002. When parent data on income were missing, income was statistically imputed.

Some differences across the studies are based on differences in design. The studies had different starting points. NLS-72 student respondents were high school seniors, HS&B base-year respondents were sophomores or seniors, and NELS:88 base-year respondents were 8th-graders. ELS:2002 base-year respondents were sophomores. A parent interview was sought for all NELS:88 and ELS:2002 base-year student respondents. HS&B had a parent survey, but it only encompassed a subsample of student respondents. NLS-72 had no parent survey at all. Because the quality of reporting on parental occupation and education increases with student age or grade, it may be of concern whether reports were gathered at grade 8, 10, or 12. However, since parent reports are markedly superior to student reports in these matters, it may be of concern that only in NELS:88 and ELS:2002 are the data primarily parent reported. Likewise, students are poor reporters of family income, but the income question was asked of students in NLS-72 and HS&B and of parents alone in NELS:88 and ELS:2002.

Some differences reflect changing social circumstances over time. For example, many fewer mothers worked in 1972 than in recent years. The importance of gathering information about maternal occupation increased with the passage of time and the increasing labor market participation of American females. The household items list has been revised for each survey. For NLS-72, owning a color television discriminated between people of various income levels. by the time of HS&B, 8 years later, this was no longer so. By 2002, HS&B items such as ownership of a typewriter had ceased to function as good proxies for family income, while other items, such as access to the Internet or having a digital video disc player, did.[6] Although items differ across the index over time, in each case the items are those that are needed to provide a measure that has a reasonable correlation with income. Another area where change over time is possible is in occupations and their relative prestige. To accommodate this factor, two sets of prestige scores were drawn upon in NELS:88: the 1961 Duncan socioeconomic indicator measure that had been employed in NLS-72 and HS&B, as well as a 1989 revision by Nakao and Treas (1992). The same strategy has been employed in ELS:2002.

H.1.6 Imputation of Missing Data for ELS:2002 Key Variables

One difference between the SES variable in ELS:2002 and in prior studies arises from the use of imputation in ELS:2002. Because all the constituents of SES are subject to imputation, it has been possible to create an SES composite with no missing data for ELS:2002. For the HS&B sophomores, SES was missing for around 9 percent of the participants, and for NELS:88 (in 1990) just under 10 percent. The availability of imputed variables (including both key classification variables and achievement test scores) also poses a novel question for analysts interested in intercohort comparisons. Because imputed values are flagged, it is the analyst's choice whether or not to employ them. If the imputed variables are used, they should have the effect of improving cross-sectional estimation. On the other hand, since imputation was not used in the prior studies, it is also possible that use of ELS:2002 imputed values might decrease

[6] The household items were asked in ELS:2002, but the index was not used in the creation of SES, since missing income data were imputed.

comparability of results across studies. To explore the issue of the magnitude of the effect of imputation on comparative bivariate and multivariate analysis, appendix C compares imputed and unimputed ELS:2002 estimates, including estimates based on an SES composite using the household items index substitution and an SES composite based on parent data with missings imputed.

H.1.7 Differences of Test Content and Reliabilities

The test battery has evolved over time. Only one school subject—mathematics—has been tested at all timepoints, and the early mathematics tests were limited to quantitative comparison items. The NLS-72 and HS&B 1980 senior tests also were administered in vocabulary and in reading, as well as in a number of ability domains not closely linked to the school curriculum (a picture number test gauged associative memory, a mosaic comparisons test measured perceptual speed and accuracy, and another test measured visualization in three dimensions). The HS&B sophomore tests—because they were to be repeated after 2 years of additional schooling—took a different tack. Arguably more curriculum sensitive, they measured knowledge in six areas: vocabulary, reading, mathematics, science, writing, and civics. The test battery in NELS:88 comprised assessments in reading, mathematics, science, and social studies (history, geography, and civics). In ELS:2002, reading and mathematics assessments were administered in the base year, and mathematics again in the first follow-up.

Although different tests have been equated, the linkage does not carry through uninterruptedly from NLS-72 to ELS:2002. The NLS-72 and HS&B senior tests were equated (Rock et al. 1985), and the NELS:88 and ELS:2002 12th-grade tests have been equated (as documented in this report). (For sophomores, a link has been effected from the HS&B sophomore cohort in 1980 to the NELS:88 scale in 1990 and the ELS:2002 in 2002 [Ingels et al. 2004]). However, certain kinds of test score analyses, using effect sizes, are possible across the various senior cohorts (see Green, Dugoni, and Ingels 1995).

In addition, starting in NELS:88, the tests were made at least moderately adaptive (in 1990, 1992, and 2004, through using the prior round's ability estimate to assign a specific test form; in 2002, through a two-stage test in which performance on a routing test determined assignment of the second-stage form). In consequence, test reliabilities are higher for the later assessment batteries (for example, in mathematics, 0.85–0.86 for NLS-72 and HS&B; 0.92–0.94 for NELS:88 and ELS:2002).

H.1.8 Differences of Questionnaire Content

Readers are referred to the crosswalk in section H.2 to identify comparable items.

H.1.9 Mode Effects in Data Collection, Context Effects

Survey responses can be influenced by the mode of questionnaire administration (Tourangeau, Rips, and Rasinski 2000). There are some mode of administration differences across the studies (such differences will grow greater with future rounds—for example, ELS:2002 will collect 2006 data via self-administration on the Web, as well as computer-assisted telephone interviews and computer-assisted personal interviews, as contrasted to paper-and-pencil mail surveys in the NLS-72 and HS&B era). Order and context effects are also possible (questions have been added, dropped, and reordered, over time). Though possible threats to comparability of data over time, little methodological work has been done on mode or context effects within this longitudinal studies series.

The crosswalk in section H.2 links ELS:2002 base-year student questionnaire items with similar items from three previous NCES high school senior cohort questionnaires: the NELS:88 second follow-up questionnaire (1992), the HS&B base-year senior cohort questionnaire (1980), and the NLS-72 base-year questionnaire (1972). This crosswalk will facilitate analyses of trends among high school seniors, spanning a 32-year period. Linked questions may be identical in content and format or may differ in one or more ways: the question, item, or response wording; the order in which response options were presented; the manner in which the data were collected (e.g., categorical response option versus open-ended response fields, instructions to mark one versus mark all that apply); and the population to which the question applies. Therefore, it is strongly recommended that analysts review documentation (including facsimiles of the questionnaires) to determine if linked questions are appropriate for their purpose.

H.2 Cross-Cohort Item Crosswalk

Table H-3 lists the contents of the ELS:2002 first follow-up questionnaires, with the exception of the locator section, which has not been made a part of the data release. In the first column, an abbreviated stem is provided for each item. In the second column, the item's ELS:2002 status is indicated, that is, the variable name for each ELS:2002 first follow-up questionnaire (for brevity, the prefix "F1" has been dropped). For example, math coursework carries an entry for all five first follow-up questionnaires (student, transfer student, homeschooled student, early graduate, dropout). In the third column, the corresponding NELS:88 second follow-up item (if any) is indicated. The fourth and fifth columns supply linkage from the NELS:88 second follow-up item (if any) to the relevant HS&B senior questionnaire variable, and the sixth column to the base year of the NLS-72.

H.3 Appendix H References

Green, P.J., Dugoni, B., and Ingels, S.J. (1995). *Trends Among High School Seniors, 1972-1992* (NCES 95–380). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Ingels, S.J., Dowd, K.L., Baldridge, J.D., Stipe, J.L., Bartot, V.H., and Frankel, M.R. (1994). *NELS:88 Second Follow-up: Student Component Data File User's Manual* (NCES 94–374). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Ingels, S.J. (1996). *Sample Exclusion in NELS:88—Characteristics of Base Year Ineligible Students; Changes in Eligibility Status After Four Years* (NCES 96–723). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Ingels, S.J., Pratt, D.J., Rogers, J., Siegel, P.H., and Stutts, E.S. (2004). *Education Longitudinal Study of 2002: Base Year Data File User's Manual* (NCES 2004–405). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Available: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2004405.

Nakao, K., and Treas, J. (1992). *The 1989 Socioeconomic Index of Occupations: Construction from the 1989 Occupational Prestige Scores* (General Social Survey Methodological Report No. 74). Chicago: National Opinion Research Center.

Rock, D.A., Ekstrom, R.B., Goertz, M.E., Hilton, T.L., and Pollack, J.M. (1985). *Factors Associated With Decline of Test Scores of High School Seniors, 1972 to 1980*. U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Tourangeau, R., Rips, L.J., and Rasinski, K. (2000). *The Psychology of Survey Response*. New York: Cambridge University Press.

Zahs, D., Pedlow, S., Morrissey, M., Marnell, P., and Nichols, B. (1995). *High School and Beyond Fourth Follow-up Methodology Report* (NCES 95–426). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Table H-3. Cross-cohort item crosswalk for longitudinal studies, by item: Selected years, 1972–2002

Question	ELS:2002 first follow-up questionnaires	NELS:88 second follow-up questionnaires	HS&B 1982 seniors	HS&B 1980 seniors	NLS-72 seniors
Grade level	S14, T18, H14	S6A			
Diploma or certificate most likely to receive	S15, T19, H15, E19	S6B			
Science coursework	S16, T20, H16, E29, D27				
Math coursework	S17, T21, H17, E30, D28				
Confidence in math	S18				
Calculators/computers in math	S19	S19B			
Computer use in math classes	S20				
College entrance tests	S21, T22, H18	S44	8	9	
How studied for college tests	S22	S45			
Participated in college preparation program for disadvantaged	S23	S14A	11cd	14cd	6de3
Yrs participated in Talent Search, etc.	S24	S14B		14cd	6de3
Victimization	S25	S8			
Extracurricular activities	S26, T23, H20, E31	S30A, S30B	38	32	10
Hours/week spent on extracurricular activities	S27, T24, H21, E32	S31			
School has library media/resource center	S28, T25				
How often uses school library	S29, T26				
How often uses public library	S30, T27, H22, E33, D49				
Hours/week spent on homework both in and out of school	S31, T28, H23	S25f	15	15	7
Hours on math homework	S32	S25a			
Hours/week spent reading outside of school	S33, T29, H24, E34, D50	S32	60b	47b	
Hours watching television	S34, T30, H25, E35, D51	S35	61	48	
Hours playing video games	S35, T31, H26, E36, D52	S34			
Computer use for schoolwork/other	S36, T32, H27, E37, D53				
Computer use at various locations	S37, T33, H28, E38, D54				
Computer use for fun, school, learn things	S38				
Activities outside of school	S39, T34, H29, E39, D55	S33, D35	60	47	
Life values	S40, T35, H30, E40, D56	S40, D36	73	57	20
How will spend summer	S41	S46			

See notes at end of table.

Table H-3. Cross-cohort item crosswalk for longitudinal studies, by item: Selected years, 1972–2002—Continued

Question	ELS:2002 first follow-up questionnaires	NELS:88 second follow-up questionnaires	HS&B 1982 seniors	HS&B 1980 seniors	NLS-72 seniors
How far in school respondent thinks will get	S42, T36, H31, E41, D57	S43, D38	80	65	29
How far mother and father wants to go	S43, T37, H32, E42, D58	S42, D37	81	66	91
Most important thing right after high school	S44, T38, H33	S41	63	50	
Plans to go on to school right after high school	S45, T39, H34	S49	87h		
Reasons decided not to go right after high school	S46, T40, H35	S50			37, 42, 49
Plans to continue education some time in future	S47, T41, H36, E44	S56	122	115	
Where went for info on college entrance	S48				
Type of school plans to attend	S49, T42, H37, E45	S61	115	107	70
Number of school applied to	S50, T43, H38, E46	S60A	124	117	66
Importance of school characteristics	S52, T45, H40, E48	S59	123	116	68
Plans to work right after high school	S53, T46, H41	S51	87a	72a	32
Has regular full-time job lined up	S54, T47, H42	S52	88	73	33
Who helped select jobs	S55	S53			
Occupation expects to have after high school—verbatim (restricted)	S56, T48, H43	S64	77a	62	25
Occupation expects to have at age 30—verbatim (restricted)	S57, T49, H44, E56, D66	S64, D40A	77a	62	25
How much education respondent thinks will be needed for job at age 30	S58, T50, H45, E57, D67	S65			
Ever worked for pay not around house	S59, T51, H46	S86A	24		
How many hours usually works a week during school year	S60, T52, H47	S88	25	22	8
How many hours works on the weekend during school year	S61	S89			
Performed unpaid volunteer/community service work	S62, T53, H48, E58, D68	S37			
Types of volunteer organizations	S63	S39			
How often discuss with parents	S64, T54, H49	S99			
Friends' plans for after high school	S65, T55, H50, E59, D69	S69, D59			

See notes at end of table.

Table H-3. Cross-cohort item crosswalk for longitudinal studies, by item: Selected years, 1972–2002—Continued

Question	ELS:2002 first follow-up questionnaires	NELS:88 second follow-up questionnaires	HS&B 1982 seniors	HS&B 1980 seniors	NLS-72 seniors
When began going to transfer school	T15				
Reasons for transferring	T16				
Agreement w/ statements re school/teachers	T17	S7	66, 67	53, 59	18
Month and year last attended school	E20, D19	D6			
Grade when last attended school	E21, D20	D7			
How earned GED	E24, D42				
Why decided to complete GED	E25, D43				
State where GED/equivalency was earned—restricted	E26, D44				
Month and year graduated/received equivalency from high school	E27, D45	E114, D32	G1		
Why decided to graduate/complete early	E28	E115	G2		
Enrolled in an educational institution since high school	E43	E127A, D23	G13A2		
Number of jobs held since left high school	E49, D59	D44A			
Current/most recent job or occupation—restricted	E50, D60	E121A, E121B, D45A, D45B	G10.1		
Month and year started working at this job	E51, D61	E122, D45E	G10.5		
Still have this job	E52, D62	E123, D45F	G10.6		
Month and year left most recent job	E53, D63	E123, D45G	G10.6		
Current/most recent pay per hour	E54, D64	D45K			
Number of hours/week usually worked at this job	E55, D65	D45L			
Whether passed last grade attended	D21	D8			
Left school for more than a month before last left	D22	D10A			
Month and year first left school for more than a month	D23	D10B			
Month and year returned to school	D24	D11			
Attended school during 2002–03 school year	D25	D14A			

See notes at end of table.

Table H-3. Cross-cohort item crosswalk for longitudinal studies, by item: Selected years, 1972–2002—Continued

Question	ELS:2002 first follow-up questionnaires	NELS:88 second follow-up questionnaires	HS&B 1982 seniors	HS&B 1980 seniors	NLS-72 seniors
Number of school days missed during 2002–03 school year	D26	D14B			
Reasons for leaving school	E22, D29	D9A			
Feels that leaving school was a good decision	E23, D30	D17A			
What people at school did	D31	D21			
What parents did	D32	D22			
Things that happened in past 2 years	D33	D24			
Participated in an alternative program	D34	D25			
Month and year entered most recent alternative program	D35	D26A			
Still enrolled in alternative program	D36	D26B			
Month and year left/completed most recent alternative program	D37	D26C			
Who referred to alternative program	D38	D27			
Services received from alternative program	D39	D29			
Number of alternative programs participated in	D40	D30			
Plan to get GED or high school diploma	D41	D31			
Currently taking class to prepare for GED examination	D46	D33A			
Plan to go back to high school/take GED class	D47	D33B			
Month and year expects to receive high school diploma/GED	D48	D34			
Sex	N2	N2			
Student is Hispanic	N3	N17			
Student's Hispanic subdivision	N4	N19			
Race	N5	N17			
Student's Asian subdivision	N6	N18			
English is student's native language	N7	S107			
Student's native language (restricted)	N8	N20			
English skills	N9	S109			

See notes at end of table.

Table H-3. Cross-cohort item crosswalk for longitudinal studies, by item: Selected years, 1972–2002—Continued

Question	ELS:2002 first follow-up questionnaires	NELS:88 second follow-up questionnaires	HS&B 1982 seniors	HS&B 1980 seniors	NLS-72 seniors
Ever held back a grade	N11	N16			
Grades repeated	N12	N16			
Lives in household at least half of time	N13				
Mother/female guardian's work	N14	N5			
Father/male guardian's work	N15	N7			
Parents' education	N16	N8			
Family has items in home	N17	N12			

NOTE: This crosswalk was constructed by linking ELS:2002 first follow-up items with the NELS:88 second follow-up items from the Intercohort Student Questionnaire Crosswalk in appendix E of the NELS:88 Second Follow-up: Student Component Data File User's Manual (94–374). S = Student, T = Transfer, H = Homeschool, E = Early Graduate, D = Dropout (Not Currently in School), N = New Participant Supplement.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002); National Longitudinal Study of the High School Class of 1972 (NLS-72); High School and Beyond (HS&B) Longitudinal Study (1980); and National Education Longitudinal Study of 1988 (NELS:88).

Appendix I
Standard Errors and Design Effects

Table I-1. Student design effects, by item using first follow-up questionnaire weight—All: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.8	0.47	0.28	14238	2.78	1.67
Most likely to receive a GED	F1S15 = 5	2.1	0.15	0.12	14238	1.66	1.29
Already took the SAT or ACT	F1S21C = 3	63.9	0.77	0.41	13555	3.50	1.87
Already took an AP test	F1S21D = 3	14.7	0.56	0.31	13177	3.33	1.82
Had something stolen at school at least once	F1S25A = 2,3	25.8	0.56	0.43	10375	1.71	1.31
Was offered drugs at school at least once	F1S25B = 2,3	20.8	0.58	0.40	10374	2.14	1.46
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.5	0.39	0.30	14095	1.74	1.32
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	15.0	0.46	0.30	14092	2.37	1.54
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.5	0.60	0.43	9824	1.89	1.38
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	55.5	0.56	0.41	14691	1.86	1.37
Uses the computer at home once or twice a week	F1S37A = 4	25.0	0.49	0.35	14892	1.93	1.39
Rarely or never performs community service	F1S39C = 1	60.9	0.57	0.40	14766	2.05	1.43
Being successful in line of work is very important	F1S40A = 3	90.7	0.32	0.24	14895	1.83	1.35
Marrying the right person is very important	F1S40B = 3	80.3	0.44	0.33	14885	1.84	1.36
Having lots of money is very important	F1S40C = 3	35.7	0.57	0.39	14891	2.08	1.44
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.4	0.48	0.38	14898	1.62	1.27
Mother expects student to graduate from college, nothing more	F1S43A = 6	38.1	0.53	0.40	14460	1.74	1.32
Plans to continue education right after high school	F1S47 = 2	77.7	0.55	0.35	13802	2.42	1.55
Plans to hold a part-time job right after school	F1S53 = 2	49.6	0.57	0.43	13685	1.79	1.34
Volunteered with a youth organization	F1S63A = 1	27.8	0.80	0.55	6677	2.12	1.45
Often discusses grades with parents	F1S64D = 3	52.5	0.56	0.43	13506	1.67	1.29
Lives with mother only	F1FCOMP = 5	18.7	0.44	0.32	14989	1.93	1.39
Native language is Spanish	F1HOMLNG = 2	8.4	0.62	0.23	14623	7.30	2.70
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.9	0.17	0.14	14569	1.43	1.19
At age 30 expects to be in the military	F1OCC30 = 7	1.0	0.11	0.08	14569	1.60	1.26
At age 30 expects to be an operative	F1OCC30 = 8	0.6	0.09	0.07	14569	1.84	1.36
At age 30 expects to be a professional (group b)	F1OCC30 = 10	13.6	0.36	0.28	14569	1.60	1.26
At age 30 expects to be in a technical field	F1OCC30 = 16	4.9	0.23	0.18	14569	1.65	1.28
At age 30 doesn't know what expects to be	F1OCC30 = -1	30.1	0.46	0.38	14569	1.47	1.21
Mathematics test score	F1TXM1IR = 0-85	48.3	0.28	0.13	13702	4.84	2.20
Summary statistics							
Mean						2.26	1.47
Minimum						1.43	1.19
Median						1.85	1.36
Maximum						7.30	2.70
Standard deviation						1.19	0.32

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-2. Student design effects, by item using first follow-up questionnaire weight—Male: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	10.6	0.53	0.37	7061	2.12	1.46
Most likely to receive a GED	F1S15 = 5	2.5	0.25	0.18	7061	1.80	1.34
Already took the SAT or ACT	F1S21C = 3	59.1	0.92	0.60	6710	2.34	1.53
Already took an AP test	F1S21D = 3	14.1	0.66	0.43	6484	2.33	1.53
Had something stolen at school at least once	F1S25A = 2,3	29.7	0.82	0.64	5123	1.64	1.28
Was offered drugs at school at least once	F1S25B = 2,3	27.3	0.86	0.62	5126	1.92	1.39
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	18.0	0.60	0.46	6977	1.71	1.31
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	10.9	0.51	0.37	6976	1.89	1.38
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.1	0.82	0.61	4849	1.76	1.33
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	56.9	0.76	0.58	7338	1.73	1.32
Uses the computer at home once or twice a week	F1S37A = 4	23.0	0.65	0.49	7431	1.78	1.33
Rarely or never performs community service	F1S39C = 1	66.5	0.73	0.55	7364	1.75	1.32
Being successful in line of work is very important	F1S40A = 3	89.2	0.48	0.36	7426	1.82	1.35
Marrying the right person is very important	F1S40B = 3	79.5	0.60	0.47	7421	1.66	1.29
Having lots of money is very important	F1S40C = 3	43.3	0.75	0.58	7422	1.71	1.31
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.9	0.68	0.54	7431	1.60	1.27
Mother expects student to graduate from college, nothing more	F1S43A = 6	40.1	0.70	0.58	7178	1.46	1.21
Plans to continue education right after high school	F1S47 = 2	72.3	0.78	0.54	6841	2.10	1.45
Plans to hold a part-time job right after school	F1S53 = 2	46.3	0.81	0.61	6784	1.77	1.33
Volunteered with a youth organization	F1S63A = 1	33.7	1.25	0.88	2891	2.01	1.42
Often discusses grades with parents	F1S64D = 3	48.0	0.85	0.61	6659	1.94	1.39
Lives with mother only	F1FCOMP = 5	17.9	0.57	0.44	7486	1.68	1.30
Native language is Spanish	F1HOMLNG = 2	7.8	0.60	0.31	7274	3.67	1.92
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.3	0.24	0.21	7221	1.27	1.13
At age 30 expects to be in the military	F1OCC30 = 7	1.7	0.20	0.15	7221	1.65	1.28
At age 30 expects to be an operative	F1OCC30 = 8	1.2	0.17	0.13	7221	1.82	1.35
At age 30 expects to be a professional (group b)	F1OCC30 = 10	9.4	0.45	0.34	7221	1.73	1.32
At age 30 expects to be in a technical field	F1OCC30 = 16	6.0	0.37	0.28	7221	1.75	1.32
At age 30 doesn't know what expects to be	F1OCC30 = -1	32.8	0.69	0.55	7221	1.54	1.24
Mathematics test score	F1TXM1IR = 0-85	49.3	0.32	0.19	6800	2.96	1.72
Summary statistics							
Mean						1.90	1.37
Minimum						1.27	1.13
Median						1.77	1.33
Maximum						3.67	1.92
Standard deviation						0.46	0.15

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-3. Student design effects, by item using first follow-up questionnaire weight—Female: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	14.9	0.64	0.42	7177	2.29	1.51
Most likely to receive a GED	F1S15 = 5	1.7	0.20	0.15	7177	1.71	1.31
Already took the SAT or ACT	F1S21C = 3	68.7	0.91	0.56	6845	2.64	1.62
Already took an AP test	F1S21D = 3	15.4	0.71	0.44	6693	2.58	1.61
Had something stolen at school at least once	F1S25A = 2,3	21.9	0.73	0.57	5252	1.63	1.28
Was offered drugs at school at least once	F1S25B = 2,3	14.5	0.67	0.49	5248	1.90	1.38
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	11.1	0.46	0.37	7118	1.55	1.25
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	19.2	0.66	0.47	7116	1.97	1.40
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.9	0.83	0.61	4975	1.84	1.36
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	54.0	0.66	0.58	7353	1.29	1.14
Uses the computer at home once or twice a week	F1S37A = 4	27.0	0.68	0.51	7461	1.77	1.33
Rarely or never performs community service	F1S39C = 1	55.2	0.79	0.58	7402	1.89	1.37
Being successful in line of work is very important	F1S40A = 3	92.1	0.42	0.31	7469	1.80	1.34
Marrying the right person is very important	F1S40B = 3	81.1	0.65	0.45	7464	2.06	1.43
Having lots of money is very important	F1S40C = 3	28.1	0.69	0.52	7469	1.74	1.32
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.0	0.64	0.54	7467	1.45	1.20
Mother expects student to graduate from college, nothing more	F1S43A = 6	36.0	0.73	0.56	7282	1.71	1.31
Plans to continue education right after high school	F1S47 = 2	83.1	0.61	0.45	6961	1.84	1.36
Plans to hold a part-time job right after school	F1S53 = 2	53.0	0.75	0.60	6901	1.54	1.24
Volunteered with a youth organization	F1S63A = 1	23.4	0.92	0.69	3786	1.78	1.33
Often discusses grades with parents	F1S64D = 3	57.0	0.70	0.60	6847	1.37	1.17
Lives with mother only	F1FCOMP = 5	19.5	0.62	0.46	7503	1.85	1.36
Native language is Spanish	F1HOMLNG = 2	9.0	0.79	0.33	7349	5.55	2.36
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.6	0.22	0.19	7348	1.44	1.20
At age 30 expects to be in the military	F1OCC30 = 7	0.4	0.08	0.07	7348	1.38	1.17
At age 30 expects to be an operative	F1OCC30 = 8	0.1	0.06	0.04	7348	1.83	1.35
At age 30 expects to be a professional (group b)	F1OCC30 = 10	17.8	0.56	0.45	7348	1.59	1.26
At age 30 expects to be in a technical field	F1OCC30 = 16	3.8	0.26	0.22	7348	1.38	1.18
At age 30 doesn't know what expects to be	F1OCC30 = -1	27.5	0.61	0.52	7348	1.39	1.18
Mathematics test score	F1TXM1IR = 0-85	47.3	0.32	0.18	6902	3.42	1.85
Summary statistics							
Mean						1.94	1.37
Minimum						1.29	1.14
Median						1.77	1.33
Maximum						5.55	2.36
Standard deviation						0.81	0.24

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-4. Student design effects, by item using first follow-up questionnaire weight—American Indian or Alaska Native: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	4.4	2.05	1.88	119	1.19	1.09
Most likely to receive a GED	F1S15 = 5	5.5	2.63	2.10	119	1.56	1.25
Already took the SAT or ACT	F1S21C = 3	38.4	6.06	4.68	109	1.68	1.30
Already took an AP test	F1S21D = 3	7.6	3.35	2.55	108	1.72	1.31
Had something stolen at school at least once	F1S25A = 2,3	33.9	6.59	5.47	76	1.45	1.21
Was offered drugs at school at least once	F1S25B = 2,3	31.1	6.59	5.31	77	1.54	1.24
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	13.8	4.30	3.22	116	1.78	1.34
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	12.6	3.93	3.11	115	1.60	1.26
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	28.2	8.81	5.50	68	2.57	1.60
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	69.3	4.37	4.17	123	1.09	1.05
Uses the computer at home once or twice a week	F1S37A = 4	28.7	5.33	4.11	122	1.68	1.30
Rarely or never performs community service	F1S39C = 1	69.2	5.29	4.22	121	1.57	1.25
Being successful in line of work is very important	F1S40A = 3	90.4	3.63	2.68	122	1.84	1.36
Marrying the right person is very important	F1S40B = 3	69.9	6.73	4.17	122	2.61	1.61
Having lots of money is very important	F1S40C = 3	40.3	4.98	4.46	122	1.25	1.12
Expects to earn a 4-year degree, nothing more	F1S42 = 6	26.3	5.50	4.00	122	1.89	1.37
Mother expects student to graduate from college, nothing more	F1S43A = 6	34.2	4.46	4.40	117	1.02	1.01
Plans to continue education right after high school	F1S47 = 2	61.4	5.63	4.58	114	1.51	1.23
Plans to hold a part-time job right after school	F1S53 = 2	52.7	4.95	4.76	111	1.08	1.04
Volunteered with a youth organization	F1S63A = 1	39.8	8.31	8.94	31	0.87	0.93
Often discusses grades with parents	F1S64D = 3	48.0	6.75	4.79	110	1.99	1.41
Lives with mother only	F1FCOMP = 5	24.2	3.70	3.84	125	0.93	0.96
Native language is Spanish	F1HOMLNG = 2	#	#	#	119	†	†
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.9	1.43	1.56	118	0.84	0.91
At age 30 expects to be in the military	F1OCC30 = 7	2.0	1.50	1.30	118	1.34	1.16
At age 30 expects to be an operative	F1OCC30 = 8	0.8	0.76	0.80	118	0.91	0.95
At age 30 expects to be a professional (group b)	F1OCC30 = 10	9.5	3.38	2.71	118	1.55	1.25
At age 30 expects to be in a technical field	F1OCC30 = 16	4.1	2.30	1.83	118	1.58	1.26
At age 30 doesn't know what expects to be	F1OCC30 = -1	41.3	5.15	4.55	118	1.28	1.13
Mathematics test score	F1TXM1IR = 0-85	41.3	1.66	1.23	110	1.83	1.35
Summary statistics							
Mean						1.51	1.22
Minimum						0.84	0.91
Median						1.55	1.25
Maximum						2.61	1.61
Standard deviation						0.44	0.18

† Not applicable.
# Rounds to zero.
NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-5. Student design effects, by item using first follow-up questionnaire weight—Asian: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.9	1.26	0.87	1476	2.09	1.45
Most likely to receive a GED	F1S15 = 5	0.7	0.21	0.22	1476	0.90	0.95
Already took the SAT or ACT	F1S21C = 3	75.9	1.92	1.13	1424	2.86	1.69
Already took an AP test	F1S21D = 3	29.4	2.54	1.22	1392	4.33	2.08
Had something stolen at school at least once	F1S25A = 2,3	27.4	2.10	1.40	1022	2.26	1.50
Was offered drugs at school at least once	F1S25B = 2,3	13.3	1.80	1.06	1023	2.88	1.70
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	13.3	1.27	0.89	1464	2.04	1.43
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	13.7	1.34	0.90	1470	2.24	1.50
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	29.4	1.88	1.45	992	1.69	1.30
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	51.2	1.95	1.29	1504	2.28	1.51
Uses the computer at home once or twice a week	F1S37A = 4	19.1	1.48	1.01	1517	2.15	1.47
Rarely or never performs community service	F1S39C = 1	51.8	1.93	1.29	1505	2.23	1.49
Being successful in line of work is very important	F1S40A = 3	88.6	1.01	0.82	1521	1.52	1.23
Marrying the right person is very important	F1S40B = 3	79.7	1.31	1.03	1520	1.62	1.27
Having lots of money is very important	F1S40C = 3	42.6	1.85	1.27	1519	2.12	1.45
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.9	1.56	1.20	1519	1.71	1.31
Mother expects student to graduate from college, nothing more	F1S43A = 6	30.9	1.49	1.21	1468	1.52	1.23
Plans to continue education right after high school	F1S47 = 2	89.6	1.28	0.81	1436	2.52	1.59
Plans to hold a part-time job right after school	F1S53 = 2	52.1	1.89	1.32	1433	2.04	1.43
Volunteered with a youth organization	F1S63A = 1	17.6	1.71	1.43	712	1.44	1.20
Often discusses grades with parents	F1S64D = 3	45.9	1.91	1.33	1409	2.07	1.44
Lives with mother only	F1FCOMP = 5	9.9	0.89	0.77	1526	1.35	1.16
Native language is Spanish	F1HOMLNG = 2	0.4	0.28	0.16	1480	2.94	1.72
At age 30 expects to be a manager, administrator	F1OCC30 = 6	4.0	0.94	0.51	1479	3.45	1.86
At age 30 expects to be in the military	F1OCC30 = 7	0.5	0.20	0.19	1479	1.09	1.04
At age 30 expects to be an operative	F1OCC30 = 8	#	0.04	0.05	1479	0.54	0.74
At age 30 expects to be a professional (group b)	F1OCC30 = 10	20.4	1.43	1.05	1479	1.86	1.36
At age 30 expects to be in a technical field	F1OCC30 = 16	5.1	0.82	0.57	1479	2.07	1.44
At age 30 doesn't know what expects to be	F1OCC30 = -1	36.6	1.73	1.25	1479	1.91	1.38
Mathematics test score	F1TXM1IR = 0-85	54.1	0.90	0.42	1439	4.58	2.14
Summary statistics							
Mean						2.14	1.44
Minimum						0.54	0.74
Median						2.07	1.44
Maximum						4.58	2.14
Standard deviation						0.88	0.29

Rounds to zero.
NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-6. Student design effects, by item using first follow-up questionnaire weight—Black or African American: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	9.42	0.93	0.68	1826	1.84	1.36
Most likely to receive a GED	F1S15 = 5	2.94	0.44	0.40	1826	1.25	1.12
Already took the SAT or ACT	F1S21C = 3	55.23	1.50	1.20	1709	1.56	1.25
Already took an AP test	F1S21D = 3	5.15	0.59	0.54	1664	1.19	1.09
Had something stolen at school at least once	F1S25A = 2,3	32.83	1.61	1.36	1200	1.40	1.18
Was offered drugs at school at least once	F1S25B = 2,3	20.58	1.48	1.17	1199	1.60	1.27
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	17.78	0.98	0.90	1800	1.18	1.09
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	17.28	1.23	0.89	1798	1.89	1.38
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	25.19	1.41	1.33	1072	1.12	1.06
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	73.27	1.20	1.01	1906	1.41	1.19
Uses the computer at home once or twice a week	F1S37A = 4	26.94	0.97	1.00	1963	0.93	0.97
Rarely or never performs community service	F1S39C = 1	64.49	1.36	1.09	1943	1.57	1.25
Being successful in line of work is very important	F1S40A = 3	93.77	0.64	0.55	1966	1.39	1.18
Marrying the right person is very important	F1S40B = 3	75.59	1.15	0.97	1964	1.41	1.19
Having lots of money is very important	F1S40C = 3	55.70	1.30	1.12	1964	1.34	1.16
Expects to earn a 4-year degree, nothing more	F1S42 = 6	29.67	1.21	1.03	1966	1.38	1.17
Mother expects student to graduate from college, nothing more	F1S43A = 6	32.80	1.17	1.07	1912	1.19	1.09
Plans to continue education right after high school	F1S47 = 2	78.34	1.24	0.99	1732	1.57	1.25
Plans to hold a part-time job right after school	F1S53 = 2	46.48	1.39	1.20	1724	1.33	1.15
Volunteered with a youth organization	F1S63A = 1	25.38	2.17	1.66	686	1.71	1.31
Often discusses grades with parents	F1S64D = 3	59.47	1.55	1.20	1687	1.68	1.29
Lives with mother only	F1FCOMP = 5	37.81	1.32	1.09	1984	1.47	1.21
Native language is Spanish	F1HOMLNG = 2	0.59	0.22	0.18	1888	1.62	1.27
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.96	0.45	0.39	1898	1.33	1.16
At age 30 expects to be in the military	F1OCC30 = 7	0.69	0.26	0.19	1898	1.83	1.35
At age 30 expects to be an operative	F1OCC30 = 8	0.84	0.26	0.21	1898	1.52	1.23
At age 30 expects to be a professional (group b)	F1OCC30 = 10	15.21	0.93	0.82	1898	1.28	1.13
At age 30 expects to be in a technical field	F1OCC30 = 16	5.39	0.68	0.52	1898	1.70	1.30
At age 30 doesn't know what expects to be	F1OCC30 = -1	26.13	1.27	1.01	1898	1.59	1.26
Mathematics test score	F1TXM1IR = 0-85	38.79	0.45	0.29	1729	2.36	1.54
Summary statistics							
Mean						1.49	1.21
Minimum						0.93	0.97
Median						1.44	1.20
Maximum						2.36	1.54
Standard deviation						0.28	0.11

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-7. Student design effects, by item using first follow-up questionnaire weight—Hispanic or Latino: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	8.5	0.85	0.62	2022	1.88	1.37
Most likely to receive a GED	F1S15 = 5	3.2	0.48	0.39	2022	1.50	1.22
Already took the SAT or ACT	F1S21C = 3	44.2	1.66	1.14	1885	2.10	1.45
Already took an AP test	F1S21D = 3	13.3	1.07	0.79	1836	1.83	1.35
Had something stolen at school at least once	F1S25A = 2,3	26.7	1.60	1.23	1300	1.71	1.31
Was offered drugs at school at least once	F1S25B = 2,3	23.3	1.51	1.17	1297	1.65	1.28
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	12.5	0.81	0.74	2000	1.19	1.09
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	11.1	0.78	0.70	2002	1.24	1.11
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.1	1.48	1.24	1197	1.42	1.19
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	60.6	1.26	1.06	2137	1.43	1.20
Uses the computer at home once or twice a week	F1S37A = 4	28.4	1.28	0.96	2194	1.76	1.33
Rarely or never performs community service	F1S39C = 1	69.8	1.08	0.98	2180	1.21	1.10
Being successful in line of work is very important	F1S40A = 3	89.3	0.94	0.66	2195	2.01	1.42
Marrying the right person is very important	F1S40B = 3	77.3	1.14	0.89	2194	1.63	1.28
Having lots of money is very important	F1S40C = 3	41.2	1.26	1.05	2198	1.44	1.20
Expects to earn a 4-year degree, nothing more	F1S42 = 6	26.2	1.23	0.94	2200	1.72	1.31
Mother expects student to graduate from college, nothing more	F1S43A = 6	33.0	1.03	1.02	2136	1.03	1.02
Plans to continue education right after high school	F1S47 = 2	72.3	1.44	1.02	1924	1.98	1.41
Plans to hold a part-time job right after school	F1S53 = 2	55.7	1.36	1.14	1905	1.43	1.20
Volunteered with a youth organization	F1S63A = 1	21.9	1.84	1.55	715	1.41	1.19
Often discusses grades with parents	F1S64D = 3	54.2	1.24	1.15	1863	1.15	1.07
Lives with mother only	F1FCOMP = 5	19.9	1.14	0.85	2218	1.79	1.34
Native language is Spanish	F1HOMLNG = 2	50.8	1.99	1.08	2125	3.37	1.83
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.4	0.36	0.34	2126	1.18	1.09
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.26	0.22	2126	1.36	1.16
At age 30 expects to be an operative	F1OCC30 = 8	0.5	0.19	0.15	2126	1.57	1.25
At age 30 expects to be a professional (group b)	F1OCC30 = 10	12.9	0.81	0.73	2126	1.23	1.11
At age 30 expects to be in a technical field	F1OCC30 = 16	5.4	0.56	0.49	2126	1.32	1.15
At age 30 doesn't know what expects to be	F1OCC30 = -1	32.1	1.02	1.01	2126	1.02	1.01
Mathematics test score	F1TXM1IR = 0-85	41.2	0.47	0.31	1915	2.26	1.50
Summary statistics							
Mean						1.59	1.25
Minimum						1.02	1.01
Median						1.47	1.21
Maximum						3.37	1.83
Standard deviation						0.46	0.17

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-8. Student design effects, by item using first follow-up questionnaire weight—More than one race: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	10.4	1.45	1.21	635	1.43	1.19
Most likely to receive a GED	F1S15 = 5	2.7	0.99	0.64	635	2.40	1.55
Already took the SAT or ACT	F1S21C = 3	60.3	2.67	1.99	604	1.80	1.34
Already took an AP test	F1S21D = 3	13.2	1.81	1.39	596	1.71	1.31
Had something stolen at school at least once	F1S25A = 2,3	31.6	2.83	2.17	459	1.69	1.30
Was offered drugs at school at least once	F1S25B = 2,3	23.4	2.81	1.98	459	2.03	1.42
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.2	1.76	1.39	631	1.60	1.26
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	18.0	1.86	1.53	630	1.47	1.21
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	22.0	2.64	1.99	435	1.76	1.33
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	59.9	2.55	1.90	663	1.79	1.34
Uses the computer at home once or twice a week	F1S37A = 4	24.3	2.17	1.65	674	1.73	1.31
Rarely or never performs community service	F1S39C = 1	59.8	2.46	1.90	668	1.68	1.30
Being successful in line of work is very important	F1S40A = 3	87.3	1.72	1.29	671	1.79	1.34
Marrying the right person is very important	F1S40B = 3	79.1	1.88	1.57	671	1.44	1.20
Having lots of money is very important	F1S40C = 3	36.2	2.37	1.85	673	1.64	1.28
Expects to earn a 4-year degree, nothing more	F1S42 = 6	34.1	2.31	1.83	673	1.59	1.26
Mother expects student to graduate from college, nothing more	F1S43A = 6	38.4	2.55	1.92	643	1.77	1.33
Plans to continue education right after high school	F1S47 = 2	71.8	2.56	1.81	618	1.99	1.41
Plans to hold a part-time job right after school	F1S53 = 2	47.0	2.53	2.02	609	1.56	1.25
Volunteered with a youth organization	F1S63A = 1	29.5	3.75	2.62	305	2.05	1.43
Often discusses grades with parents	F1S64D = 3	54.9	2.81	2.03	602	1.91	1.38
Lives with mother only	F1FCOMP = 5	21.9	1.91	1.59	678	1.44	1.20
Native language is Spanish	F1HOMLNG = 2	0.7	0.42	0.33	661	1.66	1.29
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.77	0.64	663	1.45	1.21
At age 30 expects to be in the military	F1OCC30 = 7	2.2	0.87	0.57	663	2.27	1.51
At age 30 expects to be an operative	F1OCC30 = 8	0.2	0.18	0.16	663	1.18	1.08
At age 30 expects to be a professional (group b)	F1OCC30 = 10	10.3	1.39	1.18	663	1.39	1.18
At age 30 expects to be in a technical field	F1OCC30 = 16	4.4	1.00	0.80	663	1.58	1.26
At age 30 doesn't know what expects to be	F1OCC30 = -1	30.2	2.35	1.78	663	1.74	1.32
Mathematics test score	F1TXM1IR = 0-85	47.5	0.81	0.60	611	1.81	1.34
Summary statistics							
Mean						1.71	1.30
Minimum						1.18	1.08
Median						1.70	1.30
Maximum						2.40	1.55
Standard deviation						0.26	0.10

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-9. Student design effects, by item using first follow-up questionnaire weight—White: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	14.9	0.63	0.39	8160	2.52	1.59
Most likely to receive a GED	F1S15 = 5	1.6	0.18	0.14	8160	1.62	1.27
Already took the SAT or ACT	F1S21C = 3	70.5	0.84	0.52	7824	2.65	1.63
Already took an AP test	F1S21D = 3	16.3	0.69	0.42	7581	2.65	1.63
Had something stolen at school at least once	F1S25A = 2,3	23.7	0.67	0.53	6318	1.56	1.25
Was offered drugs at school at least once	F1S25B = 2,3	20.6	0.70	0.51	6319	1.90	1.38
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.5	0.50	0.39	8084	1.66	1.29
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	15.5	0.59	0.40	8077	2.14	1.46
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.3	0.75	0.55	6060	1.86	1.36
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	49.8	0.69	0.55	8358	1.58	1.26
Uses the computer at home once or twice a week	F1S37A = 4	24.0	0.63	0.47	8422	1.83	1.35
Rarely or never performs community service	F1S39C = 1	58.2	0.75	0.54	8349	1.92	1.39
Being successful in line of work is very important	F1S40A = 3	90.7	0.41	0.32	8420	1.70	1.30
Marrying the right person is very important	F1S40B = 3	82.5	0.53	0.41	8414	1.65	1.28
Having lots of money is very important	F1S40C = 3	28.9	0.66	0.49	8415	1.79	1.34
Expects to earn a 4-year degree, nothing more	F1S42 = 6	33.2	0.60	0.51	8418	1.38	1.18
Mother expects student to graduate from college, nothing more	F1S43A = 6	41.2	0.69	0.54	8184	1.61	1.27
Plans to continue education right after high school	F1S47 = 2	78.7	0.65	0.46	7978	2.01	1.42
Plans to hold a part-time job right after school	F1S53 = 2	48.7	0.72	0.56	7903	1.64	1.28
Volunteered with a youth organization	F1S63A = 1	29.6	1.03	0.70	4228	2.16	1.47
Often discusses grades with parents	F1S64D = 3	51.0	0.68	0.56	7835	1.44	1.20
Lives with mother only	F1FCOMP = 5	14.1	0.50	0.38	8458	1.72	1.31
Native language is Spanish	F1HOMLNG = 2	0.1	0.05	0.04	8350	1.97	1.40
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.0	0.21	0.19	8285	1.31	1.15
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.14	0.11	8285	1.51	1.23
At age 30 expects to be an operative	F1OCC30 = 8	0.7	0.11	0.09	8285	1.51	1.23
At age 30 expects to be a professional (group b)	F1OCC30 = 10	13.3	0.46	0.37	8285	1.55	1.25
At age 30 expects to be in a technical field	F1OCC30 = 16	4.7	0.31	0.23	8285	1.73	1.31
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.9	0.61	0.50	8285	1.47	1.21
Mathematics test score	F1TXM1IR = 0-85	51.9	0.28	0.16	7898	3.11	1.76
Summary statistics							
Mean						1.84	1.35
Minimum						1.31	1.15
Median						1.71	1.31
Maximum						3.11	1.76
Standard deviation						0.42	0.15

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-10. Student design effects, by item using first follow-up questionnaire weight—Public: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.7	0.50	0.32	11014	2.46	1.57
Most likely to receive a GED	F1S15 = 5	2.2	0.17	0.14	11014	1.42	1.19
Already took the SAT or ACT	F1S21C = 3	61.6	0.83	0.48	10378	3.02	1.74
Already took an AP test	F1S21D = 3	14.0	0.59	0.34	10129	2.94	1.71
Had something stolen at school at least once	F1S25A = 2,3	25.8	0.60	0.49	7830	1.48	1.21
Was offered drugs at school at least once	F1S25B = 2,3	21.5	0.63	0.46	7829	1.83	1.35
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	13.9	0.41	0.33	10887	1.51	1.23
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	14.6	0.48	0.34	10889	2.03	1.43
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	23.5	0.63	0.49	7358	1.65	1.28
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	56.2	0.59	0.46	11454	1.62	1.27
Uses the computer at home once or twice a week	F1S37A = 4	25.5	0.52	0.40	11640	1.68	1.29
Rarely or never performs community service	F1S39C = 1	62.1	0.60	0.45	11536	1.78	1.34
Being successful in line of work is very important	F1S40A = 3	90.7	0.34	0.27	11640	1.64	1.28
Marrying the right person is very important	F1S40B = 3	79.7	0.48	0.37	11634	1.62	1.27
Having lots of money is very important	F1S40C = 3	36.4	0.60	0.45	11639	1.83	1.35
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.1	0.52	0.43	11647	1.45	1.20
Mother expects student to graduate from college, nothing more	F1S43A = 6	37.7	0.57	0.46	11294	1.55	1.25
Plans to continue education right after high school	F1S47 = 2	76.4	0.60	0.41	10613	2.09	1.45
Plans to hold a part-time job right after school	F1S53 = 2	49.5	0.61	0.49	10500	1.57	1.25
Volunteered with a youth organization	F1S63A = 1	27.7	0.89	0.66	4610	1.81	1.34
Often discusses grades with parents	F1S64D = 3	52.3	0.60	0.49	10339	1.48	1.22
Lives with mother only	F1FCOMP = 5	19.2	0.47	0.36	11724	1.71	1.31
Native language is Spanish	F1HOMLNG = 2	8.8	0.67	0.27	11415	6.27	2.50
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.9	0.18	0.16	11360	1.28	1.13
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.11	0.10	11360	1.40	1.19
At age 30 expects to be an operative	F1OCC30 = 8	0.7	0.10	0.08	11360	1.56	1.25
At age 30 expects to be a professional (group b)	F1OCC30 = 10	13.1	0.38	0.32	11360	1.42	1.19
At age 30 expects to be in a technical field	F1OCC30 = 16	5.1	0.25	0.21	11360	1.44	1.20
At age 30 doesn't know what expects to be	F1OCC30 = -1	30.0	0.49	0.43	11360	1.31	1.14
Mathematics test score	F1TXM1IR = 0-85	47.6	0.30	0.15	10518	4.28	2.07
Summary statistics							
Mean						1.97	1.37
Minimum						1.28	1.13
Median						1.63	1.28
Maximum						6.27	2.50
Standard deviation						1.02	0.29

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-11. Student design effects, by item using first follow-up questionnaire weight—Catholic: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.5	1.38	0.76	1885	3.29	1.81
Most likely to receive a GED	F1S15 = 5	0.5	0.16	0.16	1885	1.01	1.01
Already took the SAT or ACT	F1S21C = 3	91.4	1.15	0.65	1874	3.14	1.77
Already took an AP test	F1S21D = 3	22.4	2.05	0.99	1793	4.31	2.08
Had something stolen at school at least once	F1S25A = 2,3	26.0	1.79	1.12	1541	2.57	1.60
Was offered drugs at school at least once	F1S25B = 2,3	17.7	1.35	0.97	1543	1.93	1.39
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	22.1	1.66	0.96	1877	2.99	1.73
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	15.3	1.34	0.83	1878	2.60	1.61
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	36.0	1.98	1.24	1500	2.56	1.60
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	52.4	2.10	1.15	1882	3.32	1.82
Uses the computer at home once or twice a week	F1S37A = 4	16.8	1.06	0.86	1893	1.51	1.23
Rarely or never performs community service	F1S39C = 1	43.2	1.80	1.14	1875	2.46	1.57
Being successful in line of work is very important	F1S40A = 3	90.9	0.66	0.66	1891	1.00	1.00
Marrying the right person is very important	F1S40B = 3	87.1	0.93	0.77	1891	1.44	1.20
Having lots of money is very important	F1S40C = 3	29.2	1.62	1.05	1889	2.41	1.55
Expects to earn a 4-year degree, nothing more	F1S42 = 6	37.9	1.34	1.12	1890	1.44	1.20
Mother expects student to graduate from college, nothing more	F1S43A = 6	42.6	1.62	1.15	1841	1.97	1.40
Plans to continue education right after high school	F1S47 = 2	94.0	0.77	0.55	1875	1.95	1.40
Plans to hold a part-time job right after school	F1S53 = 2	51.2	1.69	1.15	1876	2.15	1.47
Volunteered with a youth organization	F1S63A = 1	31.8	1.88	1.30	1289	2.09	1.45
Often discusses grades with parents	F1S64D = 3	56.7	1.28	1.15	1866	1.24	1.11
Lives with mother only	F1FCOMP = 5	12.4	0.75	0.76	1899	0.97	0.99
Native language is Spanish	F1HOMLNG = 2	3.0	0.95	0.39	1879	5.80	2.41
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.3	0.35	0.41	1877	0.72	0.85
At age 30 expects to be in the military	F1OCC30 = 7	0.8	0.26	0.20	1877	1.61	1.27
At age 30 expects to be an operative	F1OCC30 = 8	#	#	#	1877	†	†
At age 30 expects to be a professional (group b)	F1OCC30 = 10	17.4	1.23	0.88	1877	1.97	1.40
At age 30 expects to be in a technical field	F1OCC30 = 16	3.6	0.51	0.43	1877	1.45	1.20
At age 30 doesn't know what expects to be	F1OCC30 = -1	30.9	1.13	1.07	1877	1.13	1.06
Mathematics test score	F1TXM1IR = 0-85	55.9	0.61	0.29	1880	4.30	2.07
Summary statistics							
Mean						2.25	1.46
Minimum						0.72	0.85
Median						1.97	1.40
Maximum						5.80	2.41
Standard deviation						1.16	0.37

† Not applicable.
# Rounds to zero.
NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-12. Student design effects, by item using first follow-up questionnaire weight—Other private: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	15.1	1.66	0.98	1339	2.87	1.69
Most likely to receive a GED	F1S15 = 5	0.6	0.16	0.20	1339	0.61	0.78
Already took the SAT or ACT	F1S21C = 3	85.7	2.47	0.97	1303	6.48	2.54
Already took an AP test	F1S21D = 3	24.7	3.11	1.22	1255	6.50	2.55
Had something stolen at school at least once	F1S25A = 2,3	24.2	2.20	1.35	1004	2.66	1.63
Was offered drugs at school at least once	F1S25B = 2,3	7.9	1.05	0.85	1002	1.50	1.23
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	20.9	2.40	1.11	1331	4.62	2.15
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	26.7	3.24	1.22	1325	7.07	2.66
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	32.7	2.27	1.51	966	2.26	1.50
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	39.4	2.37	1.33	1355	3.20	1.79
Uses the computer at home once or twice a week	F1S37A = 4	20.3	2.21	1.09	1359	4.12	2.03
Rarely or never performs community service	F1S39C = 1	50.2	2.82	1.36	1355	4.29	2.07
Being successful in line of work is very important	F1S40A = 3	89.5	1.06	0.83	1364	1.64	1.28
Marrying the right person is very important	F1S40B = 3	86.8	1.04	0.92	1360	1.30	1.14
Having lots of money is very important	F1S40C = 3	26.4	1.68	1.19	1363	1.99	1.41
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.7	1.72	1.26	1361	1.87	1.37
Mother expects student to graduate from college, nothing more	F1S43A = 6	41.4	1.77	1.35	1325	1.71	1.31
Plans to continue education right after high school	F1S47 = 2	90.5	1.58	0.81	1314	3.79	1.95
Plans to hold a part-time job right after school	F1S53 = 2	49.6	2.18	1.38	1309	2.48	1.58
Volunteered with a youth organization	F1S63A = 1	22.6	1.59	1.50	778	1.13	1.06
Often discusses grades with parents	F1S64D = 3	53.0	1.90	1.38	1301	1.89	1.38
Lives with mother only	F1FCOMP = 5	12.9	1.27	0.91	1366	1.95	1.40
Native language is Spanish	F1HOMLNG = 2	2.8	1.29	0.45	1329	8.15	2.85
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.0	0.65	0.47	1332	1.93	1.39
At age 30 expects to be in the military	F1OCC30 = 7	0.8	0.26	0.24	1332	1.21	1.10
At age 30 expects to be an operative	F1OCC30 = 8	0.2	0.18	0.12	1332	2.41	1.55
At age 30 expects to be a professional (group b)	F1OCC30 = 10	21.7	1.70	1.13	1332	2.27	1.51
At age 30 expects to be in a technical field	F1OCC30 = 16	2.8	0.48	0.45	1332	1.14	1.07
At age 30 doesn't know what expects to be	F1OCC30 = -1	33.9	1.69	1.30	1332	1.70	1.30
Mathematics test score	F1TXM1IR = 0-85	57.3	0.92	0.38	1304	5.92	2.43
Summary statistics							
Mean						3.02	1.66
Minimum						0.61	0.78
Median						2.26	1.50
Maximum						8.15	2.85
Standard deviation						2.00	0.54

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-13. Student design effects, by item using first follow-up questionnaire weight—Low socioeconomic status (SES): 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	7.0	0.55	0.46	3145	1.45	1.20
Most likely to receive a GED	F1S15 = 5	3.4	0.40	0.33	3145	1.48	1.22
Already took the SAT or ACT	F1S21C = 3	41.6	1.28	0.91	2916	1.96	1.40
Already took an AP test	F1S21D = 3	7.3	0.67	0.49	2839	1.86	1.36
Had something stolen at school at least once	F1S25A = 2,3	26.5	1.17	0.97	2085	1.46	1.21
Was offered drugs at school at least once	F1S25B = 2,3	19.0	1.11	0.86	2083	1.66	1.29
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	12.5	0.74	0.60	3087	1.53	1.24
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	13.6	0.72	0.62	3092	1.35	1.16
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	21.1	1.18	0.93	1912	1.60	1.26
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	62.9	1.03	0.83	3405	1.53	1.24
Uses the computer at home once or twice a week	F1S37A = 4	25.5	0.90	0.74	3473	1.48	1.22
Rarely or never performs community service	F1S39C = 1	70.2	0.91	0.78	3442	1.35	1.16
Being successful in line of work is very important	F1S40A = 3	89.1	0.64	0.53	3477	1.47	1.21
Marrying the right person is very important	F1S40B = 3	77.3	0.90	0.71	3476	1.62	1.27
Having lots of money is very important	F1S40C = 3	41.5	0.97	0.84	3477	1.35	1.16
Expects to earn a 4-year degree, nothing more	F1S42 = 6	25.6	0.89	0.74	3483	1.46	1.21
Mother expects student to graduate from college, nothing more	F1S43A = 6	32.8	0.93	0.81	3353	1.32	1.15
Plans to continue education right after high school	F1S47 = 2	66.1	1.15	0.87	2990	1.76	1.33
Plans to hold a part-time job right after school	F1S53 = 2	48.1	1.14	0.92	2952	1.54	1.24
Volunteered with a youth organization	F1S63A = 1	23.8	1.62	1.35	997	1.43	1.20
Often discusses grades with parents	F1S64D = 3	51.7	1.09	0.93	2882	1.38	1.17
Lives with mother only	F1FCOMP = 5	26.8	1.00	0.75	3514	1.78	1.33
Native language is Spanish	F1HOMLNG = 2	22.3	1.71	0.71	3391	5.69	2.39
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.3	0.27	0.26	3372	1.12	1.06
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.20	0.18	3372	1.30	1.14
At age 30 expects to be an operative	F1OCC30 = 8	1.4	0.27	0.20	3372	1.79	1.34
At age 30 expects to be a professional (group b)	F1OCC30 = 10	11.5	0.61	0.55	3372	1.21	1.10
At age 30 expects to be in a technical field	F1OCC30 = 16	5.4	0.44	0.39	3372	1.30	1.14
At age 30 doesn't know what expects to be	F1OCC30 = -1	31.8	0.94	0.80	3372	1.37	1.17
Mathematics test score	F1TXM1IR = 0-85	40.1	0.36	0.24	2960	2.21	1.49
Summary statistics							
Mean						1.66	1.27
Minimum						1.12	1.06
Median						1.47	1.21
Maximum						5.69	2.39
Standard deviation						0.80	0.23

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-14. Student design effects, by item using first follow-up questionnaire weight—Middle socioeconomic status (SES): 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	11.3	0.54	0.38	6861	1.96	1.40
Most likely to receive a GED	F1S15 = 5	2.0	0.21	0.17	6861	1.56	1.25
Already took the SAT or ACT	F1S21C = 3	61.9	0.88	0.60	6524	2.15	1.47
Already took an AP test	F1S21D = 3	11.1	0.54	0.39	6357	1.88	1.37
Had something stolen at school at least once	F1S25A = 2,3	25.9	0.71	0.62	5016	1.32	1.15
Was offered drugs at school at least once	F1S25B = 2,3	22.2	0.83	0.59	5016	1.99	1.41
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	15.0	0.53	0.43	6805	1.51	1.23
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	14.9	0.60	0.43	6802	1.96	1.40
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	22.8	0.82	0.61	4733	1.79	1.34
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	56.7	0.76	0.59	7048	1.67	1.29
Uses the computer at home once or twice a week	F1S37A = 4	27.0	0.63	0.53	7145	1.42	1.19
Rarely or never performs community service	F1S39C = 1	63.4	0.74	0.57	7073	1.69	1.30
Being successful in line of work is very important	F1S40A = 3	91.1	0.45	0.34	7141	1.76	1.33
Marrying the right person is very important	F1S40B = 3	80.3	0.63	0.47	7136	1.76	1.33
Having lots of money is very important	F1S40C = 3	35.8	0.77	0.57	7140	1.84	1.36
Expects to earn a 4-year degree, nothing more	F1S42 = 6	33.4	0.64	0.56	7142	1.31	1.15
Mother expects student to graduate from college, nothing more	F1S43A = 6	39.2	0.75	0.59	6922	1.64	1.28
Plans to continue education right after high school	F1S47 = 2	76.4	0.69	0.52	6660	1.73	1.32
Plans to hold a part-time job right after school	F1S53 = 2	51.0	0.76	0.62	6594	1.53	1.24
Volunteered with a youth organization	F1S63A = 1	27.5	1.09	0.81	3040	1.82	1.35
Often discusses grades with parents	F1S64D = 3	53.0	0.79	0.62	6509	1.61	1.27
Lives with mother only	F1FCOMP = 5	19.0	0.58	0.46	7184	1.59	1.26
Native language is Spanish	F1HOMLNG = 2	4.7	0.35	0.25	7005	1.92	1.38
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.23	0.20	6983	1.37	1.17
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.16	0.12	6983	1.57	1.25
At age 30 expects to be an operative	F1OCC30 = 8	0.6	0.11	0.09	6983	1.59	1.26
At age 30 expects to be a professional (group b)	F1OCC30 = 10	11.7	0.43	0.38	6983	1.27	1.13
At age 30 expects to be in a technical field	F1OCC30 = 16	5.5	0.33	0.27	6983	1.47	1.21
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.6	0.62	0.55	6983	1.28	1.13
Mathematics test score	F1TXM1IR = 0-85	47.2	0.27	0.18	6605	2.43	1.56
Summary statistics							
Mean						1.68	1.29
Minimum						1.27	1.13
Median						1.66	1.29
Maximum						2.43	1.56
Standard deviation						0.27	0.10

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-15. Student design effects, by item using first follow-up questionnaire weight—High socioeconomic status (SES): 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	20.5	0.94	0.62	4232	2.30	1.52
Most likely to receive a GED	F1S15 = 5	1.1	0.23	0.16	4232	2.05	1.43
Already took the SAT or ACT	F1S21C = 3	86.3	0.78	0.54	4115	2.13	1.46
Already took an AP test	F1S21D = 3	27.8	1.20	0.71	3981	2.86	1.69
Had something stolen at school at least once	F1S25A = 2,3	24.9	1.06	0.76	3274	1.98	1.41
Was offered drugs at school at least once	F1S25B = 2,3	19.7	0.94	0.70	3275	1.85	1.36
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	15.4	0.74	0.56	4203	1.76	1.33
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	16.6	0.82	0.57	4198	2.05	1.43
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	29.9	1.05	0.81	3179	1.69	1.30
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	45.7	1.08	0.77	4238	1.99	1.41
Uses the computer at home once or twice a week	F1S37A = 4	20.5	0.94	0.62	4274	2.32	1.52
Rarely or never performs community service	F1S39C = 1	46.7	0.95	0.77	4251	1.55	1.25
Being successful in line of work is very important	F1S40A = 3	91.3	0.51	0.43	4277	1.40	1.18
Marrying the right person is very important	F1S40B = 3	83.3	0.75	0.57	4273	1.75	1.32
Having lots of money is very important	F1S40C = 3	29.9	0.98	0.70	4274	1.95	1.40
Expects to earn a 4-year degree, nothing more	F1S42 = 6	33.3	0.94	0.72	4273	1.71	1.31
Mother expects student to graduate from college, nothing more	F1S43A = 6	41.0	0.96	0.76	4185	1.60	1.26
Plans to continue education right after high school	F1S47 = 2	90.1	0.67	0.46	4152	2.10	1.45
Plans to hold a part-time job right after school	F1S53 = 2	48.3	0.97	0.78	4139	1.54	1.24
Volunteered with a youth organization	F1S63A = 1	29.8	1.30	0.89	2640	2.13	1.46
Often discusses grades with parents	F1S64D = 3	52.4	1.09	0.78	4115	1.94	1.39
Lives with mother only	F1FCOMP = 5	9.8	0.61	0.45	4291	1.83	1.35
Native language is Spanish	F1HOMLNG = 2	2.1	0.31	0.22	4227	1.91	1.38
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.8	0.40	0.29	4214	1.82	1.35
At age 30 expects to be in the military	F1OCC30 = 7	0.9	0.20	0.15	4214	1.81	1.35
At age 30 expects to be an operative	F1OCC30 = 8	0.1	0.05	0.04	4214	1.51	1.23
At age 30 expects to be a professional (group b)	F1OCC30 = 10	19.4	0.75	0.61	4214	1.50	1.23
At age 30 expects to be in a technical field	F1OCC30 = 16	3.3	0.36	0.28	4214	1.66	1.29
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.7	0.95	0.70	4214	1.83	1.35
Mathematics test score	F1TXM1IR = 0-85	57.2	0.35	0.21	4137	2.75	1.66
Summary statistics							
Mean						1.91	1.38
Minimum						1.40	1.18
Median						1.84	1.36
Maximum						2.86	1.69
Standard deviation						0.34	0.12

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-16. Student design effects, by item using first follow-up questionnaire weight—Urban: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.5	0.89	0.48	4756	3.46	1.86
Most likely to receive a GED	F1S15 = 5	2.3	0.30	0.22	4756	1.96	1.40
Already took the SAT or ACT	F1S21C = 3	63.7	1.60	0.72	4517	5.01	2.24
Already took an AP test	F1S21D = 3	18.2	1.24	0.58	4394	4.56	2.14
Had something stolen at school at least once	F1S25A = 2,3	27.5	1.10	0.77	3347	2.04	1.43
Was offered drugs at school at least once	F1S25B = 2,3	21.9	1.13	0.72	3349	2.48	1.58
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.0	0.76	0.51	4710	2.29	1.51
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	14.7	0.84	0.52	4710	2.64	1.62
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	27.7	1.17	0.79	3172	2.19	1.48
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	59.2	1.06	0.70	4937	2.29	1.51
Uses the computer at home once or twice a week	F1S37A = 4	24.0	0.96	0.60	5008	2.52	1.59
Rarely or never performs community service	F1S39C = 1	61.1	1.10	0.69	4967	2.51	1.58
Being successful in line of work is very important	F1S40A = 3	90.5	0.60	0.41	5014	2.11	1.45
Marrying the right person is very important	F1S40B = 3	78.6	0.85	0.58	5015	2.16	1.47
Having lots of money is very important	F1S40C = 3	39.1	1.01	0.69	5015	2.15	1.47
Expects to earn a 4-year degree, nothing more	F1S42 = 6	30.7	0.93	0.65	5010	2.05	1.43
Mother expects student to graduate from college, nothing more	F1S43A = 6	36.0	0.91	0.69	4846	1.74	1.32
Plans to continue education right after high school	F1S47 = 2	79.0	0.94	0.60	4594	2.43	1.56
Plans to hold a part-time job right after school	F1S53 = 2	50.9	1.10	0.74	4543	2.19	1.48
Volunteered with a youth organization	F1S63A = 1	26.6	1.62	0.91	2333	3.15	1.77
Often discusses grades with parents	F1S64D = 3	54.8	1.03	0.74	4477	1.93	1.39
Lives with mother only	F1FCOMP = 5	22.6	0.97	0.59	5051	2.71	1.65
Native language is Spanish	F1HOMLNG = 2	14.4	1.57	0.50	4896	9.83	3.14
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.30	0.23	4893	1.68	1.30
At age 30 expects to be in the military	F1OCC30 = 7	0.9	0.16	0.13	4893	1.38	1.17
At age 30 expects to be an operative	F1OCC30 = 8	0.5	0.19	0.10	4893	3.38	1.84
At age 30 expects to be a professional (group b)	F1OCC30 = 10	16.3	0.70	0.53	4893	1.77	1.33
At age 30 expects to be in a technical field	F1OCC30 = 16	4.7	0.45	0.30	4893	2.17	1.47
At age 30 doesn't know what expects to be	F1OCC30 = -1	30.1	0.78	0.66	4893	1.42	1.19
Mathematics test score	F1TXM1IR = 0-85	46.8	0.62	0.23	4559	7.27	2.70
Summary statistics							
Mean						2.85	1.64
Minimum						1.38	1.17
Median						2.24	1.50
Maximum						9.83	3.14
Standard deviation						1.78	0.42

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-17. Student design effects, by item using first follow-up questionnaire weight—Suburban: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.4	0.66	0.40	6881	2.73	1.65
Most likely to receive a GED	F1S15 = 5	2.0	0.21	0.17	6881	1.61	1.27
Already took the SAT or ACT	F1S21C = 3	65.0	1.04	0.59	6563	3.14	1.77
Already took an AP test	F1S21D = 3	14.1	0.77	0.44	6370	3.12	1.77
Had something stolen at school at least once	F1S25A = 2,3	25.6	0.80	0.61	5092	1.70	1.30
Was offered drugs at school at least once	F1S25B = 2,3	21.3	0.81	0.57	5091	2.01	1.42
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	15.3	0.54	0.44	6815	1.53	1.24
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	14.6	0.61	0.43	6815	2.03	1.43
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.2	0.81	0.62	4825	1.72	1.31
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	53.7	0.77	0.59	7056	1.67	1.29
Uses the computer at home once or twice a week	F1S37A = 4	24.9	0.67	0.51	7153	1.74	1.32
Rarely or never performs community service	F1S39C = 1	60.7	0.74	0.58	7089	1.65	1.28
Being successful in line of work is very important	F1S40A = 3	90.8	0.42	0.34	7155	1.54	1.24
Marrying the right person is very important	F1S40B = 3	81.1	0.62	0.46	7144	1.77	1.33
Having lots of money is very important	F1S40C = 3	35.1	0.84	0.56	7149	2.19	1.48
Expects to earn a 4-year degree, nothing more	F1S42 = 6	32.2	0.69	0.55	7163	1.58	1.26
Mother expects student to graduate from college, nothing more	F1S43A = 6	39.1	0.77	0.58	6980	1.74	1.32
Plans to continue education right after high school	F1S47 = 2	78.0	0.79	0.51	6683	2.42	1.56
Plans to hold a part-time job right after school	F1S53 = 2	49.3	0.79	0.61	6633	1.66	1.29
Volunteered with a youth organization	F1S63A = 1	27.8	1.04	0.79	3213	1.73	1.31
Often discusses grades with parents	F1S64D = 3	51.7	0.80	0.62	6558	1.69	1.30
Lives with mother only	F1FCOMP = 5	17.1	0.56	0.44	7197	1.59	1.26
Native language is Spanish	F1HOMLNG = 2	6.7	0.73	0.30	7038	6.08	2.46
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.1	0.24	0.21	7017	1.34	1.16
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.17	0.13	7017	1.76	1.33
At age 30 expects to be an operative	F1OCC30 = 8	0.6	0.11	0.09	7017	1.39	1.18
At age 30 expects to be a professional (group b)	F1OCC30 = 10	12.6	0.50	0.40	7017	1.59	1.26
At age 30 expects to be in a technical field	F1OCC30 = 16	4.8	0.32	0.26	7017	1.59	1.26
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.7	0.70	0.55	7017	1.64	1.28
Mathematics test score	F1TXM1IR = 0-85	49.1	0.39	0.19	6637	4.46	2.11
Summary statistics							
Mean						2.08	1.41
Minimum						1.34	1.16
Median						1.71	1.31
Maximum						6.08	2.46
Standard deviation						1.00	0.29

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-18. Student design effects, by item using first follow-up questionnaire weight—Rural: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	14.1	0.97	0.68	2601	2.04	1.43
Most likely to receive a GED	F1S15 = 5	2.2	0.33	0.29	2601	1.36	1.17
Already took the SAT or ACT	F1S21C = 3	61.5	1.57	0.98	2475	2.59	1.61
Already took an AP test	F1S21D = 3	11.3	0.90	0.65	2413	1.96	1.40
Had something stolen at school at least once	F1S25A = 2,3	23.8	1.12	0.97	1936	1.34	1.16
Was offered drugs at school at least once	F1S25B = 2,3	18.3	1.24	0.88	1934	1.98	1.41
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	13.5	0.84	0.67	2570	1.53	1.24
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	16.7	1.20	0.74	2567	2.67	1.63
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	21.2	1.36	0.96	1827	2.02	1.42
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	54.3	1.20	0.96	2698	1.57	1.25
Uses the computer at home once or twice a week	F1S37A = 4	26.7	1.08	0.85	2731	1.63	1.28
Rarely or never performs community service	F1S39C = 1	61.0	1.45	0.94	2710	2.41	1.55
Being successful in line of work is very important	F1S40A = 3	90.5	0.82	0.56	2726	2.11	1.45
Marrying the right person is very important	F1S40B = 3	80.9	0.96	0.75	2726	1.64	1.28
Having lots of money is very important	F1S40C = 3	32.2	1.12	0.90	2727	1.57	1.25
Expects to earn a 4-year degree, nothing more	F1S42 = 6	30.6	0.94	0.88	2725	1.14	1.07
Mother expects student to graduate from college, nothing more	F1S43A = 6	38.5	1.19	0.95	2634	1.56	1.25
Plans to continue education right after high school	F1S47 = 2	75.1	1.34	0.86	2525	2.41	1.55
Plans to hold a part-time job right after school	F1S53 = 2	48.6	1.26	1.00	2509	1.59	1.26
Volunteered with a youth organization	F1S63A = 1	29.4	1.80	1.35	1131	1.77	1.33
Often discusses grades with parents	F1S64D = 3	51.3	1.13	1.01	2471	1.26	1.12
Lives with mother only	F1FCOMP = 5	16.7	0.95	0.71	2741	1.77	1.33
Native language is Spanish	F1HOMLNG = 2	3.5	0.38	0.36	2689	1.11	1.06
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.36	0.32	2659	1.28	1.13
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.23	0.20	2659	1.34	1.16
At age 30 expects to be an operative	F1OCC30 = 8	0.9	0.22	0.19	2659	1.45	1.21
At age 30 expects to be a professional (group b)	F1OCC30 = 10	11.9	0.74	0.63	2659	1.39	1.18
At age 30 expects to be in a technical field	F1OCC30 = 16	5.5	0.48	0.44	2659	1.16	1.08
At age 30 doesn't know what expects to be	F1OCC30 = -1	31.2	0.92	0.90	2659	1.05	1.02
Mathematics test score	F1TXM1IR = 0-85	48.4	0.45	0.29	2506	2.45	1.57
Summary statistics							
Mean						1.71	1.29
Minimum						1.05	1.02
Median						1.58	1.26
Maximum						2.67	1.63
Standard deviation						0.46	0.17

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-19. Student design effects, by item using base-year to first follow-up panel weight—All: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.9	0.47	0.28	13984	2.78	1.67
Most likely to receive a GED	F1S15 = 5	2.1	0.16	0.12	13984	1.75	1.32
Already took the SAT or ACT	F1S21C = 3	64.6	0.76	0.41	13317	3.40	1.84
Already took an AP test	F1S21D = 3	14.9	0.57	0.31	12954	3.34	1.83
Had something stolen at school at least once	F1S25A = 2,3	25.7	0.56	0.43	10355	1.73	1.31
Was offered drugs at school at least once	F1S25B = 2,3	20.8	0.58	0.40	10354	2.13	1.46
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.7	0.40	0.30	13843	1.78	1.33
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	15.0	0.47	0.30	13842	2.35	1.53
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.5	0.60	0.43	9805	1.89	1.37
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	55.5	0.56	0.41	14449	1.83	1.35
Uses the computer at home once or twice a week	F1S37A = 4	25.1	0.50	0.36	14629	1.96	1.40
Rarely or never performs community service	F1S39C = 1	60.8	0.58	0.41	14506	2.07	1.44
Being successful in line of work is very important	F1S40A = 3	90.8	0.32	0.24	14631	1.80	1.34
Marrying the right person is very important	F1S40B = 3	80.3	0.45	0.33	14620	1.88	1.37
Having lots of money is very important	F1S40C = 3	35.5	0.57	0.40	14625	2.05	1.43
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.6	0.49	0.38	14637	1.63	1.28
Mother expects student to graduate from college, nothing more	F1S43A = 6	38.4	0.54	0.41	14210	1.74	1.32
Plans to continue education right after high school	F1S47 = 2	77.9	0.55	0.36	13560	2.38	1.54
Plans to hold a part-time job right after school	F1S53 = 2	49.8	0.57	0.43	13434	1.74	1.32
Volunteered with a youth organization	F1S63A = 1	27.8	0.80	0.55	6664	2.11	1.45
Often discusses grades with parents	F1S64D = 3	52.6	0.56	0.43	13272	1.66	1.29
Lives with mother only	F1FCOMP = 5	18.7	0.45	0.32	14713	1.97	1.40
Native language is Spanish	F1HOMLNG = 2	8.0	0.58	0.23	14362	6.59	2.57
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.0	0.17	0.14	14322	1.43	1.20
At age 30 expects to be in the military	F1OCC30 = 7	1.0	0.11	0.08	14322	1.56	1.25
At age 30 expects to be an operative	F1OCC30 = 8	0.6	0.09	0.07	14322	1.85	1.36
At age 30 expects to be a professional (group b)	F1OCC30 = 10	13.7	0.36	0.29	14322	1.60	1.26
At age 30 expects to be in a technical field	F1OCC30 = 16	4.9	0.23	0.18	14322	1.62	1.27
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.9	0.46	0.38	14322	1.47	1.21
Mathematics test score	F1TXM1IR = 0-85	48.5	0.28	0.13	13448	4.72	2.17
Summary statistics							
Mean						2.23	1.46
Minimum						1.43	1.20
Median						1.86	1.37
Maximum						6.59	2.57
Standard deviation						1.07	0.30

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-20. Student design effects, by item using base-year to first follow-up panel weight—Male: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	10.8	0.54	0.37	6917	2.12	1.46
Most likely to receive a GED	F1S15 = 5	2.5	0.25	0.19	6917	1.80	1.34
Already took the SAT or ACT	F1S21C = 3	59.9	0.92	0.60	6570	2.33	1.53
Already took an AP test	F1S21D = 3	14.2	0.67	0.44	6353	2.33	1.53
Had something stolen at school at least once	F1S25A = 2,3	29.6	0.82	0.64	5112	1.64	1.28
Was offered drugs at school at least once	F1S25B = 2,3	27.3	0.86	0.62	5115	1.92	1.39
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	18.2	0.62	0.47	6833	1.74	1.32
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	10.9	0.51	0.38	6833	1.82	1.35
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.2	0.81	0.62	4838	1.75	1.32
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	57.2	0.78	0.58	7198	1.78	1.33
Uses the computer at home once or twice a week	F1S37A = 4	23.1	0.66	0.49	7281	1.79	1.34
Rarely or never performs community service	F1S39C = 1	66.5	0.75	0.56	7216	1.80	1.34
Being successful in line of work is very important	F1S40A = 3	89.3	0.49	0.36	7276	1.80	1.34
Marrying the right person is very important	F1S40B = 3	79.6	0.62	0.47	7270	1.69	1.30
Having lots of money is very important	F1S40C = 3	43.1	0.76	0.58	7271	1.71	1.31
Expects to earn a 4-year degree, nothing more	F1S42 = 6	32.2	0.71	0.55	7283	1.66	1.29
Mother expects student to graduate from college, nothing more	F1S43A = 6	40.7	0.71	0.59	7034	1.45	1.21
Plans to continue education right after high school	F1S47 = 2	72.6	0.78	0.54	6702	2.07	1.44
Plans to hold a part-time job right after school	F1S53 = 2	46.5	0.81	0.61	6641	1.76	1.33
Volunteered with a youth organization	F1S63A = 1	33.7	1.24	0.88	2885	2.00	1.41
Often discusses grades with parents	F1S64D = 3	48.1	0.86	0.62	6525	1.93	1.39
Lives with mother only	F1FCOMP = 5	17.9	0.59	0.45	7328	1.73	1.31
Native language is Spanish	F1HOMLNG = 2	7.3	0.56	0.31	7122	3.31	1.82
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.3	0.24	0.21	7084	1.28	1.13
At age 30 expects to be in the military	F1OCC30 = 7	1.7	0.19	0.15	7084	1.61	1.27
At age 30 expects to be an operative	F1OCC30 = 8	1.2	0.17	0.13	7084	1.82	1.35
At age 30 expects to be a professional (group b)	F1OCC30 = 10	9.4	0.46	0.35	7084	1.73	1.32
At age 30 expects to be in a technical field	F1OCC30 = 16	5.9	0.37	0.28	7084	1.71	1.31
At age 30 doesn't know what expects to be	F1OCC30 = -1	32.8	0.68	0.56	7084	1.50	1.22
Mathematics test score	F1TXM1IR = 0-85	49.5	0.32	0.19	6655	2.88	1.70
Summary statistics							
Mean						1.88	1.37
Minimum						1.28	1.13
Median						1.79	1.34
Maximum						3.31	1.82
Standard deviation						0.40	0.14

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-21. Student design effects, by item using base-year to first follow-up panel weight—Female: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	15.1	0.65	0.43	7067	2.31	1.52
Most likely to receive a GED	F1S15 = 5	1.7	0.20	0.15	7067	1.66	1.29
Already took the SAT or ACT	F1S21C = 3	69.3	0.90	0.56	6747	2.56	1.60
Already took an AP test	F1S21D = 3	15.6	0.72	0.45	6601	2.58	1.61
Had something stolen at school at least once	F1S25A = 2,3	22.0	0.73	0.57	5243	1.64	1.28
Was offered drugs at school at least once	F1S25B = 2,3	14.4	0.67	0.49	5239	1.88	1.37
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	11.2	0.47	0.38	7010	1.57	1.25
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	19.2	0.66	0.47	7009	1.96	1.40
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.8	0.83	0.61	4967	1.84	1.36
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	53.8	0.66	0.59	7251	1.26	1.12
Uses the computer at home once or twice a week	F1S37A = 4	27.1	0.70	0.52	7348	1.82	1.35
Rarely or never performs community service	F1S39C = 1	55.1	0.80	0.58	7290	1.89	1.37
Being successful in line of work is very important	F1S40A = 3	92.3	0.41	0.31	7355	1.74	1.32
Marrying the right person is very important	F1S40B = 3	81.1	0.65	0.46	7350	2.01	1.42
Having lots of money is very important	F1S40C = 3	27.8	0.68	0.52	7354	1.67	1.29
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.1	0.65	0.54	7354	1.45	1.20
Mother expects student to graduate from college, nothing more	F1S43A = 6	36.2	0.74	0.57	7176	1.69	1.30
Plans to continue education right after high school	F1S47 = 2	83.2	0.61	0.45	6858	1.86	1.36
Plans to hold a part-time job right after school	F1S53 = 2	53.1	0.76	0.61	6793	1.56	1.25
Volunteered with a youth organization	F1S63A = 1	23.5	0.92	0.69	3779	1.80	1.34
Often discusses grades with parents	F1S64D = 3	57.0	0.71	0.60	6747	1.37	1.17
Lives with mother only	F1FCOMP = 5	19.6	0.63	0.46	7385	1.85	1.36
Native language is Spanish	F1HOMLNG = 2	8.7	0.76	0.33	7240	5.26	2.29
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.6	0.23	0.19	7238	1.46	1.21
At age 30 expects to be in the military	F1OCC30 = 7	0.4	0.08	0.07	7238	1.37	1.17
At age 30 expects to be an operative	F1OCC30 = 8	0.1	0.06	0.04	7238	2.04	1.43
At age 30 expects to be a professional (group b)	F1OCC30 = 10	17.9	0.57	0.45	7238	1.57	1.25
At age 30 expects to be in a technical field	F1OCC30 = 16	3.9	0.27	0.23	7238	1.38	1.18
At age 30 doesn't know what expects to be	F1OCC30 = -1	27.0	0.61	0.52	7238	1.39	1.18
Mathematics test score	F1TXM1IR = 0-85	47.5	0.33	0.18	6793	3.42	1.85
Summary statistics							
Mean						1.93	1.37
Minimum						1.26	1.12
Median						1.77	1.33
Maximum						5.26	2.29
Standard deviation						0.77	0.23

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-22. Student design effects, by item using base-year to first follow-up panel weight—American Indian or Alaska Native: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	4.4	2.04	1.91	116	1.14	1.07
Most likely to receive a GED	F1S15 = 5	6.0	2.83	2.21	116	1.64	1.28
Already took the SAT or ACT	F1S21C = 3	39.4	6.15	4.77	106	1.67	1.29
Already took an AP test	F1S21D = 3	7.7	3.41	2.62	105	1.70	1.30
Had something stolen at school at least once	F1S25A = 2,3	33.7	6.54	5.46	76	1.44	1.20
Was offered drugs at school at least once	F1S25B = 2,3	31.0	6.53	5.30	77	1.52	1.23
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.0	4.32	3.28	113	1.73	1.31
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	12.0	3.91	3.09	112	1.60	1.27
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	28.2	8.79	5.50	68	2.55	1.60
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	69.4	4.37	4.22	120	1.07	1.03
Uses the computer at home once or twice a week	F1S37A = 4	28.0	5.25	4.12	120	1.63	1.28
Rarely or never performs community service	F1S39C = 1	68.8	5.29	4.26	119	1.54	1.24
Being successful in line of work is very important	F1S40A = 3	90.1	3.70	2.74	120	1.83	1.35
Marrying the right person is very important	F1S40B = 3	71.2	6.74	4.15	120	2.64	1.62
Having lots of money is very important	F1S40C = 3	39.3	4.94	4.48	120	1.22	1.10
Expects to earn a 4-year degree, nothing more	F1S42 = 6	26.7	5.56	4.06	120	1.88	1.37
Mother expects student to graduate from college, nothing more	F1S43A = 6	34.4	4.48	4.47	114	1.00	1.00
Plans to continue education right after high school	F1S47 = 2	61.6	5.52	4.64	111	1.42	1.19
Plans to hold a part-time job right after school	F1S53 = 2	52.9	4.91	4.83	108	1.04	1.02
Volunteered with a youth organization	F1S63A = 1	39.4	8.28	8.92	31	0.86	0.93
Often discusses grades with parents	F1S64D = 3	47.4	6.75	4.85	107	1.94	1.39
Lives with mother only	F1FCOMP = 5	23.7	3.75	3.87	122	0.94	0.97
Native language is Spanish	F1HOMLNG = 2	#	#	#	116	†	†
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.0	1.48	1.61	115	0.85	0.92
At age 30 expects to be in the military	F1OCC30 = 7	2.1	1.57	1.35	115	1.37	1.17
At age 30 expects to be an operative	F1OCC30 = 8	0.8	0.79	0.82	115	0.92	0.96
At age 30 expects to be a professional (group b)	F1OCC30 = 10	9.6	3.42	2.77	115	1.53	1.24
At age 30 expects to be in a technical field	F1OCC30 = 16	4.2	2.34	1.87	115	1.57	1.25
At age 30 doesn't know what expects to be	F1OCC30 = -1	41.1	5.18	4.61	115	1.26	1.12
Mathematics test score	F1TXM1IR = 0-85	41.5	1.74	1.24	107	1.97	1.40
Summary statistics							
Mean						1.50	1.21
Minimum						0.85	0.92
Median						1.53	1.24
Maximum						2.64	1.62
Standard deviation						0.45	0.18

† Not applicable.
[#] Rounds to zero.
NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-23. Student design effects, by item using base-year to first follow-up panel weight—Asian: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	13.0	1.28	0.89	1422	2.06	1.44
Most likely to receive a GED	F1S15 = 5	0.7	0.21	0.22	1422	0.92	0.96
Already took the SAT or ACT	F1S21C = 3	77.3	1.95	1.13	1372	2.99	1.73
Already took an AP test	F1S21D = 3	30.2	2.64	1.25	1341	4.44	2.11
Had something stolen at school at least once	F1S25A = 2,3	27.3	2.10	1.40	1017	2.26	1.50
Was offered drugs at school at least once	F1S25B = 2,3	13.3	1.82	1.06	1018	2.91	1.71
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	13.5	1.29	0.91	1408	2.02	1.42
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	13.9	1.39	0.92	1414	2.29	1.51
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	29.4	1.89	1.45	988	1.69	1.30
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	51.3	1.95	1.31	1450	2.21	1.49
Uses the computer at home once or twice a week	F1S37A = 4	19.5	1.54	1.04	1459	2.21	1.49
Rarely or never performs community service	F1S39C = 1	51.4	1.96	1.31	1450	2.23	1.49
Being successful in line of work is very important	F1S40A = 3	89.1	1.05	0.81	1463	1.65	1.28
Marrying the right person is very important	F1S40B = 3	79.9	1.30	1.05	1462	1.54	1.24
Having lots of money is very important	F1S40C = 3	41.9	1.85	1.29	1461	2.04	1.43
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.5	1.59	1.22	1461	1.70	1.31
Mother expects student to graduate from college, nothing more	F1S43A = 6	31.1	1.58	1.23	1412	1.64	1.28
Plans to continue education right after high school	F1S47 = 2	90.1	1.24	0.80	1383	2.37	1.54
Plans to hold a part-time job right after school	F1S53 = 2	52.7	1.92	1.35	1378	2.04	1.43
Volunteered with a youth organization	F1S63A = 1	17.6	1.72	1.43	710	1.45	1.20
Often discusses grades with parents	F1S64D = 3	45.4	1.95	1.35	1358	2.08	1.44
Lives with mother only	F1FCOMP = 5	10.1	0.91	0.79	1467	1.35	1.16
Native language is Spanish	F1HOMLNG = 2	0.4	0.29	0.17	1424	2.99	1.73
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.9	0.99	0.51	1424	3.74	1.93
At age 30 expects to be in the military	F1OCC30 = 7	0.5	0.20	0.19	1424	1.13	1.06
At age 30 expects to be an operative	F1OCC30 = 8	#	0.04	0.05	1424	0.55	0.74
At age 30 expects to be a professional (group b)	F1OCC30 = 10	20.7	1.47	1.07	1424	1.88	1.37
At age 30 expects to be in a technical field	F1OCC30 = 16	5.3	0.85	0.59	1424	2.05	1.43
At age 30 doesn't know what expects to be	F1OCC30 = -1	36.2	1.77	1.27	1424	1.93	1.39
Mathematics test score	F1TXM1IR = 0-85	54.3	0.91	0.42	1384	4.63	2.15
Summary statistics							
Mean						2.17	1.44
Minimum						0.55	0.74
Median						2.05	1.43
Maximum						4.63	2.15
Standard deviation						0.90	0.30

Rounds to zero.
NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-24. Student design effects, by item using base-year to first follow-up panel weight—Black or African American: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	9.40	0.92	0.69	1796	1.80	1.34
Most likely to receive a GED	F1S15 = 5	2.94	0.45	0.40	1796	1.26	1.12
Already took the SAT or ACT	F1S21C = 3	55.73	1.51	1.21	1681	1.56	1.25
Already took an AP test	F1S21D = 3	5.17	0.60	0.55	1640	1.19	1.09
Had something stolen at school at least once	F1S25A = 2,3	32.95	1.63	1.36	1199	1.45	1.20
Was offered drugs at school at least once	F1S25B = 2,3	20.64	1.50	1.17	1198	1.65	1.28
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	17.97	1.00	0.91	1770	1.19	1.09
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	17.29	1.21	0.90	1769	1.80	1.34
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.92	1.46	1.32	1071	1.22	1.11
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	73.43	1.16	1.02	1879	1.28	1.13
Uses the computer at home once or twice a week	F1S37A = 4	27.05	0.98	1.01	1932	0.94	0.97
Rarely or never performs community service	F1S39C = 1	64.72	1.38	1.09	1912	1.60	1.26
Being successful in line of work is very important	F1S40A = 3	93.80	0.65	0.55	1935	1.40	1.18
Marrying the right person is very important	F1S40B = 3	75.51	1.17	0.98	1933	1.42	1.19
Having lots of money is very important	F1S40C = 3	55.42	1.30	1.13	1933	1.32	1.15
Expects to earn a 4-year degree, nothing more	F1S42 = 6	29.96	1.21	1.04	1937	1.35	1.16
Mother expects student to graduate from college, nothing more	F1S43A = 6	33.22	1.18	1.09	1883	1.18	1.09
Plans to continue education right after high school	F1S47 = 2	78.15	1.26	1.00	1705	1.58	1.26
Plans to hold a part-time job right after school	F1S53 = 2	46.40	1.43	1.21	1694	1.38	1.18
Volunteered with a youth organization	F1S63A = 1	25.52	2.23	1.67	685	1.78	1.34
Often discusses grades with parents	F1S64D = 3	59.43	1.54	1.21	1659	1.63	1.28
Lives with mother only	F1FCOMP = 5	38.09	1.33	1.10	1951	1.45	1.20
Native language is Spanish	F1HOMLNG = 2	0.59	0.22	0.18	1860	1.60	1.26
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.02	0.46	0.40	1869	1.32	1.15
At age 30 expects to be in the military	F1OCC30 = 7	0.71	0.26	0.19	1869	1.84	1.36
At age 30 expects to be an operative	F1OCC30 = 8	0.81	0.26	0.21	1869	1.55	1.25
At age 30 expects to be a professional (group b)	F1OCC30 = 10	15.19	0.94	0.83	1869	1.28	1.13
At age 30 expects to be in a technical field	F1OCC30 = 16	5.50	0.69	0.53	1869	1.72	1.31
At age 30 doesn't know what expects to be	F1OCC30 = -1	25.69	1.28	1.01	1869	1.61	1.27
Mathematics test score	F1TXM1IR = 0-85	38.86	0.47	0.30	1699	2.47	1.57
Summary statistics							
Mean						1.49	1.22
Minimum						0.94	0.97
Median						1.45	1.20
Maximum						2.47	1.57
Standard deviation						0.29	0.11

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-25. Student design effects, by item using base-year to first follow-up panel weight—Hispanic or Latino: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	8.7	0.88	0.64	1957	1.90	1.38
Most likely to receive a GED	F1S15 = 5	3.1	0.51	0.39	1957	1.69	1.30
Already took the SAT or ACT	F1S21C = 3	45.4	1.67	1.17	1825	2.05	1.43
Already took an AP test	F1S21D = 3	13.9	1.11	0.82	1780	1.85	1.36
Had something stolen at school at least once	F1S25A = 2,3	26.2	1.58	1.22	1294	1.68	1.30
Was offered drugs at school at least once	F1S25B = 2,3	23.1	1.50	1.17	1291	1.64	1.28
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	12.9	0.84	0.76	1935	1.22	1.10
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	11.0	0.78	0.71	1937	1.20	1.10
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.1	1.49	1.24	1191	1.45	1.20
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	60.5	1.30	1.07	2078	1.48	1.22
Uses the computer at home once or twice a week	F1S37A = 4	28.3	1.32	0.98	2126	1.83	1.35
Rarely or never performs community service	F1S39C = 1	69.4	1.11	1.00	2111	1.22	1.11
Being successful in line of work is very important	F1S40A = 3	89.4	0.95	0.67	2126	2.01	1.42
Marrying the right person is very important	F1S40B = 3	77.3	1.19	0.91	2126	1.71	1.31
Having lots of money is very important	F1S40C = 3	40.9	1.33	1.07	2129	1.55	1.24
Expects to earn a 4-year degree, nothing more	F1S42 = 6	26.3	1.26	0.95	2132	1.75	1.32
Mother expects student to graduate from college, nothing more	F1S43A = 6	33.6	1.06	1.04	2071	1.05	1.02
Plans to continue education right after high school	F1S47 = 2	72.7	1.46	1.03	1863	2.00	1.41
Plans to hold a part-time job right after school	F1S53 = 2	56.1	1.38	1.16	1843	1.43	1.20
Volunteered with a youth organization	F1S63A = 1	21.7	1.81	1.54	712	1.38	1.17
Often discusses grades with parents	F1S64D = 3	53.9	1.25	1.17	1803	1.14	1.07
Lives with mother only	F1FCOMP = 5	20.2	1.18	0.87	2147	1.86	1.36
Native language is Spanish	F1HOMLNG = 2	49.4	1.95	1.10	2056	3.13	1.77
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.5	0.38	0.34	2064	1.20	1.09
At age 30 expects to be in the military	F1OCC30 = 7	1.0	0.26	0.22	2064	1.36	1.17
At age 30 expects to be an operative	F1OCC30 = 8	0.5	0.19	0.16	2064	1.55	1.24
At age 30 expects to be a professional (group b)	F1OCC30 = 10	12.8	0.78	0.74	2064	1.14	1.07
At age 30 expects to be in a technical field	F1OCC30 = 16	5.3	0.54	0.49	2064	1.19	1.09
At age 30 doesn't know what expects to be	F1OCC30 = -1	32.0	1.05	1.03	2064	1.04	1.02
Mathematics test score	F1TXM1IR = 0-85	41.4	0.48	0.32	1850	2.27	1.51
Summary statistics							
Mean						1.60	1.25
Minimum						1.04	1.02
Median						1.55	1.24
Maximum						3.13	1.77
Standard deviation						0.44	0.17

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-26. Student design effects, by item using base-year to first follow-up panel weight—More than one race: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	10.5	1.47	1.23	627	1.44	1.20
Most likely to receive a GED	F1S15 = 5	2.0	0.84	0.56	627	2.30	1.52
Already took the SAT or ACT	F1S21C = 3	61.1	2.68	2.00	596	1.80	1.34
Already took an AP test	F1S21D = 3	13.5	1.86	1.41	588	1.74	1.32
Had something stolen at school at least once	F1S25A = 2,3	31.6	2.83	2.17	459	1.70	1.30
Was offered drugs at school at least once	F1S25B = 2,3	23.3	2.81	1.97	459	2.02	1.42
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.2	1.79	1.40	623	1.63	1.28
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	17.8	1.83	1.53	622	1.42	1.19
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	21.9	2.64	1.98	435	1.77	1.33
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	60.2	2.50	1.91	658	1.71	1.31
Uses the computer at home once or twice a week	F1S37A = 4	24.6	2.21	1.67	666	1.75	1.32
Rarely or never performs community service	F1S39C = 1	59.8	2.50	1.91	661	1.72	1.31
Being successful in line of work is very important	F1S40A = 3	87.3	1.73	1.29	664	1.78	1.34
Marrying the right person is very important	F1S40B = 3	79.3	1.88	1.57	664	1.42	1.19
Having lots of money is very important	F1S40C = 3	35.6	2.37	1.86	666	1.63	1.28
Expects to earn a 4-year degree, nothing more	F1S42 = 6	33.9	2.28	1.83	667	1.55	1.24
Mother expects student to graduate from college, nothing more	F1S43A = 6	38.7	2.55	1.93	638	1.75	1.32
Plans to continue education right after high school	F1S47 = 2	71.9	2.54	1.82	610	1.94	1.39
Plans to hold a part-time job right after school	F1S53 = 2	46.9	2.56	2.04	601	1.58	1.26
Volunteered with a youth organization	F1S63A = 1	29.8	3.78	2.62	305	2.08	1.44
Often discusses grades with parents	F1S64D = 3	55.1	2.82	2.04	596	1.91	1.38
Lives with mother only	F1FCOMP = 5	22.0	1.95	1.60	670	1.49	1.22
Native language is Spanish	F1HOMLNG = 2	0.7	0.42	0.33	653	1.65	1.28
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.78	0.65	657	1.46	1.21
At age 30 expects to be in the military	F1OCC30 = 7	2.2	0.85	0.57	657	2.17	1.47
At age 30 expects to be an operative	F1OCC30 = 8	0.2	0.18	0.17	657	1.20	1.09
At age 30 expects to be a professional (group b)	F1OCC30 = 10	10.5	1.42	1.20	657	1.41	1.19
At age 30 expects to be in a technical field	F1OCC30 = 16	4.5	1.02	0.81	657	1.60	1.26
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.9	2.35	1.79	657	1.73	1.32
Mathematics test score	F1TXM1IR = 0-85	47.9	0.79	0.60	603	1.75	1.32
Summary statistics							
Mean						1.70	1.30
Minimum						1.20	1.09
Median						1.72	1.31
Maximum						2.30	1.52
Standard deviation						0.24	0.09

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-27. Student design effects, by item using base-year to first follow-up panel weight—White: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	15.1	0.63	0.40	8066	2.54	1.59
Most likely to receive a GED	F1S15 = 5	1.6	0.18	0.14	8066	1.68	1.30
Already took the SAT or ACT	F1S21C = 3	70.9	0.83	0.52	7737	2.57	1.60
Already took an AP test	F1S21D = 3	16.4	0.70	0.43	7500	2.71	1.65
Had something stolen at school at least once	F1S25A = 2,3	23.7	0.67	0.54	6310	1.56	1.25
Was offered drugs at school at least once	F1S25B = 2,3	20.5	0.70	0.51	6311	1.90	1.38
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.5	0.52	0.39	7994	1.71	1.31
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	15.5	0.59	0.40	7988	2.16	1.47
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.3	0.75	0.55	6052	1.85	1.36
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	49.9	0.69	0.55	8264	1.58	1.26
Uses the computer at home once or twice a week	F1S37A = 4	24.1	0.64	0.47	8326	1.84	1.35
Rarely or never performs community service	F1S39C = 1	58.2	0.76	0.54	8253	1.94	1.39
Being successful in line of work is very important	F1S40A = 3	90.8	0.41	0.32	8323	1.72	1.31
Marrying the right person is very important	F1S40B = 3	82.5	0.54	0.42	8315	1.68	1.30
Having lots of money is very important	F1S40C = 3	28.8	0.65	0.50	8316	1.73	1.31
Expects to earn a 4-year degree, nothing more	F1S42 = 6	33.4	0.61	0.52	8320	1.38	1.17
Mother expects student to graduate from college, nothing more	F1S43A = 6	41.5	0.70	0.55	8092	1.62	1.27
Plans to continue education right after high school	F1S47 = 2	78.9	0.64	0.46	7888	1.93	1.39
Plans to hold a part-time job right after school	F1S53 = 2	48.9	0.71	0.57	7810	1.57	1.25
Volunteered with a youth organization	F1S63A = 1	29.6	1.03	0.70	4221	2.16	1.47
Often discusses grades with parents	F1S64D = 3	51.2	0.68	0.57	7749	1.45	1.20
Lives with mother only	F1FCOMP = 5	14.0	0.50	0.38	8356	1.72	1.31
Native language is Spanish	F1HOMLNG = 2	0.1	0.05	0.04	8253	2.07	1.44
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.0	0.22	0.19	8193	1.32	1.15
At age 30 expects to be in the military	F1OCC30 = 7	1.0	0.13	0.11	8193	1.46	1.21
At age 30 expects to be an operative	F1OCC30 = 8	0.7	0.11	0.09	8193	1.52	1.23
At age 30 expects to be a professional (group b)	F1OCC30 = 10	13.4	0.46	0.38	8193	1.53	1.24
At age 30 expects to be in a technical field	F1OCC30 = 16	4.7	0.30	0.23	8193	1.66	1.29
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.7	0.62	0.50	8193	1.50	1.22
Mathematics test score	F1TXM1IR = 0-85	52.0	0.28	0.16	7805	2.91	1.71
Summary statistics							
Mean						1.83	1.35
Minimum						1.32	1.15
Median						1.72	1.31
Maximum						2.91	1.71
Standard deviation						0.40	0.14

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-28. Student design effects, by item using base-year to first follow-up panel weight—Public: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.9	0.51	0.32	10788	2.46	1.57
Most likely to receive a GED	F1S15 = 5	2.2	0.17	0.14	10788	1.49	1.22
Already took the SAT or ACT	F1S21C = 3	62.3	0.82	0.48	10167	2.93	1.71
Already took an AP test	F1S21D = 3	14.1	0.60	0.35	9933	2.95	1.72
Had something stolen at school at least once	F1S25A = 2,3	25.8	0.60	0.49	7812	1.49	1.22
Was offered drugs at school at least once	F1S25B = 2,3	21.5	0.63	0.46	7811	1.82	1.35
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.1	0.42	0.34	10664	1.54	1.24
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	14.6	0.49	0.34	10667	2.03	1.42
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	23.5	0.63	0.49	7341	1.64	1.28
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	56.3	0.59	0.47	11239	1.59	1.26
Uses the computer at home once or twice a week	F1S37A = 4	25.7	0.53	0.41	11402	1.71	1.31
Rarely or never performs community service	F1S39C = 1	62.0	0.61	0.46	11305	1.80	1.34
Being successful in line of work is very important	F1S40A = 3	90.8	0.34	0.27	11405	1.61	1.27
Marrying the right person is very important	F1S40B = 3	79.8	0.48	0.38	11398	1.66	1.29
Having lots of money is very important	F1S40C = 3	36.1	0.60	0.45	11402	1.81	1.34
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.4	0.52	0.43	11414	1.46	1.21
Mother expects student to graduate from college, nothing more	F1S43A = 6	38.1	0.58	0.46	11072	1.55	1.25
Plans to continue education right after high school	F1S47 = 2	76.6	0.60	0.42	10399	2.06	1.44
Plans to hold a part-time job right after school	F1S53 = 2	49.7	0.61	0.49	10277	1.52	1.23
Volunteered with a youth organization	F1S63A = 1	27.8	0.89	0.66	4599	1.81	1.34
Often discusses grades with parents	F1S64D = 3	52.4	0.60	0.50	10131	1.47	1.21
Lives with mother only	F1FCOMP = 5	19.2	0.48	0.37	11477	1.74	1.32
Native language is Spanish	F1HOMLNG = 2	8.4	0.62	0.26	11182	5.65	2.38
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.0	0.18	0.16	11140	1.28	1.13
At age 30 expects to be in the military	F1OCC30 = 7	1.0	0.11	0.10	11140	1.37	1.17
At age 30 expects to be an operative	F1OCC30 = 8	0.7	0.10	0.08	11140	1.57	1.25
At age 30 expects to be a professional (group b)	F1OCC30 = 10	13.2	0.38	0.32	11140	1.41	1.19
At age 30 expects to be in a technical field	F1OCC30 = 16	5.0	0.25	0.21	11140	1.42	1.19
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.7	0.50	0.43	11140	1.32	1.15
Mathematics test score	F1TXM1IR = 0-85	47.8	0.30	0.15	10292	4.16	2.04
Summary statistics							
Mean						1.94	1.37
Minimum						1.28	1.13
Median						1.63	1.28
Maximum						5.65	2.38
Standard deviation						0.92	0.27

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-29. Student design effects, by item using base-year to first follow-up panel weight—Catholic: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.5	1.38	0.76	1884	3.27	1.81
Most likely to receive a GED	F1S15 = 5	0.5	0.16	0.16	1884	1.04	1.02
Already took the SAT or ACT	F1S21C = 3	91.4	1.15	0.65	1873	3.14	1.77
Already took an AP test	F1S21D = 3	22.5	2.05	0.99	1792	4.31	2.08
Had something stolen at school at least once	F1S25A = 2,3	26.0	1.79	1.12	1541	2.56	1.60
Was offered drugs at school at least once	F1S25B = 2,3	17.7	1.35	0.97	1543	1.93	1.39
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	22.1	1.66	0.96	1876	2.99	1.73
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	15.3	1.34	0.83	1877	2.60	1.61
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	36.0	1.98	1.24	1500	2.55	1.60
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	52.3	2.11	1.15	1881	3.34	1.83
Uses the computer at home once or twice a week	F1S37A = 4	16.8	1.06	0.86	1892	1.51	1.23
Rarely or never performs community service	F1S39C = 1	43.2	1.79	1.14	1874	2.45	1.56
Being successful in line of work is very important	F1S40A = 3	90.9	0.66	0.66	1890	1.00	1.00
Marrying the right person is very important	F1S40B = 3	87.1	0.93	0.77	1890	1.45	1.20
Having lots of money is very important	F1S40C = 3	29.2	1.63	1.05	1888	2.41	1.55
Expects to earn a 4-year degree, nothing more	F1S42 = 6	37.9	1.34	1.12	1889	1.44	1.20
Mother expects student to graduate from college, nothing more	F1S43A = 6	42.6	1.62	1.15	1840	1.97	1.40
Plans to continue education right after high school	F1S47 = 2	93.9	0.77	0.55	1874	1.97	1.40
Plans to hold a part-time job right after school	F1S53 = 2	51.2	1.69	1.15	1875	2.14	1.46
Volunteered with a youth organization	F1S63A = 1	31.8	1.88	1.30	1289	2.10	1.45
Often discusses grades with parents	F1S64D = 3	56.6	1.28	1.15	1865	1.24	1.11
Lives with mother only	F1FCOMP = 5	12.4	0.75	0.76	1898	0.97	0.99
Native language is Spanish	F1HOMLNG = 2	3.0	0.94	0.39	1878	5.77	2.40
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.2	0.34	0.41	1876	0.71	0.84
At age 30 expects to be in the military	F1OCC30 = 7	0.8	0.26	0.20	1876	1.60	1.27
At age 30 expects to be an operative	F1OCC30 = 8	#	#	#	1876	†	†
At age 30 expects to be a professional (group b)	F1OCC30 = 10	17.5	1.23	0.88	1876	1.98	1.41
At age 30 expects to be in a technical field	F1OCC30 = 16	3.6	0.52	0.43	1876	1.45	1.21
At age 30 doesn't know what expects to be	F1OCC30 = -1	31.0	1.13	1.07	1876	1.12	1.06
Mathematics test score	F1TXM1IR = 0-85	55.9	0.60	0.29	1879	4.29	2.07
Summary statistics							
Mean						2.25	1.46
Minimum						0.71	0.84
Median						1.98	1.41
Maximum						5.77	2.40
Standard deviation						1.15	0.37

† Not applicable.
# Rounds to zero.
NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-30. Student design effects, by item using base-year to first follow-up panel weight—Other private: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	15.5	1.70	1.00	1312	2.89	1.70
Most likely to receive a GED	F1S15 = 5	0.6	0.16	0.21	1312	0.61	0.78
Already took the SAT or ACT	F1S21C = 3	86.2	2.48	0.97	1277	6.58	2.57
Already took an AP test	F1S21D = 3	25.1	3.11	1.24	1229	6.32	2.51
Had something stolen at school at least once	F1S25A = 2,3	24.2	2.19	1.35	1002	2.62	1.62
Was offered drugs at school at least once	F1S25B = 2,3	7.9	1.04	0.85	1000	1.47	1.21
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	20.7	2.48	1.12	1303	4.88	2.21
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	26.3	3.11	1.22	1298	6.47	2.54
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	32.6	2.28	1.51	964	2.28	1.51
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	39.3	2.38	1.34	1329	3.16	1.78
Uses the computer at home once or twice a week	F1S37A = 4	20.3	2.18	1.10	1335	3.93	1.98
Rarely or never performs community service	F1S39C = 1	50.1	2.94	1.37	1327	4.58	2.14
Being successful in line of work is very important	F1S40A = 3	89.3	1.10	0.84	1336	1.71	1.31
Marrying the right person is very important	F1S40B = 3	86.8	1.04	0.93	1332	1.26	1.12
Having lots of money is very important	F1S40C = 3	26.4	1.69	1.21	1335	1.97	1.40
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.7	1.72	1.27	1334	1.82	1.35
Mother expects student to graduate from college, nothing more	F1S43A = 6	41.6	1.79	1.37	1298	1.71	1.31
Plans to continue education right after high school	F1S47 = 2	90.4	1.61	0.82	1287	3.83	1.96
Plans to hold a part-time job right after school	F1S53 = 2	49.8	2.15	1.40	1282	2.36	1.54
Volunteered with a youth organization	F1S63A = 1	22.7	1.63	1.50	776	1.17	1.08
Often discusses grades with parents	F1S64D = 3	52.5	1.89	1.40	1276	1.83	1.35
Lives with mother only	F1FCOMP = 5	13.3	1.28	0.93	1338	1.90	1.38
Native language is Spanish	F1HOMLNG = 2	2.5	1.22	0.43	1302	7.82	2.80
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.1	0.68	0.48	1306	2.04	1.43
At age 30 expects to be in the military	F1OCC30 = 7	0.8	0.27	0.24	1306	1.20	1.09
At age 30 expects to be an operative	F1OCC30 = 8	0.2	0.19	0.12	1306	2.45	1.56
At age 30 expects to be a professional (group b)	F1OCC30 = 10	22.0	1.73	1.15	1306	2.27	1.51
At age 30 expects to be in a technical field	F1OCC30 = 16	2.7	0.48	0.45	1306	1.18	1.09
At age 30 doesn't know what expects to be	F1OCC30 = -1	34.3	1.63	1.31	1306	1.53	1.24
Mathematics test score	F1TXM1IR = 0-85	57.5	0.96	0.38	1277	6.23	2.50
Summary statistics							
Mean						3.00	1.65
Minimum						0.61	0.78
Median						2.28	1.51
Maximum						7.82	2.80
Standard deviation						1.96	0.53

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-31. Student design effects, by item using base-year to first follow-up panel weight—Low socioeconomic status (SES): 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	7.3	0.57	0.47	3054	1.46	1.21
Most likely to receive a GED	F1S15 = 5	3.4	0.42	0.33	3054	1.66	1.29
Already took the SAT or ACT	F1S21C = 3	42.7	1.31	0.93	2831	1.98	1.41
Already took an AP test	F1S21D = 3	7.6	0.69	0.50	2761	1.90	1.38
Had something stolen at school at least once	F1S25A = 2,3	26.4	1.17	0.97	2083	1.46	1.21
Was offered drugs at school at least once	F1S25B = 2,3	19.0	1.11	0.86	2081	1.66	1.29
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	12.8	0.75	0.61	2996	1.51	1.23
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	13.6	0.72	0.63	3001	1.33	1.15
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	21.1	1.18	0.93	1910	1.60	1.27
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	63.3	1.05	0.84	3317	1.57	1.25
Uses the computer at home once or twice a week	F1S37A = 4	25.8	0.92	0.75	3371	1.48	1.22
Rarely or never performs community service	F1S39C = 1	70.2	0.93	0.79	3342	1.37	1.17
Being successful in line of work is very important	F1S40A = 3	89.3	0.64	0.53	3377	1.44	1.20
Marrying the right person is very important	F1S40B = 3	77.4	0.92	0.72	3376	1.63	1.28
Having lots of money is very important	F1S40C = 3	41.2	0.99	0.85	3376	1.36	1.17
Expects to earn a 4-year degree, nothing more	F1S42 = 6	25.8	0.92	0.75	3383	1.50	1.22
Mother expects student to graduate from college, nothing more	F1S43A = 6	33.2	0.95	0.83	3259	1.32	1.15
Plans to continue education right after high school	F1S47 = 2	66.4	1.15	0.88	2905	1.73	1.31
Plans to hold a part-time job right after school	F1S53 = 2	48.2	1.14	0.93	2865	1.50	1.22
Volunteered with a youth organization	F1S63A = 1	23.8	1.62	1.35	996	1.44	1.20
Often discusses grades with parents	F1S64D = 3	51.6	1.11	0.94	2800	1.37	1.17
Lives with mother only	F1FCOMP = 5	27.0	1.00	0.76	3409	1.73	1.32
Native language is Spanish	F1HOMLNG = 2	21.4	1.60	0.72	3289	4.99	2.23
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.3	0.28	0.26	3279	1.12	1.06
At age 30 expects to be in the military	F1OCC30 = 7	0.9	0.18	0.17	3279	1.13	1.06
At age 30 expects to be an operative	F1OCC30 = 8	1.4	0.27	0.20	3279	1.81	1.34
At age 30 expects to be a professional (group b)	F1OCC30 = 10	11.6	0.62	0.56	3279	1.22	1.10
At age 30 expects to be in a technical field	F1OCC30 = 16	5.5	0.45	0.40	3279	1.28	1.13
At age 30 doesn't know what expects to be	F1OCC30 = -1	31.5	0.95	0.81	3279	1.37	1.17
Mathematics test score	F1TXM1IR = 0-85	40.2	0.36	0.24	2870	2.20	1.48
Summary statistics							
Mean						1.64	1.26
Minimum						1.12	1.06
Median						1.49	1.22
Maximum						4.99	2.23
Standard deviation						0.68	0.21

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-32. Student design effects, by item using base-year to first follow-up panel weight—Middle socioeconomic status (SES): 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	11.4	0.55	0.39	6765	1.99	1.41
Most likely to receive a GED	F1S15 = 5	2.0	0.22	0.17	6765	1.63	1.28
Already took the SAT or ACT	F1S21C = 3	62.4	0.87	0.60	6436	2.09	1.44
Already took an AP test	F1S21D = 3	11.1	0.54	0.40	6274	1.84	1.36
Had something stolen at school at least once	F1S25A = 2,3	25.9	0.71	0.62	5008	1.32	1.15
Was offered drugs at school at least once	F1S25B = 2,3	22.2	0.83	0.59	5008	1.99	1.41
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	15.1	0.54	0.44	6713	1.53	1.24
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	15.0	0.61	0.44	6711	1.97	1.40
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	22.8	0.81	0.61	4726	1.78	1.33
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	56.6	0.77	0.59	6961	1.66	1.29
Uses the computer at home once or twice a week	F1S37A = 4	27.1	0.63	0.53	7051	1.41	1.19
Rarely or never performs community service	F1S39C = 1	63.3	0.76	0.58	6982	1.72	1.31
Being successful in line of work is very important	F1S40A = 3	91.2	0.45	0.34	7047	1.74	1.32
Marrying the right person is very important	F1S40B = 3	80.2	0.63	0.47	7041	1.78	1.33
Having lots of money is very important	F1S40C = 3	35.7	0.76	0.57	7045	1.80	1.34
Expects to earn a 4-year degree, nothing more	F1S42 = 6	33.6	0.64	0.56	7049	1.29	1.14
Mother expects student to graduate from college, nothing more	F1S43A = 6	39.5	0.76	0.59	6833	1.66	1.29
Plans to continue education right after high school	F1S47 = 2	76.6	0.68	0.52	6568	1.69	1.30
Plans to hold a part-time job right after school	F1S53 = 2	51.3	0.76	0.62	6498	1.51	1.23
Volunteered with a youth organization	F1S63A = 1	27.6	1.09	0.81	3034	1.80	1.34
Often discusses grades with parents	F1S64D = 3	53.0	0.80	0.62	6422	1.64	1.28
Lives with mother only	F1FCOMP = 5	19.1	0.59	0.47	7083	1.62	1.27
Native language is Spanish	F1HOMLNG = 2	4.5	0.34	0.25	6912	1.85	1.36
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.23	0.20	6896	1.37	1.17
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.16	0.13	6896	1.56	1.25
At age 30 expects to be an operative	F1OCC30 = 8	0.6	0.12	0.09	6896	1.59	1.26
At age 30 expects to be a professional (group b)	F1OCC30 = 10	11.8	0.44	0.39	6896	1.31	1.14
At age 30 expects to be in a technical field	F1OCC30 = 16	5.5	0.32	0.27	6896	1.40	1.18
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.4	0.62	0.55	6896	1.29	1.14
Mathematics test score	F1TXM1IR = 0-85	47.5	0.27	0.18	6509	2.37	1.54
Summary statistics							
Mean						1.67	1.29
Minimum						1.29	1.14
Median						1.66	1.29
Maximum						2.37	1.54
Standard deviation						0.26	0.10

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-33. Student design effects, by item using base-year to first follow-up panel weight—High socioeconomic status (SES): 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	20.7	0.96	0.63	4165	2.34	1.53
Most likely to receive a GED	F1S15 = 5	1.1	0.23	0.16	4165	2.06	1.43
Already took the SAT or ACT	F1S21C = 3	86.8	0.78	0.53	4050	2.15	1.46
Already took an AP test	F1S21D = 3	28.1	1.21	0.72	3919	2.86	1.69
Had something stolen at school at least once	F1S25A = 2,3	24.9	1.07	0.76	3264	2.00	1.42
Was offered drugs at school at least once	F1S25B = 2,3	19.7	0.95	0.70	3265	1.85	1.36
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	15.4	0.76	0.56	4134	1.84	1.36
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	16.3	0.81	0.57	4130	1.99	1.41
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	29.8	1.07	0.81	3169	1.72	1.31
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	45.8	1.07	0.77	4171	1.93	1.39
Uses the computer at home once or twice a week	F1S37A = 4	20.4	0.95	0.62	4207	2.32	1.52
Rarely or never performs community service	F1S39C = 1	46.8	0.98	0.77	4182	1.62	1.27
Being successful in line of work is very important	F1S40A = 3	91.5	0.51	0.43	4207	1.38	1.18
Marrying the right person is very important	F1S40B = 3	83.3	0.77	0.57	4203	1.78	1.33
Having lots of money is very important	F1S40C = 3	29.5	0.95	0.70	4204	1.83	1.35
Expects to earn a 4-year degree, nothing more	F1S42 = 6	33.5	0.94	0.73	4205	1.66	1.29
Mother expects student to graduate from college, nothing more	F1S43A = 6	41.4	0.98	0.77	4118	1.61	1.27
Plans to continue education right after high school	F1S47 = 2	90.2	0.69	0.46	4087	2.21	1.49
Plans to hold a part-time job right after school	F1S53 = 2	48.4	0.97	0.78	4071	1.55	1.24
Volunteered with a youth organization	F1S63A = 1	29.8	1.30	0.89	2634	2.13	1.46
Often discusses grades with parents	F1S64D = 3	52.6	1.08	0.78	4050	1.89	1.38
Lives with mother only	F1FCOMP = 5	9.8	0.62	0.46	4221	1.84	1.36
Native language is Spanish	F1HOMLNG = 2	2.0	0.31	0.22	4161	1.98	1.41
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.8	0.41	0.30	4147	1.85	1.36
At age 30 expects to be in the military	F1OCC30 = 7	0.9	0.20	0.15	4147	1.85	1.36
At age 30 expects to be an operative	F1OCC30 = 8	0.1	0.05	0.04	4147	1.53	1.24
At age 30 expects to be a professional (group b)	F1OCC30 = 10	19.5	0.74	0.62	4147	1.46	1.21
At age 30 expects to be in a technical field	F1OCC30 = 16	3.2	0.35	0.27	4147	1.67	1.29
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.4	1.00	0.71	4147	1.98	1.41
Mathematics test score	F1TXM1IR = 0-85	57.3	0.35	0.21	4069	2.75	1.66
Summary statistics							
Mean						1.92	1.38
Minimum						1.38	1.18
Median						1.85	1.36
Maximum						2.86	1.69
Standard deviation						0.34	0.12

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-34. Student design effects, by item using base-year to first follow-up panel weight—Urban: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.8	0.91	0.49	4664	3.44	1.85
Most likely to receive a GED	F1S15 = 5	2.3	0.31	0.22	4664	2.05	1.43
Already took the SAT or ACT	F1S21C = 3	65.0	1.56	0.72	4430	4.73	2.18
Already took an AP test	F1S21D = 3	18.5	1.28	0.59	4313	4.68	2.16
Had something stolen at school at least once	F1S25A = 2,3	27.4	1.11	0.77	3340	2.08	1.44
Was offered drugs at school at least once	F1S25B = 2,3	21.9	1.12	0.72	3342	2.46	1.57
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	14.1	0.79	0.51	4618	2.40	1.55
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	14.6	0.86	0.52	4619	2.72	1.65
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	27.6	1.18	0.79	3165	2.20	1.48
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	59.4	1.06	0.71	4846	2.27	1.51
Uses the computer at home once or twice a week	F1S37A = 4	24.1	0.98	0.61	4913	2.56	1.60
Rarely or never performs community service	F1S39C = 1	61.0	1.10	0.70	4871	2.48	1.57
Being successful in line of work is very important	F1S40A = 3	90.7	0.57	0.41	4918	1.92	1.39
Marrying the right person is very important	F1S40B = 3	78.6	0.87	0.58	4919	2.19	1.48
Having lots of money is very important	F1S40C = 3	39.0	0.99	0.70	4918	2.04	1.43
Expects to earn a 4-year degree, nothing more	F1S42 = 6	31.0	0.95	0.66	4915	2.06	1.43
Mother expects student to graduate from college, nothing more	F1S43A = 6	36.5	0.92	0.70	4755	1.73	1.32
Plans to continue education right after high school	F1S47 = 2	79.4	0.91	0.60	4508	2.26	1.50
Plans to hold a part-time job right after school	F1S53 = 2	51.2	1.10	0.75	4452	2.16	1.47
Volunteered with a youth organization	F1S63A = 1	26.6	1.62	0.92	2327	3.12	1.77
Often discusses grades with parents	F1S64D = 3	55.0	1.05	0.75	4393	1.96	1.40
Lives with mother only	F1FCOMP = 5	23.0	1.01	0.60	4950	2.87	1.69
Native language is Spanish	F1HOMLNG = 2	13.8	1.43	0.50	4800	8.28	2.88
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.31	0.24	4806	1.66	1.29
At age 30 expects to be in the military	F1OCC30 = 7	0.8	0.15	0.13	4806	1.41	1.19
At age 30 expects to be an operative	F1OCC30 = 8	0.5	0.19	0.10	4806	3.33	1.82
At age 30 expects to be a professional (group b)	F1OCC30 = 10	16.4	0.71	0.53	4806	1.77	1.33
At age 30 expects to be in a technical field	F1OCC30 = 16	4.7	0.46	0.31	4806	2.23	1.49
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.8	0.80	0.66	4806	1.47	1.21
Mathematics test score	F1TXM1IR = 0-85	47.0	0.62	0.23	4468	7.35	2.71
Summary statistics							
Mean						2.80	1.63
Minimum						1.41	1.19
Median						2.25	1.50
Maximum						8.28	2.88
Standard deviation						1.58	0.39

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-35. Student design effects, by item using base-year to first follow-up panel weight—Suburban: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	12.5	0.67	0.40	6758	2.77	1.66
Most likely to receive a GED	F1S15 = 5	1.9	0.22	0.17	6758	1.73	1.32
Already took the SAT or ACT	F1S21C = 3	65.4	1.05	0.59	6449	3.11	1.76
Already took an AP test	F1S21D = 3	14.2	0.78	0.44	6262	3.09	1.76
Had something stolen at school at least once	F1S25A = 2,3	25.6	0.80	0.61	5082	1.70	1.30
Was offered drugs at school at least once	F1S25B = 2,3	21.2	0.81	0.57	5081	2.00	1.42
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	15.4	0.55	0.44	6693	1.56	1.25
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	14.7	0.62	0.43	6694	2.04	1.43
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	24.3	0.80	0.62	4816	1.70	1.30
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	53.8	0.77	0.60	6941	1.64	1.28
Uses the computer at home once or twice a week	F1S37A = 4	25.0	0.69	0.52	7026	1.81	1.34
Rarely or never performs community service	F1S39C = 1	60.7	0.76	0.59	6965	1.70	1.31
Being successful in line of work is very important	F1S40A = 3	91.0	0.43	0.34	7027	1.58	1.26
Marrying the right person is very important	F1S40B = 3	81.1	0.64	0.47	7016	1.85	1.36
Having lots of money is very important	F1S40C = 3	34.8	0.84	0.57	7021	2.18	1.48
Expects to earn a 4-year degree, nothing more	F1S42 = 6	32.3	0.71	0.56	7037	1.60	1.27
Mother expects student to graduate from college, nothing more	F1S43A = 6	39.5	0.78	0.59	6857	1.73	1.32
Plans to continue education right after high school	F1S47 = 2	78.2	0.79	0.51	6562	2.43	1.56
Plans to hold a part-time job right after school	F1S53 = 2	49.4	0.79	0.62	6512	1.62	1.27
Volunteered with a youth organization	F1S63A = 1	27.9	1.04	0.79	3207	1.73	1.32
Often discusses grades with parents	F1S64D = 3	51.6	0.79	0.62	6446	1.63	1.28
Lives with mother only	F1FCOMP = 5	17.0	0.56	0.45	7063	1.56	1.25
Native language is Spanish	F1HOMLNG = 2	6.4	0.73	0.29	6914	6.22	2.49
At age 30 expects to be a manager, administrator	F1OCC30 = 6	3.1	0.24	0.21	6896	1.35	1.16
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.16	0.13	6896	1.68	1.29
At age 30 expects to be an operative	F1OCC30 = 8	0.6	0.11	0.09	6896	1.42	1.19
At age 30 expects to be a professional (group b)	F1OCC30 = 10	12.7	0.51	0.40	6896	1.59	1.26
At age 30 expects to be in a technical field	F1OCC30 = 16	4.8	0.32	0.26	6896	1.51	1.23
At age 30 doesn't know what expects to be	F1OCC30 = -1	29.6	0.70	0.55	6896	1.63	1.28
Mathematics test score	F1TXM1IR = 0-85	49.3	0.38	0.19	6513	4.24	2.06
Summary statistics							
Mean						2.08	1.42
Minimum						1.35	1.16
Median						1.70	1.30
Maximum						6.22	2.49
Standard deviation						1.00	0.28

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-36. Student design effects, by item using base-year to first follow-up panel weight—Rural: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
Most likely to receive an honors diploma from high school	F1S15 = 2	14.3	0.98	0.69	2562	2.01	1.42
Most likely to receive a GED	F1S15 = 5	2.2	0.34	0.29	2562	1.39	1.18
Already took the SAT or ACT	F1S21C = 3	62.0	1.58	0.98	2438	2.59	1.61
Already took an AP test	F1S21D = 3	11.5	0.92	0.65	2379	1.97	1.40
Had something stolen at school at least once	F1S25A = 2,3	23.9	1.13	0.97	1933	1.35	1.16
Was offered drugs at school at least once	F1S25B = 2,3	18.3	1.24	0.88	1931	1.98	1.41
Participated in intramural sports at school (not as an officer/leader/captain)	F1S26A = 2	13.6	0.84	0.68	2532	1.51	1.23
Participated in school band (not as an officer/leader/captain)	F1S26C = 2	16.6	1.17	0.74	2529	2.51	1.59
Spends 1-3 hours a week on math homework outside of school	F1S32B = 4	21.2	1.37	0.96	1824	2.04	1.43
Watches TV/DVD 2-3 hours a day on weekdays	F1S34A = 4,5,6	54.2	1.21	0.97	2662	1.56	1.25
Uses the computer at home once or twice a week	F1S37A = 4	26.8	1.09	0.85	2690	1.61	1.27
Rarely or never performs community service	F1S39C = 1	60.8	1.47	0.94	2670	2.42	1.56
Being successful in line of work is very important	F1S40A = 3	90.5	0.82	0.57	2686	2.10	1.45
Marrying the right person is very important	F1S40B = 3	81.0	0.95	0.76	2685	1.58	1.26
Having lots of money is very important	F1S40C = 3	31.8	1.14	0.90	2686	1.62	1.27
Expects to earn a 4-year degree, nothing more	F1S42 = 6	30.9	0.96	0.89	2685	1.16	1.08
Mother expects student to graduate from college, nothing more	F1S43A = 6	38.8	1.21	0.96	2598	1.59	1.26
Plans to continue education right after high school	F1S47 = 2	75.2	1.34	0.87	2490	2.41	1.55
Plans to hold a part-time job right after school	F1S53 = 2	48.8	1.22	1.01	2470	1.47	1.21
Volunteered with a youth organization	F1S63A = 1	29.4	1.81	1.36	1130	1.79	1.34
Often discusses grades with parents	F1S64D = 3	51.6	1.16	1.01	2433	1.31	1.14
Lives with mother only	F1FCOMP = 5	16.6	0.97	0.72	2700	1.83	1.35
Native language is Spanish	F1HOMLNG = 2	3.3	0.39	0.35	2648	1.25	1.12
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.37	0.32	2620	1.30	1.14
At age 30 expects to be in the military	F1OCC30 = 7	1.1	0.24	0.20	2620	1.35	1.16
At age 30 expects to be an operative	F1OCC30 = 8	0.9	0.23	0.19	2620	1.47	1.21
At age 30 expects to be a professional (group b)	F1OCC30 = 10	12.1	0.76	0.64	2620	1.43	1.19
At age 30 expects to be in a technical field	F1OCC30 = 16	5.5	0.48	0.45	2620	1.15	1.07
At age 30 doesn't know what expects to be	F1OCC30 = -1	31.0	0.92	0.90	2620	1.04	1.02
Mathematics test score	F1TXM1IR = 0-85	48.5	0.45	0.29	2467	2.39	1.55
Summary statistics							
Mean						1.71	1.30
Minimum						1.04	1.02
Median						1.59	1.26
Maximum						2.59	1.61
Standard deviation						0.44	0.17

NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Public-Use Data File, 2004.”

Table I-37. Dropout design effects, by item using first follow-up questionnaire weight—All: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
11th grade was the last grade attended in school	F1D20 = 2	49.3	2.13	1.94	668	1.21	1.10
Left school for a job	F1D29A = 1	27.9	2.04	1.72	679	1.41	1.19
Left school because they did not like it	F1D29B = 1	36.4	2.21	1.85	680	1.43	1.19
Left school because they could not get along with teachers	F1D29C = 1	24.9	2.10	1.66	681	1.60	1.27
Left school because they were pregnant	F1D29E = 1	28.6	2.93	2.63	296	1.24	1.11
Left school because they did not feel safe	F1D29I = 1	9.9	1.42	1.15	677	1.53	1.24
Left school because they were expelled	F1D29K = 1	10.2	1.38	1.16	679	1.41	1.19
Left school because they had no feeling of belonging	F1D29L = 1	19.6	1.87	1.52	679	1.51	1.23
Left school because they were getting poor grades/failing	F1D29N = 1	38.0	2.14	1.86	680	1.31	1.15
Left school because getting a GED was easier	F1D29T = 1	40.1	2.29	1.88	678	1.48	1.22
Plans to get GED or high school diploma	F1D41 = 2	87.0	1.47	1.29	677	1.28	1.13
Currently taking class to prepare for the GED	F1D46 = 1	20.5	1.92	1.67	586	1.32	1.15
Watches TV/DVD 2-3 hours a day on weekdays	F1D51A = 4	18.7	1.66	1.51	666	1.21	1.10
Uses the computer at home once or twice a week	F1D54A = 4	22.4	1.77	1.60	678	1.22	1.10
Being successful in line of work is very important	F1D56A = 3	84.0	1.59	1.41	674	1.28	1.13
Marrying the right person is very important	F1D56B = 3	75.1	1.98	1.66	677	1.42	1.19
Having lots of money is very important	F1D56C = 3	43.8	2.25	1.91	677	1.39	1.18
Having strong friendships is very important	F1D56D = 3	74.6	1.88	1.68	674	1.25	1.12
Being able to find steady work is very important	F1D56E = 3	87.3	1.36	1.28	676	1.12	1.06
Lives with mother only	F1FCOMP = 5	26.2	1.86	1.68	686	1.22	1.10
Native language is Spanish	F1HOMLNG = 2	16.1	2.06	1.44	650	2.04	1.43
At age 30 expects to be a farmer, farm manager	F1OCC30 = 3	#	#	#	662	†	†
At age 30 expects to be a homemaker	F1OCC30 = 4	0.1	0.12	0.13	662	0.76	0.87
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.66	0.65	662	1.04	1.02
At age 30 expects to be in the military	F1OCC30 = 7	0.3	0.19	0.22	662	0.74	0.86
At age 30 expects to be an operative	F1OCC30 = 8	1.7	0.55	0.50	662	1.22	1.10
At age 30 expects to be a professional (group b)	F1OCC30 = 10	5.9	1.07	0.92	662	1.36	1.17
At age 30 expects to be a school teacher	F1OCC30 = 14	0.6	0.31	0.29	662	1.10	1.05
At age 30 expects to be in a technical field	F1OCC30 = 16	3.6	0.85	0.72	662	1.39	1.18
At age 30 doesn't know what expects to be	F1OCC30 = -1	36.8	2.27	1.88	662	1.47	1.21
Summary statistics							
Mean						1.31	1.14
Minimum						0.74	0.86
Median						1.31	1.15
Maximum						2.04	1.43
Standard deviation						0.24	0.11

† Not applicable.
[#] Rounds to zero.
NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Table I-38. Dropout design effects, by item using base-year to first follow-up panel weight—All: 2004

Survey item (or composite variable)	Variable	Estimate	Design standard error	Simple random sample standard error	N	DEFF	DEFT
11th grade was the last grade attended in school	F1D20 = 2	49.8	2.15	1.96	651	1.20	1.09
Left school for a job	F1D29A = 1	27.8	2.07	1.74	662	1.42	1.19
Left school because they did not like it	F1D29B = 1	36.6	2.27	1.87	663	1.47	1.21
Left school because they could not get along with teachers	F1D29C = 1	25.0	2.15	1.68	664	1.64	1.28
Left school because they were pregnant	F1D29E = 1	27.8	2.91	2.64	289	1.21	1.10
Left school because they did not feel safe	F1D29I = 1	10.0	1.45	1.17	660	1.54	1.24
Left school because they were expelled	F1D29K = 1	9.9	1.37	1.16	662	1.41	1.19
Left school because they had no feeling of belonging	F1D29L = 1	19.9	1.96	1.55	662	1.59	1.26
Left school because they were getting poor grades/failing	F1D29N = 1	38.0	2.16	1.89	663	1.31	1.15
Left school because getting a GED was easier	F1D29T = 1	40.5	2.33	1.91	661	1.49	1.22
Plans to get GED or high school diploma	F1D41 = 2	86.8	1.51	1.32	660	1.32	1.15
Currently taking class to prepare for the GED	F1D46 = 1	20.7	1.96	1.70	571	1.33	1.15
Watches TV/DVD 2-3 hours a day on weekdays	F1D51A = 4	18.1	1.66	1.51	649	1.21	1.10
Uses the computer at home once or twice a week	F1D54A = 4	21.9	1.74	1.61	661	1.17	1.08
Being successful in line of work is very important	F1D56A = 3	84.1	1.61	1.42	659	1.27	1.13
Marrying the right person is very important	F1D56B = 3	75.2	2.01	1.68	661	1.43	1.20
Having lots of money is very important	F1D56C = 3	43.5	2.27	1.93	661	1.39	1.18
Having strong friendships is very important	F1D56D = 3	74.5	1.92	1.70	658	1.27	1.13
Being able to find steady work is very important	F1D56E = 3	87.2	1.38	1.30	660	1.12	1.06
Lives with mother only	F1FCOMP = 5	26.2	1.89	1.70	669	1.23	1.11
Native language is Spanish	F1HOMLNG = 2	15.9	2.06	1.45	634	2.01	1.42
At age 30 expects to be a farmer, farm manager	F1OCC30 = 3	#	#	#	646	†	†
At age 30 expects to be a homemaker	F1OCC30 = 4	0.1	0.11	0.13	646	0.70	0.84
At age 30 expects to be a manager, administrator	F1OCC30 = 6	2.8	0.65	0.65	646	0.99	0.99
At age 30 expects to be in the military	F1OCC30 = 7	0.3	0.20	0.23	646	0.75	0.87
At age 30 expects to be an operative	F1OCC30 = 8	1.7	0.55	0.51	646	1.19	1.09
At age 30 expects to be a professional (group b)	F1OCC30 = 10	6.1	1.11	0.94	646	1.40	1.18
At age 30 expects to be a school teacher	F1OCC30 = 14	0.6	0.31	0.30	646	1.08	1.04
At age 30 expects to be in a technical field	F1OCC30 = 16	3.6	0.85	0.73	646	1.35	1.16
At age 30 doesn't know what expects to be	F1OCC30 = -1	36.7	2.31	1.90	646	1.48	1.22
Summary statistics							
Mean						1.31	1.14
Minimum						0.70	0.84
Median						1.32	1.15
Maximum						2.01	1.42
Standard deviation						0.25	0.11

† Not applicable.
\# Rounds to zero.
NOTE: DEFF = design effect; DEFT = root design effect; N = sample size.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Public-Use Data File, 2004."

Appendix J
Synopsis of the ELS:2002 First Follow-up Field Test (2003)

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J.1 Overview of the First Follow-up Field Test

The overall purpose of the Education Longitudinal Study of 2002 (ELS:2002) first follow-up field test was to provide a trial and evaluation of the instruments, forms, sampling, data collection, and processing procedures to be used in the main study 1 year later. The field test also provided a basis for evaluating the adequacy of the study design as manifested in a follow-up round of data collection. A major product of the field test was recommendations for how main study instruments and procedures can be improved. Data generated in the field test have been used both to guide the final choice of test and questionnaire items and to support specific recommendations for the revision of questionnaire and test items and survey procedures.

The overall design for the field test included testing the process of gaining cooperation once again from base-year field test schools (and associated districts) and implementing the five main data-gathering components of the study:

- an in-school student survey and assessment;
- a dropout survey;
- an out-of-school survey of transfer and homeschooled students and early graduates;
- a survey of school administrators; and
- a school records component (collection of academic transcripts).

Special procedures to be evaluated in the field test included the following:

- examination of the impact of monetary incentives on in-school student participation;
- freshening of the cohort to make it representative of high school seniors;
- tracing of students who have left their base-year school;
- identification of both regular and augmented dropouts; and
- receipt of school, parent, and student permission for the transcript component.

In addition, the field test served to evaluate the various survey instruments: the questionnaire and mathematics test for students in the core ELS school sample, the transfer student questionnaire, the early graduate questionnaire, the questionnaire for homeschooled students, the dropout questionnaire, and the school administrator questionnaire.

Instruments were evaluated in a number of ways. For the questionnaires, analyses included evaluation of item nonresponse, test-retest reliabilities, scale reliabilities, and correlations between theoretically related measures. For the achievement tests in mathematics, item parameters were estimated and both classical and Item Response Theory (IRT) techniques employed to determine the most appropriate items for inclusion in the first follow-up math test. In addition, items were tested for differential item functioning (DIF) to see if they had different meaning for different subgroups such that a given item could put a subgroup at an unjustified disadvantage in terms of assessment results.

The school sample for the field test comprised over 50 public and private schools in the five field test states. The states—New York, North Carolina, Texas, Illinois, and Florida—were chosen in the base year on the basis of their demographic heterogeneity and represent various regions of the United States.

This synopsis of 2003 field test results focuses on several areas of key importance for planning and implementing the 2004 full-scale study. One such area is that of formulating and testing plans for sample freshening, to ensure that a nationally representative senior cohort could be identified and surveyed in the first follow-up. A second area of concern was designing and testing a program of student incentives that could be used to help achieve outstandingly high in-school response rates. A third area of critical importance was use of the field test to refine the design for the ELS:2002 mathematics assessment.

J.2 Sample Freshening

Because part of the target population consisted of those students who were enrolled in the 12th grade in the 2002–03 school year (or for the main study, 2003–04), the first follow-up field test included students at the base-year sample school who were enrolled in the 12th grade but were not in the 10th grade in the United States during the 2000–01 school year, at the time of the base-year survey. During this time, such students may have been out of the country or enrolled in school in the United States in a grade other than 10th (either at the sampled school or at another school). In addition, some students may have reenrolled, although they were temporarily out of school during the 2000–01 school year because of illness, injury, being institutionalized, being homeschooled, or having dropped out of school.

Student freshening was limited to the base-year sample schools because all sample students were identified at these schools regardless of their status and could be linked to potential freshened students. However, the freshening process was also performed at a handful of new schools that had effectively replaced base-year schools. These schools received base-year students in an en masse transfer because the base-year school had either closed or did not offer a 12th grade. Some small amount of bias may arise from the fact that some students eligible for freshening did not have a chance of selection if they attended a new school (one that came into existence subsequent to the base year), since, owing to cost and logistical constraints, freshening was not conducted in schools to which base-year sample members transferred (other than in the case of en masse transfer).

The freshening process differed somewhat from the procedures used in the National Education Longitudinal Study of 1988 (NELS:88). In both studies, students on the 12th-grade list following 10th-grade sample students were identified. In NELS:88, the school was asked about all of those identified students, but in the ELS:2002 field test, the school was asked only about those students not on the 10th-grade list. The latter method places less burden on the school and may identify more students eligible to be included in the sample.

List collection was the basis for identification of the freshened sample. If both the original and new enrollment lists were electronic, they were sorted alphabetically within stratum (as the original list was sorted for sample selection) to facilitate the comparison of the original and new lists. If one of the lists was electronic and one was hard copy, then the electronic list was sorted alphabetically within stratum and printed for the freshening process. If both lists were hard copy, then they were used as is in the freshening process.

The freshening process began by identifying the base-year sample students on the new list. If the student immediately following each sampled base-year student within the race/ethnicity strata on the new list was not on the original list, then that student was selected as a potential addition to the sample. Whenever a potential new sample student was identified, the next student on the list was examined to determine whether that student was on the original list. If this next student was not on the original list, then the student was also a potential addition to the sample. This process was continued until reaching a student who was on the original list. Then, this process was repeated with the next base-year sample student on the list.[1]

Next, the school was contacted to determine the eligibility of the freshened students. Any student identified as eligible by the school was selected into the sample. Some 275 high school seniors were identified as potential candidates for the first follow-up freshening sample. Of these 275 students, 57 (22 percent) were found to be eligible for inclusion in the study, 205 students were found to be ineligible, and 13 students' eligibility was undetermined. The high ineligibility rate was expected since the freshening procedure selected 12th-grade students who were not on the 10th-grade list without information on their status in the 10th grade. Many of these sampled students were 10th-graders who transferred in from another school, which contributed to the high ineligibility rate. The expected number of freshened students was about 1 per school. The actual number of freshened students was approximately 1.2 students per school (57 students out of 46 schools that sent 12th-grade enrollment lists).

J.3 Maximizing In-School Response Rates Through the Use of Incentives

A major concern for the first follow-up was achieving a high in-school student response rate, given that spring term of senior year is a time when many students are disengaging from high school, and response propensities are historically low, particularly for low-stakes/high-burden assessments and surveys. An incentive experiment was therefore undertaken.

J.3.1 Incentive Experiment

To explore means to obtain the needed high response rates in the ELS:2002 first follow-up, a test of student-level incentives was implemented in the 2003 field test. The key hypothesis to be tested was that providing a $20 cash incentive would prove more effective than a token incentive in eliciting high levels of student participation.

J.3.1.1 Incentives Experiment: Design

Schools in the 2003 first follow-up field test were essentially the same schools that had participated in the base-year field test in 2001. A listing of the schools was sorted by school sector (private vs. public), state, region (urban, suburban, and rural), and consent type (active vs. passive). After sorting, systematic sampling was used to divide the field test schools into two

[1] This process is also known as the half-open interval rule. For further information on half-open interval procedures, see Kish (1965, p. 56) or Groves (1989, p. 127).

groups: one receiving monetary incentives and one not receiving monetary incentives. In this example of systematic sampling (an analogue of random sampling), a sample selection flag (0 vs. 1) was assigned to each school alternating between 0 and 1 until all schools had an assignment. After the incentive assignments were made, distributions of the sorting variables were examined to check the distributions across the control variables.

After sampling had been completed, coordinators at schools selected for the incentive treatment were contacted by telephone to advise them of the availability of cash incentives for participating students and to confirm that it was permissible to offer a cash incentive to the students. Some schools preferred a noncash monetary incentive (such as gift certificates); these and other arrangements were allowed (further detail appears below). In schools where incentives of any kind were approved, the type of incentive and amount were stated in the parent consent letter. A flyer mentioning the incentive was also included in the parent consent mailing for the parent to share with the selected student. The flyer invited the student to participate in the study and announced the incentive treatment that participating students at the school were to receive ($20 cash, $20 gift certificate, or, in one case, a pizza party). Additionally, it was requested that the school coordinator reinforce awareness of the incentive by mentioning it to sampled students prior to the scheduled survey day.

Survey administrators presented cash/gift certificates to each participating student immediately following completion of the questionnaire and test. At schools that were not selected for monetary incentives, the survey administrator presented each participating student with a token incentive of relatively small monetary value (a “Class of 2003” key ring) after completing the questionnaire and test. In both cases, participating students received the incentive whether they participated on Survey Day or a Makeup Day.

J.3.1.2 Incentives Experiment: Results

Results of the experiment were as follows. Of the 27 schools selected to receive monetary incentives, 16 allowed the students to be paid in cash, 9 allowed each participating student to be given an equivalent amount ($20) in a bookstore gift certificate, and 1 used the incentive money for a pizza party for the participating students. One school refused any incentive of any kind. This school and the pizza party school were not included in the analysis.

Of the remaining schools, 19 were not offered incentives, and 4 schools, which were not statistically sampled and were not included in the experiment, were offered incentives on a special case basis.[2]

To test the hypothesis that cash incentives would have a positive effect on participation, chi-squared tests were performed. A respondent was defined as an eligible student who participated in the in-school survey by completing at least the student questionnaire.

[2] These four schools were offered an incentive due to the extra burden of either not administering the survey during the regular school day or mailing parental consent forms for student participation. Of these four schools, two allowed cash incentives, one allowed a gift certificate, and one refused the incentive. Again, these schools were not included in the analysis of results of the experiment.

As shown in table J-1, for both active and passive consent schools combined, there was a significant difference ($p = 0.036$) in the response rates for students who received a monetary incentive of either cash or a gift certificate and those students who did not receive any incentive. When the two incentive types were examined separately, students who received cash incentives were more likely to respond than those who did not receive any incentive ($p = 0.032$). However, when students were offered only gift certificates as incentives, there was no significant difference ($p = 0.307$) in student response rates.

Table J-1. Response rate comparisons, by **school consent type and incentive type: 2003**

Characteristic	Total students	Response rate (percent)	*P* value
Respondent status for all students	742	88.41	
Cash and gift certificate incentive	415	90.60	
Token incentive	327	85.63	0.036
Cash incentive	285	91.23	
Token incentive	327	85.63	0.032
Gift certificate incentive	130	89.23	
Token incentive	327	85.63	0.307
Respondent status for students in passive schools	607	90.94	
Cash and gift certificate incentive	304	93.09	
Token incentive	303	88.78	0.064
Cash incentive	174	95.98	
Token incentive	303	88.78	0.007
Gift certificate incentive	130	89.23	
Token incentive	303	88.78	0.891
Respondent status for students in active schools	135	77.04	
Cash and gift certificate incentive	111	83.78	
Token incentive	24	45.83	0.000
Cash incentive	111	83.78	
Token incentive	24	45.83	0.000
Gift certificate incentive	0		
Token incentive	24	45.83	†

† Not applicable.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Field Test, 2003."

In passive consent schools, the response rates were significantly different at .10 ($p = 0.064$) among students who received either a cash incentive or gift certificate and those who did not. Similar results were found for those students receiving a cash incentive ($p = 0.007$). However, when students in passive consent schools were offered only gift certificates as incentives, there was no significant difference ($p = 0.891$) in student response rates.

For the two active consent schools, one school received an incentive in the form of cash and one received no incentive. Therefore, only a significance test for differences in response rates based on cash incentive could be performed. Thus, for active consent schools, the data showed that students receiving cash incentives were more likely to respond ($p = 0.000$) than those students not receiving any incentive.

In addition to the issue of participation, a further issue was quality or completeness of participation, that is, whether respondents completed both the questionnaire and the test. Overall, 94.2 percent of questionnaire completers were also test completers, with very little variation between treatment groups.

Given the positive outcome of the incentives experiment, a cash incentive was adopted for the main study in-school survey. Of course, incentives to participate are an issue for the out-of-school sample as well, and perhaps particularly for high school dropouts. Although no formal experiment took place with the out-of-school group, an incentive was also implemented for the full-scale out-of-school sample.

As a postscript to the discussion of the 2003 field test experiment, it may be of interest to examine results of the 2004 main study, in terms of the possible effects of the incentives designed in the field test. There is no basis for conclusively attributing the success of the main study—a 91.2 percent unweighted or 89.0 percent weighted student in-school response rate,[3] a higher response rate than achieved for sophomores 2 years before—specifically to a cash incentive. Nevertheless, the results are at least consistent with such a relationship and are especially suggestive given the success of the incentives experiment in the field test. Table J-2 provides a concise summary of main study ELS:2002 first follow-up completion rates by type of incentive received.

[3] Although this response rate is predicated upon questionnaire completion, it should be noted that the assessment was was completed by 99.1 percent (weighted and unweighted) of the in-school questionnaire completers. By qualitative measures, such as number of omitted items or strength of coefficient alpha reliabilities, the tests were taken with seriousness by the test takers, as seriously at least as the low-stakes tests in prior studies, such as NELS:88, which did not give the test takers a cash incentive.

Table J-2. ELS:2002 in-school unweighted completion rate, by school consent type and incentive type: Spring term 2004

Characteristic	Number of students	Number of respondents	Response rate (percent)
Total	12,048	11,276	93.59
Active consent	941	804	85.44
Cash	685	605	88.32
Gift certificate	209	157	75.12
Other	47	42	89.36
Passive consent	11,107	10,472	94.28
Cash	7,955	7,605	95.60
Gift certificate	2,356	2,146	91.09
Other	444	401	90.32
None	352	320	90.91

NOTE: Because this is a methodological table, it contains some cases that were not included in other ELS:2002 first follow-up tables; therefore, respondent totals may not wholly agree with other tables in this data file documentation (NCES 2006–344). For purposes of reporting the in-school incentive results, cases were included from so-called convenience schools (see chapter 4), as well as all freshening cases, regardless of whether they were included on the data file.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, 2004."

J.4 Assessment Design Issues and Recommendations

The field test was designed to help provide information to successfully deal with a number of testing issues:

- About 90 percent of base-year mathematics questions were presented in multiple-choice format. The 10 percent of items that were open ended were scored as right or wrong, with no partial credit awarded. Results of the 10th-grade testing were used to recast the selected open-ended items in multiple-choice format. This was intended not only to save time and expense in scoring but to increase scoring accuracy and reduce administration time.
- The 2001 base-year field test results suggested that additional difficult mathematics questions would be required to avoid ceiling effects in the high-difficulty first follow-up test form. Several of the most difficult NELS:88 items were added to the 2003 first follow-up field test forms.
- Two test forms of approximately parallel difficulty and content were employed in the first follow-up field test, with a total of 63 test items. Booklet covers and answer sheets were color coded to avoid confusion.
- Some first follow-up participants were not tested in mathematics in 10th grade and thus lacked the base-year ability estimate required for test form assignment. A broadband form was therefore developed for administration to freshened sample students and others who lacked base-year mathematics scores. This form was designed to provide an approximately rectangular distribution of item difficulties that would make it suitable for a wide range of achievement levels.

Each of the 63 field test items was selected to serve a particular purpose:

- to evaluate the performance of items that were reformatted from open-ended to multiple-choice presentation (10 items);
- to obtain statistics on a set of items with higher difficulty levels than most of those used in 10th grade, to avoid a ceiling effect in the first follow-up (8 items); and
- to provide a link to grade 10 main study score scales (45 items).

The 45 grade 10 items used in the first follow-up field test were selected for one or more of the following reasons:

- 15 items: Items that were administered to all 10th-grade main study participants are valuable for targeting the level of difficulty required for the first follow-up test forms. The same 15-item routing test was administered to all students in the base year. This routing test included the items that defined the middle three mathematics proficiency levels (levels 2, 3, and 4) in the NELS:88 survey. (One additional item, counted below, appeared in all three base-year second-stage forms.)
- 8 items: The lowest and highest NELS:88 mathematics proficiency levels (levels 1 and 5), consisting of 4 items each, appeared in the ELS:2002 base-year low and high second-stage forms, respectively. Percentage correct for students who received these items in the base year was compared with percentage correct for the low and high quartile of 2003 field test participants. The first follow-up main study plan called for selecting a test form for each student based on his or her performance in 10th grade. Analysis of grade 10 main study versus grade 12 field test performance on these items supplemented the information available from the 15 routing test items for estimating growth trajectories for the low and high quartiles of the base-year sample.
- 12 items: The first follow-up field test contained 12 of the items that showed the biggest grade 10 versus grade 12 differences in the base-year field test. These items were considered prime candidates for selection for first follow-up main study forms because they were likely to be strongly curriculum related. (They included the one item mentioned above that was used in all three grade 10 second-stage forms.)
- 3 items: Some of the 10th-grade mathematics items consisted of several questions based on the same stem or premise and increasing in difficulty. Three of the field test items that might not otherwise have been selected were included because they were part of item sets, and statistics for other items in the sets might have been affected if the context had been changed.
- 7 items: After the 38 items above had been selected for the reasons described, there were some large gaps in the estimated difficulty ranges of the field test forms. Seven additional items were selected to fill these gaps.

Tables J-3 and J-4 list the 63 first follow-up field test items: 32 in form A and 31 in form B. The column labeled “ELS:2002 grade 10 form” shows the item usage in the base year, if any. Form W is the routing test, and forms X, Y, and Z are the low, middle, and high second-stage forms, respectively. The reasons for selection are listed for each item. “Estimated B” is the item difficulty, in a metric corresponding to the estimates that were used for matching test forms to students' ability. Difficulty estimates for items not previously used in ELS:2002 tests (the new NELS:88 items and the open-ended items reformatted to multiple choice) were derived from whatever information was available from other uses or other versions of the items. Other columns show the original source of each item (prior to any revisions that may have been implemented) and the content and process categories used for modeling the ELS:2002 test on NELS:88 test specifications.

Table J-3. Field test items, form A, "Yellow Form," by usage: 2003

2003 field test form, #	ELS:2002 grade 10 form	Reason for selection	Est. B	Original source	Content	Process
A1	X	Prof lev 1	-2.19	NELS	Arithmetic	Skill/knowledge
A2	X	Prof lev 1	-2.21	NELS	Arithmetic	Skill/knowledge
A3	X	Prof lev 1	-0.76	NELS	Arithmetic	Skill/knowledge
A4	W	Gr10 routing	-0.33	NELS	Algebra	Understanding/comprehension
A5	W	Gr10 routing	0.12	NELS	Geometry	Understanding/comprehension
A6	W	Gr10 routing	-0.19	NELS	Algebra	Skill/knowledge
A7	W	Gr10 routing	-0.46	NELS	Algebra	Understanding/comprehension
A8	X	Fill gap	-1.28	NELS	Arithmetic	Skill/knowledge
A9	W	Gr10 routing	-1.19	NELS	Data/probability	Understanding/comprehension
A10	XY	Biggest gain	-0.42	NELS	Arithmetic	Problem solving
A11	Y	Biggest gain	0.00	NAEP	Geometry	Understanding/comprehension
A12	XY	Reformat	-0.30	PISA	Arithmetic	Understanding/comprehension
A13	W	Gr10 routing	1.26	NELS	Algebra	Problem solving
A14	Y	Fill gap	0.33	NELS	Advanced topics	Problem solving
A15	Z	Fill gap	2.01	NELS	Arithmetic	Problem solving
A16	XY	Biggest gain	0.00	PISA	Data/probability	Skill/knowledge
A17	XY	Part of set	-1.48	PISA	Data/probability	Skill/knowledge
A18	XY	Part of set	-1.18	PISA	Data/probability	Skill/knowledge
A19	Y	Biggest gain	1.30	PISA	Data/probability	Problem solving
A20	YZ	Biggest gain	0.08	NAEP	Data/probability	Understanding/comprehension
A21	W	Gr10 routing	0.85	NELS	Algebra	Problem solving
A22	Z	Biggest gain	2.11	NELS	Geometry	Problem solving
A23		New NELS	1.41	NELS	Geometry	Problem solving
A24		New NELS	1.15	NELS	Advanced topics	Skill/knowledge
A25		New NELS	2.13	NELS	Geometry	Understanding/comprehension
A26		New NELS	2.27	NELS	Data/probability	Understanding/comprehension
A27		New NELS	2.78	NELS	Geometry	Problem solving
A28	Z	Reformat	2.60	PISA	Geometry	Problem solving
A29	Z	Part of set	0.00	PISA	Geometry	Problem solving
A30	Z	Reformat	2.30	PISA	Geometry	Problem solving
A31abcd	Z	Biggest gain	2.70	PISA	Geometry	Problem solving
A32	Z	Prof lev 5	2.92	NELS	Advanced topics	Understanding/comprehension

NOTE: NELS = National Education Longitudinal Study; NAEP = National Assessment of Educational Progress; PISA = Program for International Student Assessment.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Field Test, 2003."

Table J-4. Field test items, form B, "Blue Form," by usage: 2003

2003 field test form, #	ELS:2002 grade 10 form	Reason for selection	Est. B	Original source	Content	Process
B1	X	Fill gap	-1.30	NELS	Arithmetic	Skill/knowledge
B2	W	Gr10 routing	-0.54	NELS	Arithmetic	Skill/knowledge
B3	W	Gr10 routing	-0.60	NELS	Arithmetic	Skill/knowledge
B4	Y	Biggest gain	0.05	NELS	Arithmetic	Understanding/comprehension
B5	W	Gr10 routing	-0.26	NELS	Arithmetic	Skill/knowledge
B6	XY	Biggest gain	-0.50	NAEP	Algebra	Skill/knowledge
B7	X	Prof lev 1	-2.26	NELS	Arithmetic	Understanding/comprehension
B8	W	Gr10 routing	0.06	NELS	Algebra	Understanding/comprehension
B9	W	Gr10 routing	0.02	NELS	Arithmetic	Understanding/comprehension
B10	XY	Reformat	0.00	NAEP	Advanced topics	Understanding/comprehension
B11	YZ	Reformat	0.00	PISA	Advanced topics	Understanding/comprehension
B12	YZ	Reformat	2.80	PISA	Advanced topics	Understanding/comprehension
B13	YZ	Reformat	1.60	PISA	Advanced topics	Understanding/comprehension
B14	W	Gr10 routing	1.02	NELS	Geometry	Problem solving
B15	W	Gr10 routing	0.14	NELS	Geometry	Problem solving
B16ab	XYZ	Reformat	0.50	PISA	Geometry	Problem solving
B17	XYZ	Biggest gain	1.07	NELS	Advanced topics	Understanding/comprehension
B18	YZ	Biggest gain	1.29	NELS	Geometry	Understanding/comprehension
B19	W	Gr10 routing	1.02	NELS	Algebra	Understanding/comprehension
B20	YZ	Fill gap	0.40	NAEP	Geometry	Skill/knowledge
B21	YZ	Fill gap	1.60	NELS	Algebra	Understanding/comprehension
B22	Y	Fill gap	1.35	NELS	Geometry	Problem solving
B23	Z	Biggest gain	1.70	NAEP	Algebra	Understanding/comprehension
B24	Z	Reformat	1.80	NAEP	Algebra	Skill/knowledge
B25		New NELS	2.42	NELS	Data/probability	Skill/knowledge
B26		New NELS	2.26	NELS	Algebra	Understanding/comprehension
B27		New NELS	1.27	NELS	Algebra	Understanding/comprehension
B28	YZ	Reformat	1.90	PISA	Geometry	Problem solving
B29	Z	Prof lev 5	2.67	NELS	Data/probability	Problem solving
B30	Z	Prof lev 5	2.78	NELS	Geometry	Problem solving
B31	Z	Prof lev 5	2.56	NELS	Algebra	Problem solving

NOTE: NELS = National Education Longitudinal Study; NAEP = National Assessment of Educational Progress; PISA = Program for International Student Assessment.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Field Test, 2003."

J.4.1 Field Test Assessment Sample

Approximately 1,070 students in 52 schools took sets of mathematics items in the spring 2003 field test (see table J-5). Students were randomly assigned to one of the two field test booklets. There were slightly more females than males, with enough participants that DIF could be evaluated by gender. Sample sizes and response rates for racial/ethnic minority groups allowed evaluation of DIF for Hispanic compared with White students for about half of the field test items, and for Black compared with White students for about one-quarter of the items. About two-thirds of test takers also participated in other field test activities; the remaining one-third were "test augmentation cases" added to the regular field test sample for the purpose of collecting enough test data for evaluation of items. The test augmentation cases were primarily

12th-graders, with grades 9, 10, and 11 also represented, to reflect that not all main study 10th-graders progressed to 12th grade 2 years later.

Table J-5. Field test sample counts, selected characteristics: 2003

Characteristic	Form A, “Yellow Form”	Form B, “Blue Form”
Total	543	523
Male	265	250
Female	279	273
All other races/unknown	42	44
Black or African American	119	108
Hispanic or Latino	133	137
White	250	234
Public	520	497
Catholic	12	12
Other private	12	14
Test augmentation cases	184	171
Grade 9	6	3
Grade 10	9	7
Grade 11	49	49
Grade 12	120	112

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Field Test, 2003.”

J.4.2 Assessment Timing and Completion Rates

Completion rates indicated that the 26 minutes allotted for the first follow-up mathematics field tests were sufficient for most of the field test students (see table J-6). Not all students answered the last question, which could have been due to running out of time or discontinuing the test for some other reason. Nearly everyone got at least as far as question 24, about three-quarters of the way through the test form. On average, students answered all but one or two of the items in each form. The high proportion of students who answered most of the test questions, as well as the consistency of results (see later section on reliability), suggests that most of the students were motivated to take the test seriously.

Table J-6. Test form, by timing, number of items, and completion rates: 2003

Characteristic	Form A, “Yellow Form”	Form B, “Blue Form”
Time (minutes)	26	26
Number of questions	32	31
Completion rates		
Average number of items answered	29.8	30.0
Percentage reaching end of test	74%	85%
Percentage reaching item 24 (¾ of test)	95%	99%

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Field Test, 2003.”

Ten of the mathematics items were included in the first follow-up field test because they had been reformatted from open-ended presentation in the base year to multiple choice for the first follow-up. Although the primary reason for the reformatting was to increase scoring accuracy and reduce scoring complexity and expense, the change to multiple-choice format had a beneficial effect on response rates as well.

Results observed in the ELS:2002 base year and in the National Assessment of Educational Progress (NAEP) suggest that, in a low-stakes test, students are more likely to omit open-ended than multiple-choice questions. Score statistics show that this is not necessarily due to their inability to answer the questions but is probably influenced by their unwillingness to extend the extra effort required to produce an open-ended response. This effect is noted not only for questions that require an extended response, such as solving a problem or writing an equation, but also for questions that simply require making a choice, such as picking one of several alternative diagrams and writing in a letter code.

Table J-7 shows the percentage of omitted responses for the 10 questions that were open ended in the base-year field test and main study and for the same questions converted to multiple choice in the first follow-up field test. Omits are defined as unanswered questions followed by at least one question that was answered. The largest reductions in omit rates observed for the reformatted items tend to be for the most difficult questions.

Table J-7. Percentage of omitted responses for reformatted items, by study stage: 2003

Item	Base-year field test (open ended)	Base-year main study (open ended)	First follow-up field test (multiple choice)
A12	11	7	4
A28	11	8	3
A30	26	15	7
B10	8	9	7
B11	13	4-5	2
B12	14	5-6	2
B13	13	4-6	2
B16	8	3-7	0
B24	30	31-33	2
B28	9	6	2

NOTE: A range of percentages is reported in the table for items that appeared in more than one base-year second-stage form: omit rates were calculated separately by form. Omit rates are not reported when the item was the last item in the test, because failure to respond could be due to running out of time or discontinuing the test for some other reason.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “Base Year, Field Test, 2001,” “Base Year, Main Study, 2002,” and “First Follow-up, Field Test, 2003.”

J.4.3 Item and Test Performance

This section describes the psychometric characteristics of the first follow-up mathematics field test item pool. The specific goals—reformatting open-ended items, adding difficult items to the pool to avoid a ceiling effect in grade 12, and establishing a basis for selection of items for grade 12 forms—are evaluated. Tables J-8 and J-9 present item statistics for the yellow and blue field test forms.

Two different methodologies were used to evaluate item performance: classical item analysis and IRT estimation. The two methods reinforce each other in that both generate estimates of item difficulty and discrimination. In addition, each supplies a unique perspective on some aspect of the items that is not provided by the other tool.

J.4.3.1 Classical Item Analysis

Classical item analysis provides information on the total test, descriptive statistics for each test item, and the correlation of each item with the total test score. The number and percentage of test takers choosing each response option were computed, along with the average total test score for each of the response-option groups. The same statistics were computed for students who omitted each item but answered subsequent item(s) in the test and for those who omitted the item and did not answer any subsequent items ("not reached"). Item analysis tables also show "P+" (the percentage of correct responses) and R-biserials (adjusted correlations of item score with total test score). These statistics were reviewed to identify possible flaws in individual items, such as the following:

- An incorrect response option that is selected by very few test takers may need to be replaced by a more plausible choice.
- An item omitted by an unusually large number of test takers may have something unclear or offensive in the presentation.
- For each item, the mean total test score for students choosing the correct response should be substantially higher than the score means for each of the incorrect groups. If this is not the case, it is possible that the question stem, the keyed correct response, or one or more of the incorrect response options may be ambiguous or incorrect.
- Items that are much too easy (very high P+), with nearly all test takers able to answer correctly, may not be serving a useful purpose on the test.
- Very difficult items (such as a four-choice item with a P+ of 0.25 or below, which could result from random guessing) may or may not be serving a useful purpose. Examination of the mean scores for those answering right and wrong can suggest whether a test item is helping to make distinctions among students at the highest achievement levels or is merely being guessed at random.

The R-biserial statistic is a measure of discrimination, or how well each test item relates to the skill being measured by the test as a whole. Low R-biserials (below about 0.40) generally indicate items that are not strong measures of the overall construct.

Table J-8 summarizes the classical item statistics for the field test forms. The difficulty of the items was appropriate for the field test sample. The distribution of number right on each form was approximately rectangular, with no perfect scores on either form and only a small percentage of below-chance scores. Only two items were so easy that more than 90 percent of the test takers got them right, whereas seven items were answered correctly by less than 25 percent of students. When test forms were assembled for the first follow-up main study, additional easy items were needed for the easiest test form. These items were selected from among base-year items that were not field tested in 2003.

R-biserials were generally high, falling below 0.40 for 11 of the 63 items. Two of the low R-biserial items were questions that had been reformatted from open ended to multiple choice; three others were difficult NELS:88 items that had not previously been used in ELS:2002 test forms.

Response options were reviewed for the 10 base-year items that had been converted to multiple-choice format. The response options had been selected to represent the most popular incorrect answers (as well as the correct answer) obtained when the items were administered in open-ended format in the base year. Ideally, students who do not know the correct answer to a test question should be able to do no better than guessing at random among the response options. If the question is strongly related to the construct being measured, this would result in similar mean total test scores for the group choosing each incorrect option and a much higher mean for those choosing the correct answer. Each incorrect option should be selected by a substantial number of test takers: there should be no "throwaway" options that virtually all test takers could eliminate from consideration. Review of the item statistics for the 10 reformatted items showed no need for revisions. That is, each incorrect response option was selected by a satisfactory number of test takers, and total score means for all incorrect options were substantially lower than the means for the correct response.

Table J-8. Summary of classical item analysis statistics, by test form: 2003

Test measures	Form A, "Yellow Form"	Form B, "Blue Form"
Perfect scores (Form A: 32; Form B: 31)	0	0
More than 28 items correct	4%	1%
Chance scores (< 7 correct)	3%	5%
Mean number right (standard deviation)	17.2 (6.1)	15.6 (6.2)
Mean percentage correct (P+) for items	0.55	0.51
Mean R-biserial	0.57	0.59

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Field Test, 2003."

J.4.3.2 Item Response Theory (IRT)

IRT provides an alternative way of measuring item difficulty and discrimination. The Parscale program uses a three-parameter IRT model to estimate item characteristics and test-taker ability. The IRT "a" parameter is an estimate of the discriminating ability of a test item, or how well it serves to distinguish between adjacent levels of ability. This is somewhat analogous to the R-biserial but applies to a certain point on the ability continuum rather than an overall correlation. Items with "a" parameters of about 1.0 or higher are doing a good job of discriminating levels of ability. The "b" parameter is a difficulty estimate, analogous to the percentage correct but compensating for the possibility of guessing. Items with a range of difficulty that matches the estimated ability range of the test takers will be selected. The guessing parameter, "c," estimates the probability of a very low-skilled person answering the item correctly. It is important in obtaining estimates of probabilities of correct answers but was less important for the purpose of the field test, that is, for selecting items for the first follow-up main study forms. The Parscale program uses the scored-item responses to compute these item parameter estimates and ability estimates by iterating on the data until the system converges to within a predetermined tolerance.

Table J-9 summarizes item and student performance in terms of the IRT metrics. IRT scaling was carried out for the two field test forms combined, so that parameter estimates could be evaluated on the same scale.

Table J-9. Summary of Item Response Theory (IRT) estimates: 2003

IRT measure	Forms A and B combined
Average item “a” parameter (discrimination)	1.16
Average item “b” parameter (difficulty)	-0.13
Average theta (student ability)	-0.42
Standard deviation	1.01

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), “First Follow-up, Field Test, 2003.”

The “b” parameters for the field test items represent the item difficulty, corresponding to the ability level at which 50 percent of students would answer an item correctly, after compensating for guessing. Satisfactory parameters were obtained for items ranging from about 1.2 standard deviations below the mean ability of first follow-up participants to about 2 standard deviations above the mean. There were no large gaps in item difficulty, that is, no ability level within the expected first follow-up range that could not be matched to items of appropriate difficulty. As noted above, it was necessary to select base-year items that were not used in the field test for the main study first follow-up low difficulty test form.

Twenty of the 63 field test items had “a” parameters below 1.0, meaning that the ability of the item to discriminate between closely adjacent levels of ability was somewhat weak. Only 5 of the items had “a” parameters so low (below 0.70) that they were not likely to be selected for main study forms. The rest of the relatively weak items were chosen only if they were needed to fill difficulty gaps or to meet content specifications.

The IRT system also provides for both statistical and graphical approaches to evaluating how well the IRT model is doing in representing the actual data. Graphs of item response functions were reviewed for each of the field test items to determine how well the estimates fit the field test data. The graphs also show whether the fit is satisfactory at all ability levels or only within a limited range. Fit statistics provide a numerical way to evaluate the success of the IRT model for estimating performance on each item. Fit of data to the IRT model was satisfactory for virtually all field test items.

These two methodologies, classical item analysis and IRT, reinforce and complement each other by providing overlapping as well as unique information for evaluating item performance. Both offer measures of item difficulty and discrimination. In addition, classical item statistics supply information on performance of distractors (incorrect response options) and omit rates. IRT offers fit statistics and information on where along the ability continuum the item performs best. This was particularly useful in selecting items for the first follow-up main study test forms, where the ability range in which the item must perform was dictated by its assignment to a test form to be matched to each student’s expected achievement level. Combining information from the two methodologies provided a good idea of how well an item performed, whether any revisions were desirable, and whether the item was appropriate for all students or within a restricted range of ability.

J.4.4 Reliability

Reliabilities for the two mathematics forms were high (see table J-10). Coefficient alpha measures the internal consistency of the test, that is, the extent to which variance in performance on individual items is related to variance in performance on the whole test. The reliability of the IRT ability estimate is derived from a comparison of within-student variance to between-student variance. The field test reliability statistics are quite high for a test of 31 or 32 items. By coincidence alone, the alpha coefficients and reliability of the IRT ability estimate are identical for each test form. A consequence of the plan to select test forms to match students' ability levels in the main study was to expect a low alpha coefficient for each form but raise the reliability of the IRT-based ability estimates. Restricting the ability range of the students taking each form means that the variance of total scores on the form was expected to be lower than the randomly assigned field tests, and thus the alpha coefficient would be smaller. Conversely, a better match of items to each student's ability level than was the case for the broad range of items in the field test would result in better measurement for each student, that is, a higher reliability for the ability estimate.

Table J-10. Reliabilities, by test form: 2003

Reliability measure	Form A, "Yellow Form"	Form B, "Blue Form"
Alpha coefficient	0.86	0.87
Reliability of IRT theta (ability estimate)	0.86	0.87

NOTE: IRT = Item Response Theory.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Field Test, 2003."

J.4.5 Differential Item Functioning (DIF)

Cognitive test items were checked for DIF for males compared with females, and for Black and Hispanic students compared with White students, to the extent that sample sizes permitted. It is not necessarily expected that different subgroups of students will have the same average performance on a set of items. But when students from different groups are matched on overall ability, performance on each test item for the matched groups should be about the same. There should be no relative advantage or disadvantage based on the student's gender or racial/ethnic group alone.

The DIF procedure carries out comparisons of subgroup performance for a focal group (e.g., females) compared with a reference group (e.g., males) matched on a criterion (e.g., number right on the whole test). It is based on the Mantel-Haenszel odds ratio and its associated chi-square. Items are classified as "A," "B," or "C" depending on the statistical significance of subgroup differences as well as effect sizes. Items identified as having "C"-level DIF have detectable differences that are both sizeable and statistically significant. A finding of differential functioning, however, does not automatically mean that the difference in performance is unfairly related to subgroup membership. A judgment that these items are unfair to particular population groups requires not only the measure of DIF but also a determination that the difference in performance is not related to the construct being measured. In other words, different population subgroups may have differential exposure or skill in solving test items relating to a topic that is to be measured. If so, the finding of differential performance may be an important and valid measure of the targeted skill.

Analysis of the mathematics field test, using total number right score as the matching criterion, showed four items with C-level DIF, one favoring females and three favoring males. One of the items favoring males had already been identified in the base-year main study data and deleted from base-year scoring procedures. The remaining DIF items were reviewed and, if necessary, deleted from consideration for first follow-up forms.

A minimum of 100 matched-ability students in each subgroup is required for the DIF procedure to be carried out for each test item. Small sample sizes may result in spurious findings of DIF where none exists. The numbers of Black and Hispanic students responding to each test question were sufficient for evaluation of DIF for only about one-quarter of the questions for the Black versus White contrast and about half of the questions for Hispanic versus White.

J.4.6 Field Test Conclusions

J.4.6.1 Reformatted Items

Of the 10 items changed from open-ended to multiple-choice format, 7 had psychometric characteristics suitable for consideration for first follow-up main study forms. Table J-11 shows that the reformatting improved the R-biserial for the majority of the potentially useful items (relative to at least one of the base-year forms) and improved the IRT "a" parameter for all but one. The 2 items that had weak statistics in the multiple-choice versions had been weak in their original open-ended versions as well. In addition to maintaining or improving the psychometric characteristics of the items, the reformatting resulted in lower omit rates, as noted above, and was expected to reduce costs.

Table J-11. Summary statistics for reformatted items, by item type: 2003

	R-biserial		IRT "a" parameter		
Item	Base year (open ended)	Field test (multiple choice)	Base year (open ended)	Field test (multiple choice)	Notes
A12	0.54–0.66	0.62	0.98	1.01	
A28	0.46	0.34	0.71	0.91	
A30	0.44	0.41	0.69	0.51	Low "a," R-biserial
B10	0.50–0.64	0.68	0.98	1.02	
B11	0.46–0.55	0.65	1.07	1.17	
B12	0.43–0.55	0.45	0.82	1.50	
B13	0.30–0.51	0.60	0.92	1.08	DIF
B16	0.36–0.41	0.35	0.41	0.32	Low "a," R-biserial
B24	0.61	0.55	1.28	1.08	
B28	0.50	0.63	0.66	0.92	

NOTE: A range of R-biserials is reported in the table for items that appeared in more than one base-year second-stage form. R-biserials were calculated separately by form. DIF = differential item functioning; IRT = Item Response Theory.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Field Test, 2003."

J.4.6.2 Difficult Items

Table J-12 shows summary statistics for the most difficult items in the test, sorted in ascending order of the IRT difficulty parameter, "b." This is a more useful measure of difficulty than P+ (percentage correct), because the "b" parameter compensates for guessing while P+ does not. The table shows that there were sufficient numbers of items suitable for testing students whose ability level fell in the top quarter of field test participants (theta > 0.27, same metric as "b" parameter). Seven of the eight NELS items that were added to the ELS:2002 item pool have difficulty parameters in this high range, and two of these items were among the three most difficult items field tested.

Table J-12. Summary statistics for difficult items: 2003

	IRT parameters			Item statistics	
Item	a	b	c	P+	R-biserial
A24 (new NELS item)	1.54	0.13	0.16	0.43	0.72
B20	1.22	0.21	0.07	0.36	0.77
A13	0.99	0.22	0.17	0.44	0.61
B18	1.76	0.22	0.37	0.56	0.56
A23 (new NELS item)	1.70	0.31	0.22	0.43	0.63
B28	0.92	0.38	0.12	0.38	0.63
A22	1.60	0.41	0.13	0.31	0.71
B19	1.27	0.41	0.20	0.40	0.58
B22	1.08	0.41	0.16	0.39	0.64
A14	1.27	0.43	0.41	0.56	0.41
B21	1.07	0.52	0.11	0.33	0.65
B13	1.08	0.55	0.15	0.36	0.60
B26 (new NELS item)	1.46	0.63	0.24	0.39	0.52
A30	0.51	0.64	0.17	0.42	0.41
A19	1.26	0.76	0.12	0.28	0.60
A25 (new NELS item)	1.72	0.91	0.19	0.28	0.49
B27 (new NELS item)	0.81	0.97	0.13	0.29	0.50
A15	1.31	1.01	0.27	0.35	0.36
A26 (new NELS item)	0.77	1.09	0.26	0.40	0.36
B12	1.50	1.21	0.14	0.21	0.45
B23	0.97	1.23	0.23	0.33	0.36
B31	1.12	1.26	0.10	0.19	0.47
A28	0.91	1.30	0.24	0.34	0.34
A31	0.57	1.41	0.00	0.19	0.53
B29	1.89	1.53	0.10	0.14	0.30
B30	1.02	1.62	0.19	0.25	0.31
B25 (new NELS item)	0.78	1.73	0.18	0.25	0.34
A27 (new NELS item)	1.25	2.02	0.12	0.13	0.19
A32	0.90	2.04	0.14	0.19	0.25

NOTE: IRT = Item Response Theory; NELS = National Education Longitudinal Study; P+ = percentage correct.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "First Follow-up, Field Test, 2003."

Although two of the difficult items had "a" parameters that fell below the desired standard of 1.0, numerous high-quality items remained from which to select the first follow-up main study high form. For the most difficult items, the "a" parameter is a more useful measure of discrimination than the R-biserial, because the item may discriminate well only in the ability range close to its difficulty level but not at lower levels. Items with high "a" parameters and low R-biserials (such as A27) are suitable for a test form to be administered to high-ability students but not for easier forms.

J.4.6.3 Timing

The 26 minutes allotted was sufficient for most of the participants to complete the 31 or 32 items in the field test forms. With first follow-up main study forms selected according to the anticipated achievement level of the test takers, it should be possible to administer 30 to 35 test items in the same amount of time. This number of items are expected to result in a satisfactory level of reliability.

J.4.6.4 Grade 12 Item Pool

The 2003 mathematics field test resulted in a satisfactory item pool from which to assemble first follow-up main study test forms. Items of acceptable quality (high R-biserials and "a" parameters) were available for the full range of achievement levels encountered in the field test sample, without gaps in estimated difficulty. The item pool from which the main study forms were selected included all base-year main study items, with parameters calibrated on a common scale to facilitate comparisons. Review of item analysis statistics for response options showed no need for further revisions of items.

J.5 Appendix J References

Groves, R.M. (1989). *Survey Errors and Survey Costs.* New York: Wiley.

Kish, L.A. (1965). *Survey Sampling.* New York: Wiley.