

# Chapter 2: Common Core of Data (CCD)

## 1. OVERVIEW

The Common Core of Data (CCD) is NCES’ primary database on public elementary and secondary education in the United States. Every year CCD collects information from the universe of state education agencies (SEAs) on all public elementary and secondary schools and education agencies in the United States. CCD provides descriptive data about staff and students at the school, school district, and state levels. Information about revenues and expenditures is collected at the school district and state levels. Some of CCD’s component surveys date back to the 1930s. The integrated CCD was first implemented in 1987–88.

### Purpose

To provide basic statistical information on all children in this country receiving a public education from prekindergarten through 12<sup>th</sup> grade and information on the public funds collected and expended for providing public elementary and secondary education. The specific objectives of CCD are: (1) to provide an official listing of public elementary and secondary schools and education agencies in the nation which can be used to select samples for other NCES surveys, and (2) to provide basic information and descriptive statistics on public elementary and secondary schools and schooling.

### Components

There are four major components to CCD: the Public School Universe Survey, the Public Education Agency Universe Study, the State Nonfiscal Survey, and the national Public Education Financial Survey. There are also two other surveys: a separate survey that captures early estimates of key items collected in the component surveys (the Early Estimates Survey) and a Census Bureau financial survey that is cross-referenced to CCD (the School District Finance Survey). These surveys are completed by appointed CCD Coordinators in each of the state education agencies for the 50 states, the District of Columbia, the Bureau of Indian Affairs schools, the Department of Defense Dependents Schools, and 5 outlying areas (American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, Puerto Rico, and the Virgin Islands).

**Public School Universe Survey.** This survey collects information on all of the nearly 91,000 public elementary and secondary schools in the United States. Data include the school’s mailing address, telephone number, operating status, locale (ranging from large central city to rural), and type (“regular” or focused on a special area such as vocational education). The survey also collects student enrollment (membership) for every grade taught in the school; number of students in each of five racial/ethnic groups; number of students eligible for free lunch programs; and number of classroom teachers (reported as full-time equivalents). Beginning in 1998–99, several variables were added: location address (if different from mailing); Title I, magnet, and charter school status; number eligible for reduced price lunch programs; migrant students enrolled previous year; and breakout of enrollment by race and sex within grade.

## SURVEY OF THE UNIVERSE OF ELEMENTARY AND SECONDARY SCHOOLS

CCD collects data through these major components:

- ▶ Public School Universe Survey
- ▶ Public Education Agency Universe Survey
- ▶ State Nonfiscal Survey
- ▶ National Public Education Finance Survey
- ▶ School District Finance Survey
- ▶ Early Estimates Survey

**Public Education Agency Universe Survey.** This survey serves as a directory of basic information on more than 16,000 public education agencies. It collects the agency's mailing address, telephone number, county location, metropolitan status, and type of agency. The survey includes for the *current* year the total number of students enrolled (membership) in grades prekindergarten through 12; number of ungraded students; number of students with Individual Education Programs (IEPs); and number of instructional, support, and administrative staff. It includes for the *previous* year the number of high school graduates, other completers, and grade 7–12 dropouts. Dropout data were first collected in the 1992–93 CCD, reflecting dropouts for the 1991–92 school year. Items that were added in 1998–99 include location address, migrant students provided services during the previous summer, limited English proficiency (LEP) students provided services, and the number of diploma recipients and other high school completers by race and sex.

**State Nonfiscal Survey.** This survey collects information on all students and staff aggregated to the state level, including number of students by grade level; counts of full-time equivalent staff; and high school completers by race/ethnicity. Data on student enrollment and staffing are for the *current* school year. Data on high school completers and dropouts are for the *previous* year.

**National Public Education Financial Survey (NPEFS).** This survey collects detailed finance data at the state level, including average daily attendance, school district revenues by source (local, state, federal), and expenditures by function (instruction, support services, and noninstruction) and object (salaries, supplies, etc.). It also reports capital outlay and debt service expenditures.

**Early Estimates Survey.** This survey collects numbers of students enrolled in public elementary and secondary schools, high school graduates, and teachers, as well as total revenues and expenditures for the operation of public elementary and secondary schools. The survey is designed to allow NCES to report key state-level statistics during the school year to which they apply—compared to 1–2 years later for the other CCD surveys. All *Early Estimates* data are subject to revision.

**School District Finance Survey.** This survey collects detailed data by school district, including revenues by source, expenditures by function and subfunction, and enrollment. These data are collected through the Bureau

of Census' F-33, Annual Survey of Local Government Finances. Data were collected from all districts in the decennial census year (e.g., 1990) and years ending in 2 and 7, and from a large sample in remaining years. Beginning with fiscal year 1995, this is a census. The F-33 data goes back to fiscal year 1980; NCES began to substantially support the survey beginning with the FY 92 collection.

### Periodicity

Annual. Some of the component surveys were initiated during the 1930s. CCD, in its integrated form, was introduced in 1986–87.

## 2. USES OF DATA

CCD collects three categories of information: (1) general descriptive information on schools and school districts, including name, address, phone number, and type of locale; (2) data on students and staff, including demographic characteristics (e.g., race/ethnicity); and (3) fiscal data covering revenues and current expenditures. The datasets within CCD can be used separately or jointly to provide information on many topics related to education. The ease of linking CCD data with other datasets makes CCD an even more valuable resource.

CCD is not only a source of data for demonstrating relationships between different school, district, and state characteristics, but it also provides a historical record of schools or agencies of interest. This information can shed light on how and why education in the United States is changing. The types of schools or districts that have changed the most with respect to a measured characteristic (e.g., proportion of Hispanic students) can be identified, and reasons for these changes can be independently investigated. Similarly, the impacts of state and local education policies and practices can be assessed through an examination of changes in school and district characteristics. For example, districts that have shown substantial improvement in their racial balance or inter-racial exposure indices can be identified. The policies and practices employed by these districts can then be examined. By identifying the presence of significant changes and where these changes are occurring, CCD data can help policymakers and practitioners better target their efforts and help researchers develop more sharply focused hypotheses for investigating key education issues.

### 3. KEY CONCEPTS

The concepts described below pertain to the levels of data collection (school, agency, state) in CCD. For a comprehensive list of CCD terms and definitions, refer to the glossaries in CCD reports (e.g., *Key Statistics*) and technical user guides available on the Internet and CD-ROM.

**Public Education Agency.** An agency with administrative responsibility for providing instruction or specialized services to one or more elementary or secondary schools. Most of these agencies are *regular school districts* (also known as local education agencies or LEAs), which are locally administered and directly responsible for educating children. Other agencies include *supervisory unions* (providing administrative systems for smaller regular districts with which they are associated); *regional education service agencies* (offering research, data processing, special education or vocational program management, and other services to a number of client school districts); *state-operated school districts* (e.g., for the deaf and blind); *federally-operated school districts* (e.g., operated by the Bureau of Indian Affairs); and *other agencies* not meeting the definitions of the preceding categories (e.g., operated by a Department of Corrections).

**Public Elementary/Secondary School.** An institution that is linked with an *education agency*, serves students, and has an administrator. It is possible for more than one CCD-defined school to exist at a single location (e.g., an elementary and secondary school sharing a building, each with its own principal). One school may also spread across several locations (e.g., a multiple “store front” learning center managed by a single administrator).

CCD classifies schools by type. *Regular schools* provide instruction leading ultimately toward a standard high school diploma; they may also offer a range of specialized services. *Special education* and *vocational schools* have the provision of specialized services as their primary purpose. *Other alternative schools* focus on an instructional area not covered by the first three types (e.g., developing basic language and numeracy skills of adolescents at risk of dropping out of school).

Some schools do not report any students in *membership* (i.e., enrolled on the official CCD reporting day of October 1). This occurs when students are enrolled in more than one school but are reported for only one. For example, students whose instruction is divided between a regular and a vocational school may be reported only in

membership for the regular school. In other cases, a school may send the students for which it is responsible to another school for their education—a situation most likely in a small community that does not have sufficient students to warrant keeping a school open every year.

### 4. SURVEY DESIGN

#### Target Population

All public elementary and secondary schools (nearly 91,000), all LEAs (more than 16,000) and SEAs throughout the United States, including the District of Columbia, the overseas Department of Defense Dependents Schools, and five outlying areas.

#### Sample Design

CCD collects information from the universe of state-level education agencies.

#### Data Collection and Processing

CCD data are voluntarily obtained from state administrative records of information collected and edited by the SEA during its regular reporting cycle for the state.

**Reference dates.** Most data for the nonfiscal surveys are collected for a particular school year (September through August). The official reference date is October 1 or the closest school day to October 1. Special education, free-lunch eligible, and racial/ethnic counts may be taken on December 1 or the closest school day to that date. Student and teacher data are reported for the *current* school year, whereas data for high school graduates, other completers, and dropouts reflect the *previous* year. Fiscal data are for the previous fiscal year, thus FY 98 represents the 1997–98 school year.

**Data collection.** Survey instruments are usually distributed to the states in January. A State CCD Coordinator, appointed by the Chief State School Officer, is responsible for overseeing the completion of the surveys (the Coordinator for the fiscal surveys is often a different person than for the nonfiscal surveys). To assure comparable data across states, NCES provides the CCD Coordinator with a set of standard critical definitions for all survey items. In addition, data conferences and training sessions are held at least yearly. The state’s data plan identifies any definitional differences between the state’s recordkeeping and CCD’s collection, and any adjustments made by the state to achieve comparability. Counts across CCD surveys may not be identical, but differences should

be consistent and the state is asked to describe the reason for the discrepancy.

NCES provides the state with general information collected during the previous survey on each district and school (e.g., name, address, phone number, locale code, and type of school/district). This information must be verified as correct by the CCD Coordinator or recoded with the correct information. The Coordinator must also assign appropriate identification codes to new schools and agencies, and update the operational status codes for schools and agencies that have closed.

CCD data are compiled into prescribed formats and submitted. Nonfiscal data are submitted via diskette or the Internet. Fiscal data are submitted via the web, Internet, diskette, or paper. CCD requests that the data be submitted by March 15 (or the Monday following March 15 if March 15 occurs on a weekend); the CCD nonfiscal closing date to submit the previous year's data is October 1. For fiscal data, the closing date for the current survey year collection is the Tuesday following Labor Day. Corrections to submitted fiscal data are accepted until October 1, but only corrections that lower a state's current expenditure per pupil are accepted after the "Labor Tuesday" deadline for use in the formula for allocating Title I and other ED funding to state and local school systems.

**Editing.** Completed surveys undergo comprehensive editing by NCES and the states. Where data are determined to be inconsistent, missing, or out of range, NCES contacts the SEAs for verification. States are given the edit software that NCES uses to review their data. They are also asked to confirm prepared summaries of the collected information. At this time, the states may revise data collected in the previous survey cycle. NCES examines the data from the 120 largest school districts on a record-by-record basis, setting up fail-safe edit checks to catch unexplained anomalies. In addition, records are processed through a post-edit to replace blanks and nonmeaningful zeroes with meaningful responses. After editing, final adjustments for missing data are performed.

**Early Estimates Survey.** The State Coordinators receive survey forms in October and are requested to return them as soon as possible by mail or fax. Coordinators who do not respond by late November are contacted by telephone. All data are checked for reasonableness against prior years' reports, and follow-up calls are made to resolve any questions. When states do not supply a count or estimate, NCES estimates a value. State-supplied estimates that

indicate a 10 percent increase or decrease greater than the national average is replaced with NCES estimated values. Early estimates represent the best information available midway through the school year and are reported by NCES in the current school year. All early estimates are subject to later revision.

### Estimation Methods

NCES estimates missing values to improve data comparability across states. Only state-level data are estimated on a regular basis. Missing values in the Public School and Agency Universe Surveys are generally left as missing, with a few exceptions.

There are two basic estimation methods: imputation and adjustment. *Imputation* is performed when the missing value for a data item is not reported at all, indicating that subtotals and totals containing the category are underreported. Imputation assigns a value to the missing item, and the subtotals and totals containing this item are increased by the amount of the imputation. *Adjustment* corrects a situation in which a value reported for one item contains a value for one or more additional items not reported elsewhere. The original value is reduced by an appropriate amount, which is distributed to the items missing a value. All totals and subtotals are then recalculated. If it is not possible to impute or adjust for a missing value, the item remains blank and is counted as "missing."

Every cell in the data file has a companion cell with a flag indicating whether the data contents were reported by the state (R) or placed there by NCES using one of several methodologies: adjustment (A); imputation based on the prior year's data (P); imputation based on a method other than the prior year's data (I); totaling based on the sum of internal or external detail (T); or combining with data provided elsewhere by the state (C).

**Estimating state-level nonfiscal data.** NCES imputes and adjusts some reported values for student and staff counts at the state level (including the District of Columbia). Imputations for prekindergarten students are performed first, followed by staff imputations and then other adjustments. No imputations or adjustments are made to racial/ethnic data.

**Estimating state-level fiscal data.** NCES also imputes and adjusts revenue and expenditure data. The federal standard, defined in *Financial Accounting for Local and State School Systems, 1990*, is used in the adjustments to distributed expenditure and revenue data. Adjustments

are also used to distribute direct state support expenditures to specific objects and functions. In some cases, local revenues from student activities and food services are imputed.

**Early Estimates Survey.** NCES imputes values for *Early Estimates* data when the states themselves do not provide preliminary counts or their own estimates of counts.

### Future Plans

Because it is an ongoing annual survey, CCD engages in continuous planning with its data users and providers. Changes are likely in 2004 due to the newly revised NCES Financial Accounting Handbook and new reporting implementation guidelines set by the Government Accounting Standards Board. The 2004 CCD will also incorporate tabulation guidelines for the newly approved racial and ethnic definitions.

NCES has contracted with the Census Bureau to produce a standardized district finance file and file documentation (meeting formal NCES requirements) for fiscal years 1990 to 1998. This work is still in progress.

## 5. DATA QUALITY AND COMPARABILITY

The data in CCD are obtained from the universe of SEAs, which are provided with a common set of definitions for all data items requested. In addition, NCES provides crosswalk software which converts a state's existing accounting reports to the federal standard, as indicated in *Financial Accounting for Local and State School Systems, 1990*. This ensures the most comparable and comprehensive information possible across states. As with any survey, however, there are possible sources of error, as described below.

### Sampling Error

Because CCD is a universe survey, its data are not subject to sampling errors.

### Nonsampling Error

**Coverage error.** A recent report, *Coverage Evaluation of the 1994–95 Common Core of Data: Public Elementary/Secondary Education Agency Universe Survey* (NCES 97–505), found that overall coverage in the Agency Universe Survey was 96.2 percent (in a comparison to state education directories). “Regular” agencies—those traditionally

responsible for providing public education—had almost total coverage in the 1994–95 survey. Most coverage discrepancies were attributed to nontraditional agencies that provide special education, vocational education, and other services.

### Nonresponse error.

**Unit nonresponse.** The unit of response in CCD is the state education agency. Under current NCES standards, the regular components of CCD are likely to receive at least partial information from every state, resulting in a 100 percent unit response rate.

**Item nonresponse.** Any data item missing for one school district is generally missing for other districts in the same state. The following items have higher than normal nonresponse: free-lunch-eligible students by school; nonregular agencies; and dropouts. Some states assign all ungraded students to one grade and therefore do not report any ungraded students.

Several items have shown marked improvement in response during recent years. Student enrollment was only reported for 80 percent of the districts in 1986–87, but is now available for about 100 percent. Reports of student race/ethnicity at the school level increased from 63 percent in 1987–88 (when first requested) to nearly 100 percent today.

**Measurement error.** Measurement error typically results from varying interpretations of NCES definitions, differing recordkeeping systems in the states, and failures to distinguish between zero, missing, and inapplicable in the reporting of data. NCES attempts to minimize these errors by working closely with the state CCD Coordinators.

**Definitional differences.** Although states follow a common set of definitions in their CCD reports, the differences in how states organize education lead to some limitations in the reporting of data, particularly regarding dropouts. CCD definitions appear to be less problematic for NPEFS Coordinators, although data on average daily attendance in NPEFS are not comparable across states. States provide figures for average daily attendance in accordance with state law; NCES provides a definition for states to use in the absence of state law. Because of this lack of comparability, student membership counts from the State Nonfiscal Survey are used as the official state counts.

Because not all states follow the CCD *dropout* definition and reporting specifications, dropout counts cannot be compared accurately across states. For states that do not

comply with the CCD definition, the dropout count is blanked out in the database and considered missing. Currently, there is considerable variation across local, state, and federal data collections on how to define dropouts. CCD's definition differs from that in other data sources, including the High School and Beyond Study, the National Education Longitudinal Study of 1988, and the Current Population Survey (CPS, conducted by the Bureau of the Census). Although the collection of dropout information in CCD was designed to be consistent with procedures for the CPS, differences remain. CCD dropout data are obtained from state administrative records (whereas CPS obtains this information from a household survey). CCD includes dropouts in grades 7 through 12 (whereas CPS includes only grades 10 through 12).

States also vary in the kinds of high school completion credentials on which they collect data. Some issue a single diploma regardless of the student's course of study. Others award a range of different credentials depending upon whether the student completed the regular curriculum or addressed some other individualized set of education goals. Unreported information is shown as missing in CCD data files and published tables unless it is possible to impute or adjust a value (see section 4, Estimation Methods).

*Changes in state reporting practices.* Basic characteristics of a school or district do not change frequently. However, a minor change in local or statewide reporting practices (such as two or three Coordinators instructing schools to review *all* of their general information) can have a large impact on the reliability and validity of CCD items. In 1990–91, a significant proportion (7 percent) of schools, primarily in three states, reported a change in locale code from the prior survey. While this undoubtedly provided better information on school locales in these states, data became less comparable across years. Such changes are rare, however, and tend to be clustered by state and year.

### **Data Comparability**

Most CCD items can be used to assess changes over time by state, district, and school. However, checks of the prevalence and patterns of nonresponse should be performed to assess the feasibility of any analysis. There may also be discontinuities in the data resulting from the introduction of new survey items, changes in state reporting practices, etc., and there may be inconsistencies across reporting levels in the numbers for the same data element (e.g., number of students).

**Content changes.** As new items are added to CCD, NCES encourages the states to incorporate into their own survey systems the items they do not already collect so that these data will be available in future rounds of CCD. Over time, this has resulted in fewer missing data cells in each state's response, thus reducing the need to impute data. Users should keep in mind, however, that while the restructuring of data collection systems can produce more complete and valid data, it can also make data less comparable over time. For example, prior to fiscal year 1989, public revenues were aggregated into four categories and expenditures into three functions. Because these broad categories did not provide policymakers with sufficient detail to understand changes in the fiscal conditions of states, the survey was expanded in 1990 to collect detailed data on all public revenues and expenditures within states for regular prekindergarten to grade 12 education.

**Comparisons within CCD.** A major goal of CCD is to provide comparable information across all surveys. The surveys are designed so that the schools in the Public School Universe are those reflected in the Public Agency Universe, and so that the data from these universes are reflected in the state aggregate surveys. While counts may not always be equal across reporting levels or even within the same level, differences should be consistent and explainable. For example, counts of students by race/ethnicity in the Public School Universe may not always be comparable to student counts by grade because these counts may be taken at different times.

For the most part, the total number of students in a regular district is close to the aggregated number of students in all of the district's schools. Since 1990, there has typically been agreement between these counts in at least 85 percent of the districts. Membership numbers in the Public School and Agency Universes may legitimately differ if: (1) there are students served by the district but not accounted to any school (e.g., hospitalized or homebound students), or (2) there are schools operated by the state Board of Education rather than by a local agency. To avoid confusion, NCES publishes the numbers of students and staff from the State Nonfiscal Survey as the official counts for each state.

Teacher counts may also vary across reporting levels. Teachers are reported in terms of full-time equivalency (FTE), rounded to the nearest tenth, in the Public School Universe. FTE teacher counts are rounded to the nearest whole number in the State Nonfiscal Survey.

**Comparisons with the Early Estimates Survey.** Early estimates are reported midway through the school year and do not undergo the verification and editing procedures required for the other CCD surveys. All early estimates are subject to revision once the data from the other CCD surveys are verified and adjustments completed. Numbers for a given data item in *Early Estimates* publications are likely to differ somewhat from numbers for that same data item reported in later NCES publications. Nevertheless, comparisons of estimated change from 1994–95 to 1995–96 (as reported in the *Early Estimates Survey*) and actual change (as reported in the regular CCD surveys) reveal differences of less than one percentage point for membership, high school graduates, current expenditures, and revenues. Of the five changes compared, only teachers showed a larger discrepancy, with *Early Estimates* projecting an increase of 1.5 percent and CCD reporting an actual decrease of 0.1 percent between the two surveys. For nearly all states, the early estimates were within 10 percent of the final reported CCD counts for these items.

## 6. CONTACT INFORMATION

For content information on CCD, contact the following individuals:

### Public School Universe and Public Education Agency Universe:

John Sietsema  
 Phone: (202) 502-7425  
 E-mail: john.sietsema@ed.gov

### State Nonfiscal Report:

Beth Young  
 Phone: (202) 502-7480  
 E-mail: beth.young@ed.gov

### National Public Education Finance Survey, and School District Finance Survey:

Frank Johnson  
 Phone: (202) 502-7362  
 E-mail: frank.johnson@ed.gov

### Early Estimates Survey:

Lena McDowell  
 Phone: (202) 502-7396  
 E-mail: lena.mcdowell@ed.gov

Frank Johnson  
 Phone: (202) 502-7362  
 E-mail: frank.johnson@ed.gov

### Mailing Address for All Contacts:

National Center for Education Statistics  
 1990 K Street NW  
 Washington, DC 20006-5651

## 7. METHODOLOGY AND EVALUATION REPORTS

### Data Quality and Comparability

*Coverage Evaluation of the 1994–95 Common Core of Data: Public Elementary/Secondary Education Agency Universe Survey*, NCES 97-505, by S. Owens and J. Bose. Washington, DC: 1997.

*Coverage Evaluation of the 1994–95 Common Core of Data: Public Elementary/Secondary School Universe Survey*, NCES Working Paper 2000-12, by T. Hamann. Washington, DC: 2000.

*Customer Service Survey: Common Core of Data Coordinators*, NCES Working Paper 97-15, by L. Hoffman. Washington, DC: 1997.

*Disparities in Public School District Spending 1989–90: A Multivariate, Student-weighted Analysis, Adjusted for Differences in Geographic Cost of Living and Student Need*, NCES 95-300, by T.B. Parrish, C.S. Matsumoto, and W.J. Fowler. Washington, DC: 1995.

### Survey Design

*Evaluation of the 1996–97 Nonfiscal Common Core of Data Surveys Data Collection, Processing, and Editing Cycle*, NCES Working Paper 1999-03, by T.A. Hamann. Washington, DC: 1999.



# Chapter 3: Private School Universe Survey (PSS)

## 1. OVERVIEW

In recognition of the importance of private education, NCES has made the collection of data on private elementary and secondary schools a priority. In 1988, NCES introduced a proposal to develop a Private School Data Collection System that would improve on the irregular collection of private school information dating back to 1890. Since 1989, the U.S. Bureau of the Census has conducted the biennial Private School Universe Survey (PSS) for NCES. PSS collects information comparable to that collected on public schools in the Common Core of Data (CCD—see chapter 2). PSS data are complemented by more in-depth information collected in the private school sample surveys that are part of the Schools and Staffing Survey (SASS—see chapter 4). The next PSS data collection will take place during the 2003–04 school year. The next SASS is planned for the 2003–04 school year.

### Purpose

To (1) build an accurate and complete universe of private schools to serve as a sampling frame for NCES surveys of private schools, and (2) generate biennial data on the total number of private schools, teachers, and students.

### Components

PSS consists of a single survey that is completed by administrative personnel in private schools. An early estimates survey designed to allow early reporting of key statistics was discontinued after the 1992–93 school year.

**Private School Universe Survey.** This survey collects data on private elementary and secondary schools, including: religious orientation, level of school, size of school, length of school year, length of school day, total enrollment (K–12), race/ethnicity of students, number of high school graduates, number of teachers employed, program emphasis, and existence and type of kindergarten program.

### Periodicity

Biennial. The next PSS will be administered in 2003–04 and then every 2 years thereafter. Earlier surveys were conducted in 1989–90, 1991–92, 1993–94, 1995–96, 1997–98, 1999–2000, and 2001–02.

## 2. USES OF DATA

PSS produces private school data similar to that for public schools in CCD. Profiles of private education providers can be developed from PSS data to address a variety of policy- and research-relevant issues, including the growth of religiously-affiliated schools,

### BIENNIAL SURVEY OF THE UNIVERSE OF PRIVATE SCHOOLS

PSS collects data on:

- ▶ Student enrollment
- ▶ Teaching staff
- ▶ High school graduates
- ▶ School religious affiliation

the number of private high school graduates, the length of the school year for various private schools, and the number of private school students and teachers.

NCES uses an indirect estimate approach as an alternative to the current procedures for the production of state estimates of the number of private schools in the nation and the associated numbers of students, teachers, and graduates. (See *Indirect State-level Estimation for the Private School Survey*, NCES 1999–351).

### 3. KEY CONCEPTS

Some key concepts related to PSS are described below.

**Private School.** A school that is not supported primarily by public funds. It must provide instruction for one or more of grades K through 12 (or comparable ungraded levels), and have one or more teachers. Organizations or institutions that provide support for home schooling but do not offer classroom instruction for students are not included. Private schools are assigned to one of three major categories and, within each major category, to one of three subcategories:

- ▶ *Catholic*: parochial, diocesan, private;
- ▶ *Other religious*: affiliated with a conservative Christian school association, affiliated with a national denomination, unaffiliated; and
- ▶ *Nonsectarian*: regular program emphasis, special program emphasis, special education.

Schools with kindergarten, but no grade higher than kindergarten, are referred to as *kindergarten-terminal* (*K-terminal*) schools; these schools were first included in the 1995–96 PSS. Schools meeting the pre-1995 definition of a private school (i.e., including any of grades 1 through 12) are referred to as *traditional* schools.

**Elementary School.** A school with one or more of grades K–6 and no grade higher than grade 8. For example, schools with grades K–6, 1–3, or 6–8 are classified as elementary schools.

**Secondary School.** A school with one or more of grades 7–12 and no grade lower than grade 7. For example, schools with grades 9–12, 7–8, 10–12, or 7–9 are classified as secondary schools.

**Combined School.** A school with one or more of grades K–6 and one or more of grades 9–12. For example, schools with grades K–12, 6–12, 6–9, or 1–12 are classified as

combined schools. Schools in which all students are ungraded (i.e., not classified by standard grade levels) are also classified as combined.

**Teacher.** Any full-time or part-time teacher whose school reports that his or her assignment is teaching in any of grades K–12.

## 4. SURVEY DESIGN

### Target Population

All private schools in the United States that meet the NCES definition. The PSS universe consists of a diverse population of schools. It includes both schools with a religious orientation (e.g., Catholic, Lutheran, or Jewish) and nonsectarian schools with programs ranging from regular to special emphasis and special education.

### Sample Design

NCES uses a dual frame approach for building its private school universe. The primary source of the PSS universe is a *list frame* containing most private schools in the country. The list frame is supplemented by an *area frame*, which contains additional schools identified during a search of randomly selected geographic areas around the country. The two frames are used together to estimate the population of private schools in the United States.

**List frame.** In an effort to ensure a complete population list of all private elementary and secondary schools in the United States, NCES updates the list frame every 2 years in preparation for the next PSS administration. This frame, developed over more than a decade, is assembled from lists provided by several sources, including private school associations and state departments of education. The lists from these sources are matched against the most recent PSS universe. Nonmatches are added to the universe as births.

The basis of the current survey's list frame is the previous PSS. In order to expand coverage to include private schools founded since the previous survey, NCES requests lists of schools from the 50 states and the District of Columbia in advance of each survey administration. Requests are made to state education departments, as well as to other departments such as health or recreation. NCES also collects membership lists from about 26 private school associations and religious denominations. Schools on the state and association lists are compared to the base list, and any school not matching a school on the base list is added to the universe list.

Prior to the 1995–96 survey, only schools that included at least one of grades 1–12 were included in PSS (now referred to as *traditional schools*). As of 1995–96, PSS also collects data from schools for which kindergarten is the highest grade (referred to as *K-terminal schools*). NCES also removed from the PSS eligibility criteria the requirements that a school have 160 days in the school year and 4 hours per day conducting classes. The list of K-terminal schools for the 1999–2000 PSS was assembled from state and association lists and information obtained from questionnaires sent to about 5,800 programs identified in the 1997–98 PSS as prekindergarten only.

**Area frame.** The list frame is supplemented by an *area frame* containing additional private schools identified during a search of telephone books and other sources in randomly selected geographic areas around the country. Each area's list is created from a set of predetermined sources within that area and then matched against the updated list frame universe to identify schools missing from the updated list frame.

The United States is divided into 2,054 primary sampling units (PSUs), each consisting of a single county, independent city, or cluster of geographically contiguous areas. During the first NCES area search for private schools conducted in 1983, eight PSUs with populations greater than 1.7 million were selected with certainty for the private school survey; these same eight PSUs have been retained as certainty PSUs in all PSS administrations. In addition to these certainty PSUs, the area frame consists of two sets of sample PSUs: (1) a 50 percent subsample (overlap) of the area frame sample PSUs from the previous PSS, maintaining a reasonable level of reliability in estimates of change, and (2) a sample of PSUs selected independently from the previous PSS sample (nonoverlap). A minimum of two nonoverlap PSUs are allocated to each of the 16 strata, which are defined as follows: (a) four Census regions (Northeast, Midwest, South, West); (b) metro/nonmetro status (two levels); and (c) whether the PSU's percentage of private school enrollment exceeds the median percentage of private enrollment of the other PSUs in the census region/metro status strata (two levels). Within a stratum, the sample PSUs are selected with probability proportional to the square root of the population in each of the PSUs.

The 1999–2000 area sample included a total of 125 distinct PSUs (sampled geographic areas). Within each of these PSUs, the Census Bureau attempted to find all eligible private schools. A block-by-block listing of all private schools in a sample of PSUs was not attempted.

Instead, regional field staff created the frame by using sources such as the yellow pages, local Catholic dioceses, religious institutions, local education agencies, and local government offices. Once the area search lists were constructed, they were matched against the list frame. Schools not matching the list frame were considered part of the area frame.

Due to differences in methodology and definition, the results of the 1993–94 and subsequent area search frames are not strictly comparable to results in earlier years. Prior to 1993, an initial eligibility screening was performed over the telephone for area frame schools before the questionnaire was mailed out. Ineligible schools were declared out of scope at that time, and eligible schools were either interviewed over the telephone or sent a questionnaire. In the 1993–94 PSS, screener questions were added to the survey instrument for the purpose of determining eligibility. Ineligible schools were not eliminated until after the questionnaires were returned. In the 1995–96 PSS, all area frame schools were placed in the telephone follow-up phase of PSS, and ineligible schools were again eliminated based on responses to screener questions.

Since 1995–96, schools are no longer required to have 160 days in the school year or to conduct classes for at least 4 hours per day to be included. The combination of these changes resulted in an increased number of schools surveyed in the last two surveys.

### Data Collection and Processing

The data collection phase consists of (1) a mailout/mailback stage and (2) a telephone follow-up stage. The U.S. Bureau of the Census is the collection agent.

**Reference dates.** The official reference date for reporting PSS information is October 1.

**Data collection.** In October of the survey year, the Census Bureau mails PSS questionnaires to the private schools. (Data collection for the 1999–2000 PSS coincided with the data collection phase of the private school component of the 1999–2000 SASS: the private schools selected for SASS were excluded from PSS, and the schools selected for SASS received a SASS private school questionnaire only, while the remaining private schools were sent a PSS questionnaire. The PSS questionnaire used the same wording as the SASS questionnaire, but contained only a subset of the SASS questionnaire items. After data collection, the data for the SASS cases were merged into the PSS universe.) If no response is received

within a month, a second questionnaire is mailed. Reminder postcards are sent 1 week after each questionnaire mailout. Three to 4 months after the initial mailout, the Census Bureau begins telephone follow up of schools that have not responded to either mailout; the schools from the area frame operation are added at this time. Interviewing takes place at the Census Bureau's computer-assisted telephone interviewing (CATI) facilities. For schools that cannot be contacted by telephone, additional follow up is conducted in the Census Bureau's Regional Offices.

The 1999–2000 PSS return rate (i.e., the total number of returns—interviews, noninterviews, and out-of-scopes—divided by the total number of schools in the Private School Universe) was 40 percent at the end of the first mailout and 62 percent at the end of the second mailout. Follow-up efforts achieved a final unweighted return rate of 100 percent.

**Editing.** Most of the mailback questionnaires are scanned; those that must be keyed are 100 percent key-verified. For data collected during the telephone follow-up phase, preliminary quality assurance and editing checks take place at the time of the interview. The data collection instrument is designed to alert interviewers to inconsistencies reported by the respondent so that any necessary corrections can be made at this time. Data from the CATI facilities are transmitted to Census headquarters for further processing. All data then undergo extensive editing at the Census Bureau's headquarters. The edits include:

- ▶ range checks to eliminate out-of-range entries;
- ▶ consistency edits to compare data in different fields for consistency;
- ▶ blanking edits to verify that skip patterns on the questionnaire were followed; and
- ▶ interview status recodes (ISR), performed prior to the weighting process to assign
- ▶ the final interview status to the records (i.e., interview, noninterview, or out-of-scope, as described above).

### Estimation Methods

Weighting adjusts the number of schools in the area frame sample up to a fully representative number of schools missing from the list frame, and adjusts the survey data from both the area and list components for school nonresponse. Imputation is used to compensate for item nonresponse.

**Weighting.** PSS data from the area frame component are weighted to reflect the sampling rates (probability of selection) in the PSUs. Survey data from both the list and area frame components are adjusted for school nonresponse. This represents a departure from procedures used in the 1989 survey, which adjusted for total nonresponse (i.e., school nonresponse) and for partial nonresponse associated with four specific PSS data elements. Since 1991, only one weight has been required, due to a newly developed and complex imputation process used to compensate for item nonresponse. When estimates are produced for schools and other data elements, the same PSS school weight should be used. A brief description of the components comprising the PSS weight follows:

$W_i$ , the PSS weight for all data items for the  $i^{\text{th}}$  school is:  

$$W_i = BW_i \times NR_c$$

where:  $BW_i$  is the inverse of the selection probability for school  $i$  ( $BW_i = 1$  for list frame schools;  $BW_i =$  inverse of the PSU probability of selection for area frame schools), and

$NR_c$  is the weighted ratio of the sum of the in-scope schools to the sum of the in-scope responding schools in cell  $c$ , using  $BW_i$  as the weight.

The cells used in  $NR_c$  are school association by school level, by size, by urbanicity for list frame schools; the cells used in  $NR_c$  for area frame schools are certainty/noncertainty PSU by school affiliation by school level. If the number of schools in cell  $c$  is less than 15 or  $NR_c$  is greater than 1.5, then cell  $c$  is collapsed. List frame cells for traditional schools were collapsed within enrollment category, urbanicity and grade level. Associations were never collapsed together. List frame cells for k-terminal schools were collapsed within enrollment category and urbanicity before the associations were collapsed. Area frame cells for traditional schools were collapsed within grade level before affiliation cells (Catholic, other religious, nonsectarian) were collapsed. Area frame cells for k-terminal schools were collapsed within affiliation.

**Imputation.** Since the 1991–92 PSS, imputation has been used to compensate for item nonresponse in records classified as interviews (i.e., required items are completed). All items that are missing data are imputed. The first survey, the 1989–90 PSS, used weighting adjustments for both interviews and noninterviews.

Imputation occurs in two stages. The first stage (internal) imputation uses data from other items for the same school in the current PSS and data from the previous PSS. If an item cannot be imputed during the first stage processing, it is imputed during the second stage. The second stage (donor) process uses a hot-deck imputation methodology that extracts data from the record for a reporting school (donor) similar to the nonrespondent school. All records (donors and nonrespondents) on the file are sorted by variables that describe certain characteristics of the schools, such as school type, affiliation, school level, enrollment, and urbanicity.

For a few items, there are cases where entries are clerically imputed. The data record, sample file record, and the questionnaire are reviewed and an entry consistent with the information from those sources is imputed. This procedure is used when: (1) no suitable donor is found, (2) the computer method produces an imputed entry that is unacceptable, and (3) the nature of the item requires an actual review of the data rather than a computer-generated value.

### Recent Changes

Several changes to the questionnaire were introduced in the last few PSS cycles. Three major revisions were made to the *1993–94 PSS*. First, a new design was implemented to facilitate respondent reporting by clearly indicating skip patterns through the use of arrows as well as words and by minimizing the number of questions asked on each page. Second, content on prekindergarten programs was expanded to collect the type of prekindergarten program in addition to the prekindergarten student and teacher counts requested in earlier surveys. Third, data on the racial/ethnic makeup of the school's student body were collected for the first time.

Modifications made to the *1995–96 PSS* included adding nursery and prekindergarten, transitional kindergarten, and transitional first grade enrollment counts to the enrollment item. Questions regarding the length of school day and number of days per week for kindergarten, transitional kindergarten, and transitional first grade were also added. "Early childhood program/day care center" was added as a category for type of school. Items on types of prekindergarten programs and the number of prekindergarten teachers were deleted.

In the *1997–98 PSS*, the following items were added to the survey instrument: (1) whether or not the school is coeducational (and if yes, the number of male students; if no, whether the school is all female or all male); and (2)

whether or not the school has a library or library media center.

There were few changes in the *1999–2000 PSS*. One religious affiliation—Church of God in Christ—was added, and three associations were added—Association of Christian Teachers and Schools, National Coalition of Girls' Schools, and state or regional independent school association. The item that previously collected data on the number of graduates that applied to 2-year or 4-year colleges was changed to collect data on the percentage of graduates who went on to attend three types of schools: 2-year colleges, 4-year colleges, and technical or other specialized schools.

### Future Plans

PSS will continue as a biennial survey.

## 5. DATA QUALITY AND COMPARABILITY

### Sampling Error

Only the area frame contributes to the standard error in PSS. The list frame component of the standard error is always 0. Estimates of standard errors are computed using half-sample replication.

Because the area frame sample of PSUs is small (125 out of a total of approximately 2,000 eligible PSUs), there is a potential for unstable estimates of standard errors. This is particularly true when the domain of interest is small and there may not be enough information to compute a standard error. Stabilizing the standard error estimate given the level of detail of the PSS estimates would require a much larger PSU sample. The current area frame is designed to produce regional estimates.

### Nonsampling Error

**Coverage error.** Undercoverage is one possible source of nonsampling error. Because PSS uses a dual frame approach, it is possible to estimate the coverage or completeness of PSS. A capture-recapture methodology is used to estimate the number of private schools in the United States and to estimate the coverage of private schools. The coverage rate for schools was equal to 97 percent in the *1999–2000 PSS*.

A study evaluating the quality of PSS frame coverage in comparison to the commercial Quality Education Data database of schools is discussed by Hynshik Lee, John

Burke, and Keith Rust in their paper “Evaluating the Coverage of the U.S. National Center for Education Statistics’ Public and Private School Frames Using Data from the National Assessment of Educational Progress,” published in the *Proceedings of the Second International Conference on Establishment Surveys*.

### **Nonresponse error.**

*Unit nonresponse.* The unweighted unit response rate for traditional schools in the 1999–2000 PSS was 93.1 percent, and the weighted response rate was 92.7 percent. For K-terminal schools in the 1999–2000 PSS, the unweighted response rate was 98.4 and the weighted response rate was 98.6 percent.

*Item nonresponse.* For traditional schools, all but three items in the 1999–2000 PSS had unweighted response rates greater than 90 percent. The three lower rates (ranging from 76.1 percent to 82.8 percent) pertained to the percentage of graduates who went to 4-year colleges, 2-year colleges, and technical or other specialized schools. Imputation is used to compensate for item nonresponse.

*Measurement error.* NCES seeks to minimize measurement error by developing survey content in consultation with representatives of private school associations, reviewing extensively the questionnaire and instructions before distribution, requiring that the data that are not scanned are 100 percent key-verified, and processing the survey data through an extensive series of edits to verify accuracy and consistency.

### **Intersurvey Consistency in NCES Private School Surveys**

PSS and the private school component of SASS were fielded in the same school year for the first time in 1993–94. Even though these two surveys measure some of the same variables (schools, teachers, and students), the 1993–94 results were not in agreement due to sampling and other errors. PSS results are likely to be the more accurate since PSS serves as the sampling frame for the SASS private school component (a sample of around 3,000 schools). Special methodological studies of these two surveys have been done, including empirical results of attempts to ensure that the 1993–94 PSS numbers of schools, teachers, and students was the same as the 1993–94 SASS numbers of private schools, private school teachers, and private school students—see *Intersurvey Consistency in NCES Private School Surveys* (NCES Working Paper 95–16) and *Intersurvey Consistency in NCES Private School Surveys for 1993–94* (NCES Working Paper 96–27).

### **Data Comparability**

While changes to survey design and content generally result in improved data quality, they also impact the comparability of data over time. Recent changes to PSS and the comparability of PSS data both within PSS itself and with other data sources are discussed below.

*Design change.* Changes in the survey design of the 1995–96 PSS resulted in an increased number of private schools in the survey population. First, seven new association lists were obtained, adding 512 new schools to the list frame. In previous years, the area frame was relied upon to include these schools. Second, the area search results were not strictly comparable to those in previous years due to procedural differences. The 1995–96 PSS was the first survey to verify the control of schools marked as public in the screener item. Final determination of school control was based on a review of the school’s name and other identifying information. As a result, several schools marked as public but obviously private were added back into PSS. They were counted as interviews if the required data were provided or as noninterviews if the required data were missing. Third, the eligibility criteria for PSS were changed to no longer require schools to have 160 days in the school year or to conduct classes for at least 4 hours per day. Fourth, the PSS definition of a school was expanded to include programs where kindergarten is the highest grade (K-terminal schools). Additional lists of programs which might have a kindergarten were requested from nontraditional sources, and the area search was expanded to search for programs with a kindergarten. Some schools meeting the traditional PSS definition of a school (any of grades 1–12 or comparable ungraded levels) were discovered on these lists. When added to PSS, these schools also increased the estimates of traditional schools.

Note that even when the population of schools is about the same from one survey to the next, it may represent a different set of schools. For example, the number of schools was around 27,000 in both 1997–98 and 1999–2000, although about 1,700 schools were added to the PSS universe in 1999–2000. This suggests that a nearly equal number of schools dropped out of the universe between 1997–98 and 1999–2000.

*Questionnaire changes.* Several modifications have been made to both the format and content of the PSS questionnaire since 1991–92. A number of items were added (including race/ethnicity of students), and some items were deleted or modified.

**Comparisons within PSS.** Comparisons of the 1999–2000 PSS estimates with those from previous surveys show no significant change in the estimates for the number of private schools; however, the estimates do indicate an increase in the estimate for the number of teachers and number of private school students.

**Comparisons with the Current Population Survey.**

A comparison of the PSS estimates of K–12 students enrolled in all private schools in the 1999–2000 school year with the household survey estimate from the October 1999 Supplement of the Current Population Survey (CPS) shows that the PSS estimate of 5,254,485 is lower than the CPS estimate of 5,532,000; the 95 percent confidence interval on the CPS estimate ranges from 5,314,000 to 5,750,000. The 1997–98 PSS estimate was larger than the CPS estimate (5,179,180 to 4,883,000, respectively) and fell above the upper 95 percent confidence interval on the CPS estimate. The 1995–96 PSS estimates of K–12 students was within the CPS confidence interval (5,146,753 to 5,324,000, respectively). Prior to 1995–96, the PSS estimate did not include kindergarten enrollment from K-terminal schools, whereas the CPS has always included kindergarten enrollment from K-terminal schools.

**Comparisons with National Catholic Educational Association data.**

Comparisons of the PSS estimate for Catholic schools with the National Catholic Educational Association (NCEA) data for the 1999–2000 school year show a similarity in school counts but a difference in the student counts. Beginning in the 1997–98 school year, the NCEA computed FTE teacher counts giving each part-time teacher a weight of 0.333. Therefore, the FTE teacher counts are not strictly comparable between PSS and NCEA. The survey methodologies used by NCES and NCEA are quite different; NCES surveys private schools directly while NCEA surveys archdiocesan and diocesan offices of education and some state Catholic conferences. The NCEA 1999–2000 school year count of 8,144 schools was within the 95 percent confidence interval of the 1999–2000 PSS estimate for Catholic schools (ranging from 8,054 to 8,150). However, the NCEA K–12 student count of 2,500,416 was lower than the 95 percent confidence interval of the 1999–2000 PSS estimate for Catholic students (ranging from 2,501,659 to 2,520,422). Both the NCEA teacher count of 157,134 and the PSS estimate of 149,600 include part-time and full-time teachers in the computation of full-time equivalents (the 95 percent confidence interval of the PSS estimate ranges from 149,188 to 150,012).

**NCES publication criteria for PSS.** NCES criteria for the publication of an estimate are dependent on the type of survey—sample or universe. To publish an estimate for a sample survey, at least 30 cases must be used in developing the estimate. For a universe survey, a minimum of three cases must be used. PSS includes both types of surveys: (1) a sample survey of PSUs (area frame) which collects data on schools not on the list frame (the number of PSUs changes for each administration), and (2) a complete census of schools belonging to the list frame. NCES has established a rule that published PSS estimates must be based on at least 15 schools. If the estimate satisfies this criterion and the coefficient of variation (standard error/estimate) is greater than 25 percent, then the estimate is identified as having a large coefficient of variation and the reader is referred to a table of standard errors.

## 6. CONTACT INFORMATION

For content information on PSS, contact:

Stephen Broughman  
Phone: (202) 502-7315  
E-mail: [stephen.broughman@ed.gov](mailto:stephen.broughman@ed.gov)

**Mailing Address:**

National Center for Education Statistics  
1990 K Street NW  
Washington, DC 20006-5651

## 7. METHODOLOGY AND EVALUATION REPORTS

Methodology discussed in Technical Notes.

**General**

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*Private School Universe Survey, 1993–94*, NCES 96–143, by S. Broughman. Washington, DC: 1996.

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*Private School Universe Survey, 1989–90*, NCES 93–122, by E. Gerald, M. McMillen, and S. Kaufman. Washington, DC: 1992.

### Survey Design

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*Intersurvey Consistency in NCES Private School Surveys*, NCES Working Paper 95–16, by F. Scheuren and B. Li. Washington, DC: 1995.

*Intersurvey Consistency in NCES Private School Surveys for 1993–94*, NCES Working Paper 96–27, by F. Scheuren and B. Li. Washington, DC: 1996.

### Data Quality and Comparability

“Evaluating the Coverage of the U.S. National Center for Education Statistics’ Public and Private School Frames Using Data from the National Assessment of Educational Progress,” *The Second International Conference on Establishment Surveys: Survey Methods for Businesses, Farms, and Institutions* (pp. 89–98), by H. Lee, J. Burke, and K. Rust. Arlington, VA: American Statistical Association, 2000.

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# Chapter 4: Schools and Staffing Survey (SASS)

## 1. OVERVIEW

The Schools and Staffing Survey (SASS) provides data on public and private schools, principals, school districts, and teachers. SASS gathers information about many topics, including various characteristics of elementary and secondary students, some of the professional and paraprofessional staff who serve them, the programs offered by schools, principals' and teachers' perceptions of school climate and problems in their schools, teacher compensation, and district hiring practices. SASS is a unified set of surveys that facilitates comparison between public and private schools and allows linkages of teacher, school, school district, and principal data. SASS has been administered four times since 1987–88, most recently in 1999–2000.

### Purpose

To collect the information necessary for a complete picture of American elementary and secondary education. SASS is designed to provide national estimates for public elementary, secondary, and combined schools and teachers; state estimates of public elementary and secondary schools and teachers; and estimates for private schools and teachers at the national level and by private school affiliation. The focus in 1999–2000 shifted from teacher supply and demand issues to the measurement of teacher and school district capacity. Among the topics examined to measure teacher capacity are teacher qualifications, teacher career paths, and professional development. Among the topics examined to measure school capacity are school organization and decisionmaking, curriculum and instruction, parental involvement, school safety and discipline, and school resources.

### Core Components

SASS consists of four core components; these are administered to districts, schools, principals, and teachers. The district questionnaire is sent to a sample of public school districts. The school questionnaires are sent to a sample of public schools and private schools, as well as all charter schools in operation as of 1998–99, and all schools operated by the Bureau of Indian Affairs (BIA) or American Indian/Alaska Native tribes. The principal and teacher questionnaires are sent to a sample of principals and teachers working at the schools which received the school questionnaire. (The Teacher Follow-up Survey is a fifth component, but has its own chapter—see chapter 5.)

***School District Survey (formerly titled the Teacher Demand and Shortage Survey—TDS).*** This survey is mailed to each sampled local education agency (LEA). The respondents are contact people identified by LEA personnel. If no contact person is identified, the questionnaire is addressed to “Superintendent.” The School District Questionnaire consists of items about student enrollments, number of teachers, teacher recruitment and hiring practices, teacher dismissals, existence of a teacher union, length

### SAMPLE SURVEY OF PUBLIC, PRIVATE, CHARTER, AND BIA SCHOOLS

SASS collects data on:

- ▶ School districts
- ▶ Principals
- ▶ Schools
- ▶ Teachers
- ▶ Library media centers

of the contract year, teacher salary schedules, school choice, magnet programs, graduation requirements, and professional development for teachers and administrators. The 1999–2000 School District Questionnaire added new items on the percentage of payroll dedicated to school staff benefits, oversight of home-schooled students and charter schools, use of school performance reports, migrant education, and procedures for recruiting and dismissing teachers. Some items that appeared previously have been dropped, such as layoff data and counts of students by grade level (the latter is available through CCD). The School District Questionnaire is mailed only to public school districts. Comparable questions for BIA, charter schools, and private schools appear on those schools' questionnaires.

***School Principal Survey (formerly titled the School Administrator Survey).*** This survey is mailed to principals/heads of schools. The 1999–2000 School Principal Questionnaire appears in four versions: one for principals or heads of public schools, one for heads of private schools, one for heads of charter schools, and one for heads of BIA schools. The four versions contain only minor differences in phrasing to reflect differences in governing bodies and position titles in the schools. The questionnaires collect information about principal/school head demographic characteristics, training, experience, salary, and judgments about the seriousness of school problems. The 1999–2000 School Principal Questionnaire also covers new data on: principals'/school heads' frequency of engaging in various school and school-related activities; perceived degree of influence of principals and other groups (state, local, school, and parents) in setting performance standards for students; barriers (e.g., personnel policies, inadequate documentation, lack of support, stress) to dismissing poor or incompetent teachers; rewards or sanctions for success or failure to meet district or state performance goals; and means for assessing progress on school improvement plans.

***School Survey.*** The SASS School Questionnaire is sent to public schools, private schools, BIA schools, and charter schools. (The Charter School Questionnaire is described below.) School Questionnaires are addressed to "Principal" although the respondent could be any knowledgeable school staff member (e.g., vice principal, head teacher, or school secretary). Items cover grades offered, number of students enrolled, staffing patterns, teaching vacancies, high school graduation rates, programs and services offered, and college application rates. The 1999–2000 version for public, private, and BIA schools incorporates new items on: computers (number,

access to the Internet, and whether there is a computer coordinator in the school); availability of certain types of curricular options; how special education students' needs are met; changes in the school year or weekly schedule; the enrollment capacity of schools; and whether schools have programs for disruptive students.

***Public Charter School Questionnaire.*** As a continuation of a national study of charter schools, NCES added a new SASS component on charter schools. All charter schools in operation as of 1998–99 were surveyed in the 1999–2000 SASS. For the first time, there will be comparable data on public, private, BIA, and charter schools. A number of questions that only apply to charter schools are asked, including: when the charter was granted, and by whom; what types of regulations were waived, and their importance; whether the school is new or was converted from a pre-existing school; and whether the school operates within a school district or not. A small number of school library media center items have also been incorporated into the charter school questionnaire, such as whether the school has a library media center, the number of school library media center staff, and the number of students who used the library media center in the past week. Charter schools that operate on their own are asked some of the district items, such as school hiring practices and graduation requirements.

***Teacher Survey.*** This survey is mailed to a sample of teachers from the SASS sample of schools. It is sent out in four versions—to teachers in public schools, private schools, charter schools, and BIA schools. The four versions, however, are virtually identical, except that charter school teachers who worked in the school prior to its becoming a charter school are asked if they supported the conversion. The SASS Teacher Questionnaire collects data from teachers about their education and training, teaching assignment, certification, workload, and perceptions and attitudes about teaching. The 1999–2000 SASS Teacher Questionnaire expands data collection on teacher preparation, induction, organization of classes, and professional development. It also collects data on a new topic: use of computers. The only eligible respondent for each teacher questionnaire is the teacher named on the questionnaire label. As of the 1993–94 SASS, administrators are eligible for both the Teacher Survey and the Principal Survey, if they teach a regularly scheduled class.

### **Additional Components**

In addition to the core data collection described above, SASS featured additional components focusing on library

media specialists/librarians and a student records component in 1993–94, and on library media centers in 1993–94 and 1999–2000. One year following each SASS, a Teacher Follow-up Survey (TFS) is mailed to a sample of participants in the SASS Teacher Survey. See chapter 5 for a complete description of TFS.

**Library Media Center Survey.** This component was added in the 1993–94 SASS. The School Library Media Center Questionnaire asks public, private, and BIA schools about their access to and use of new information technologies. The survey collects data on library collections, media equipment, use of technology, staffing, student services, expenditures, currency of the library collection, and collaboration between the library media specialist and classroom teachers. Schools could respond to the School Library Media Center Questionnaire in the usual paper and pencil mode or by using a web-based survey form on the Internet in 1999–2000. (See chapter 9 for a more complete description of this survey.)

**Library Media Specialist/Librarian Survey.** This questionnaire was mailed to a subsample of the SASS sample of public, private, and BIA schools in 1993–94. This survey solicited data that could be used to describe school librarians—for example, their educational background, work experience, and demographic characteristics. Because much of the collected information was comparable to that obtained in the Teacher Questionnaires, comparisons between librarians and classroom teachers can be made.

**Student Records Component.** This questionnaire, along with a roster of sampled students, was mailed to a subsample of the SASS sample of public and private schools in 1993–94. This survey solicited information about a student that could be answered by a school administrator using the student’s school record. The information about selected students was not obtained from the students themselves. The survey provided information on the types of services students received, and the types of math and science courses in which they were enrolled. The students can be linked to their schools and teachers.

### Periodicity

From 1987–88 to 1993–94, SASS core components were on a 3-year cycle, with the TFS conducted 1 year after SASS. After a 6-year hiatus, SASS was fielded in 1999–2000, with the TFS following in 2000–01. Subsequent SASS administrations are scheduled on a 4-year cycle.

## 2. USES OF DATA

SASS is the largest, most extensive survey of school districts, schools, principals, teachers, and library media centers in the United States today. It includes data from public, private, and Bureau of Indian Affairs school sectors. Moreover, SASS is the only survey that studies the complete universe of public charter schools. Therefore, SASS provides a multitude of opportunities for analysis and reporting on issues related to elementary and secondary schools.

SASS data have been collected four times over the period between 1987 and 2000. Many questions have been asked of respondents at multiple time points, allowing researchers to examine trends on these topics over time. SASS asks similar questions of respondents across sectors, including public, public charter, Bureau of Indian Affairs, and private schools. The consistency of questions across sectors and the large sample sizes allow for exploration of similarities and differences across sectors.

SASS data are representative at the state level for public school respondents and at the private school affiliation level for private school respondents. Thus, SASS is invaluable for analysts interested in elementary, middle, and secondary schools within or across specific states or private school affiliations. The large SASS sample allows extensive disaggregation of data according to the characteristics of teachers, administrators, school, and school districts. For example, researchers can compare urban and rural settings, and the working conditions of teachers and administrators of differing demographic backgrounds.

SASS collects extensive data on teachers, principals, schools, and school districts. Information on teachers includes their qualifications, early teaching experience, teaching assignments, professional development, and attitudes about the school. School questions include enrollment, staffing, the types of programs and services offered, school leadership, parental involvement, and school climate. At the district level, information is sought on the recruitment and hiring of teachers, professional development programs, student services, and other relevant topics.

SASS data can be very useful for researchers performing their own focused studies on smaller populations of teachers, administrators, schools, or school districts. SASS can supply data at the state, affiliation, or national level that provide valuable contextual information for

localized studies; localized studies can provide illustrations of broad findings produced by SASS.

Users of restricted-use SASS data can link school districts and schools to other data sources. For instance, 1999–2000 SASS restricted-use data sets include selected information taken from the NCES Common Core of Data, but researchers can augment the data sets by adding more data from the CCD—either fiscal or nonfiscal data.

### 3. KEY CONCEPTS

Because of the large number of concepts in SASS surveys, only those pertaining to the level of data collection (LEA, school, teacher, library) are described in this section. For additional terms, the reader is referred to glossaries in SASS reports.

**Local Education Agency (LEA).** A public school district that is defined as a government agency employing elementary and secondary level teachers and administratively responsible for providing public elementary and/or secondary instruction and educational support services. Districts that do not operate schools but employ teachers are no longer included as of the 1999–2000 SASS. For example, some states have special education cooperatives that employ special education teachers who teach in schools in more than one school district.

**Public School.** An institution that provides educational services for at least one of grades 1–12 (or comparable ungraded levels), has one or more teachers to give instruction, is located in one or more buildings, receives public funds as primary support, and is operated by an education agency. Schools in juvenile detention centers and schools located on military bases and operated by the Department of Defense are included.

**Private School.** An institution that is not in the public system and that provides instruction for any of grades 1–12 (or comparable ungraded levels). The instruction must be given in a building that is not used primarily as a private home. Private schools are divided into three categories: (1) Catholic: parochial, diocesan, private order; (2) Other religious: affiliated with a Conservative Christian school association, affiliated with a national denomination, unaffiliated; (3) Nonsectarian: regular, special program emphasis, special education. The three nonsectarian school categories are determined not by governance but by program emphasis. This classification disentangles private schools offering a conventional

academic program (regular) from those which either serve special needs children (special education) or provide a program with a special emphasis (e.g., arts, vocational, alternative).

**Charter School.** A charter school is a public school that, in accordance with an enabling state statute, has been granted a charter exempting it from selected state or local rules and regulations. A charter school may be a newly created school or it may previously have been a public or private school.

**BIA School.** A school funded by the Bureau of Indian Affairs, U.S. Department of the Interior. These schools may be operated by the BIA, a tribe, a private contractor, or a local education agency (school district).

**Library media center (LMC).** A library media center is an organized collection of printed, audiovisual, or computer resources that (a) is administered as a unit, (b) is located in a designated place or places, and (c) makes resources and services available to students, teachers, and administrators.

**Teacher.** A full-time or part-time teacher who teaches any regularly scheduled classes in any of grades K–12.\* Includes administrators, librarians, and other professional or support staff who teach regularly scheduled classes on a part-time basis. Itinerant teachers are also included, as well as long-term substitutes who are filling the role of a regular teacher on a long-term basis. An itinerant teacher is one who teaches at more than one school (e.g., a music teacher who teaches three days per week at one school and two days per week at another). Short-term substitute teachers and student teachers are not included.

### 4. SURVEY DESIGN

#### Target Population

Local Education Agencies (LEAs) that employ elementary and/or secondary level teachers (e.g., public school districts, state agencies that operate schools for special student populations such as inmates of juvenile correctional facilities, Department of Defense, etc.) and cooperative agencies that provide special services to more than one school district; public, private, BIA, and charter schools with students in any of grades 1–12; principals of those schools, as well as library media centers; and teachers in public, private, BIA, and charter schools who

\*A teacher teaching only kindergarten students is in scope, provided the school serves students in a grade higher than kindergarten.

teach students in grades K–12 in a school with at least a 1<sup>st</sup> grade.

### Sample Design

SASS uses a stratified probability sample design. Details of stratification variables, sample selection, and frame sources are provided below.

*Schools* are selected first. For the *public school* sample, the first level of stratification is by the five types of school: (a) BIA schools; (b) Native American schools (i.e., schools with 19.5 percent or more Native American students); (c) schools in Delaware, Nevada, and West Virginia (where it is necessary to implement a different sampling methodology to select at least one school from each LEA in the state); (d) charter schools; and (e) all other schools. Schools falling into more than one group are assigned in hierarchical order. In the second level of stratification, Native American schools are stratified by Arizona, California, Minnesota, Montana, New Mexico, North Dakota, Oklahoma, South Dakota, Washington, and all other states (except Alaska, since most Alaskan schools have high Native American enrollment), and schools in Delaware, Nevada, and West Virginia are stratified first by state and then by LEA. Within each second level there were three grade level strata (elementary, secondary, and combined schools).

Within each stratum, all non-BIA and non-Charter schools are systematically selected using a probability proportionate to size algorithm. The measure of size used for the schools on CCD was the square root of the number of teachers in the school as reported on the CCD file. Any school with a measure of size larger than the sampling interval was excluded from the probability sampling operation and included in the sample with certainty.

The Common Core of Data (CCD) Public School Universe serves as the public school sampling frame. (See chapter 2 for a complete description of CCD.) The frame includes regular public schools, Department of Defense-operated military base schools, and special purpose schools such as special education, vocational, and alternative schools. Schools outside the United States and schools that teach only prekindergarten, kindergarten, or postsecondary students are deleted from the file. The following years of CCD were used as the public school frame for the last three rounds of SASS:

- ▶ 1997–98 CCD for the 1999–2000 SASS public school sample;
- ▶ 1991–92 CCD for the 1993–94 SASS; and

- ▶ 1988–89 CCD for the 1990–91 SASS.

In the 1987–88 SASS, the 1986 Quality of Education Data (QED) survey was used as the sampling frame.

For *private schools*, the sample is stratified within each of the two types of frames: (1) a list frame, which is the primary private school frame, and (2) an area frame, which is used to identify schools not included on the list frame and to thereby compensate for the undercoverage of the list frame. For list frame private schools, the schools are stratified by affiliation and school association membership, grade level, and region. All schools in the area frame that are in noncertainty PSUs are included with certainty and those in certainty PSUs are included in the list frame and sampled there. Within each stratum, schools are sampled systematically using a probability proportionate to size algorithm. The measure of size used in 1999–2000 SASS is the square root of the 1997–98 PSS number of teachers in the school. Any school with a measure of size larger than the sampling interval was excluded from the probability sampling process and included in the sample with certainty.

The most recent Private School Survey (PSS), updated with the most recent association lists, serves as the private school sampling frame. For example, the 1997–98 PSS, updated with 26 lists of private schools provided by private school association as well as 51 lists of private schools from the 50 states and the District of Columbia, was used as the private school frame for the 1999–2000 SASS. (See chapter 3 for a complete description of PSS.) The 1991–92 and the 1989–90 PSS were the basis for the private school frame for the 1993–94 and 1990–91 SASS, respectively. The 1986 Quality of Education Data (QED) survey was used as the sampling frame for the 1987–88 SASS.

Since the 1993–94 SASS, all *Bureau of Indian Affairs (BIA) schools* are selected with certainty; in 1990–91, 80 percent of BIA schools were sampled. The Indian School frame for the 1999–2000 SASS consists of a list of schools that the BIA operated or funded during the 1997–98 school year. The list is obtained from the U.S. Department of the Interior. The BIA list is matched against CCD, and the schools on the BIA list which do not match CCD are added to the universe of schools.

A *charter school* frame was added in the 1999–2000 SASS. All charter schools are selected with certainty. The charter school frame consists of a list of charter schools developed for the Institute of Education Sciences (IES). This list includes only charter schools that were open (teaching students) during the 1998–99 school year.

Each sampled school receives a school questionnaire and the principal of each sampled school receives a principal questionnaire.

For the 1999–2000 SASS, as in 1993–94, the *library media center* sample was a subsample of the SASS school sample. Each sampled library media center receives a library media center questionnaire.

A sample of *teachers* is selected within each sampled school. First, the sampled schools are asked to provide a list of their teachers and selected characteristics. In 1999–2000, teachers were stratified into one of five teacher types in the following hierarchical order: Asian or Pacific Islander; American Indian, Aleut, or Eskimo; Bilingual/English as a Second Language (ESL); New; and Experienced. For new/experienced teachers in public schools, oversampling was not required due to the large number of sample schools with new teachers. Therefore, teachers were allocated to the new and experienced categories proportional to their numbers in the school. However, for private teachers, new teachers were oversampled. Before teachers were allocated to the new/experienced strata, schools were first allocated an overall number of teachers to be selected.

The school-level file that included the number of teachers at the school for the five teacher strata was sorted by school type (public, private, charter), school strata, school order of selection, and school control number. Within each school and teacher stratum, teachers were selected systematically with equal probability. Using the teacher probabilities of selection, take every, and start-withs, sample teachers were selected from each stratum across schools. The within-school probabilities of selection were computed so as to give all teachers within a school stratum the same overall probability of selection (self-weighted). However, since the school sample size of teachers was altered due to the minimum constraint (i.e., at least one teacher/school) or maximum constraint (i.e., no more than either twice the average stratum allocation or 20 teachers/school), the goal of achieving self-weighting for teachers was lost in some schools. Each sampled teacher receives a teacher questionnaire.

Once public schools are selected, the *districts* associated with these schools—except in the states of Delaware, Nevada, and West Virginia—are in the sample as well. In Delaware, Nevada, and West Virginia, all districts were defined as school sampling strata, placing all districts in each of these three states in the district sample. (In some SASS administrations a sample of districts not associated with schools is taken, but not in the 1999–2000

SASS.) The district sample is selected using a systematic equal probability algorithm. Each sampled school district receives a school district questionnaire.

The approximate sample sizes for the 1999–2000 SASS are 14,500 schools and administrators, 75,000 teachers, 5,700 school districts, and 13,400 school library media centers.

### Data Collection and Processing

The 1999–2000 Schools and Staffing Survey (SASS) was primarily a mailout/mailback survey with computer-assisted telephone interviewing (CATI) and telephone follow up. The School Library Media Center Survey could also be answered through a web-based survey form on the Internet. All survey modes were administered by the U.S. Bureau of the Census.

**Reference dates.** Data for SASS components are collected during a single school year. Most data items refer to that school year. Questions on enrollment and staffing refer to October 1 of the school year. Questions for teachers about current teaching loads refer to the most recent full week that school was in session, and questions on professional development refer to the past 12 months.

**Data collection.** The data collection procedures begin with advance mailings to school districts and schools principals explaining the nature and purpose of SASS. The advance mailing to principals includes a request to submit a list of all teachers in their schools. Follow up to the teacher listing form request includes a reminder postcard, a second mailing of the teacher listing form request, and finally telephone calls to all nonrespondents. The teacher sample is selected using these lists.

The school district, principal, and library media center questionnaires are mailed out first, followed by the school questionnaires, and then the teacher questionnaires. Reminder postcards are mailed within 1 to 4 weeks after the initial mailing for each type of questionnaire. A second copy of the questionnaire is mailed to cases that fail to respond to the first mailout within 6 weeks of the reminder postcard.

About 6 weeks after the second mailing for each type of questionnaire, Census Bureau staff members begin telephoning sample units that have not returned questionnaires. Most follow up is done through calls made by Census staff in three centralized locations, using computer-assisted telephone interviewing (CATI) to collect the questionnaire data.

Finally, nonrespondent school districts, private schools, BIA schools, charter schools, and public and private school teachers are called or visited by field representatives (FRs). These FRs complete paper copies of the questionnaires as they collect the data. In some cases where the respondent is unwilling to participate in an interview, the FR attempts to persuade him/her to return a mailed questionnaire. (Due to budgetary constraints, FRs collected data from a subsample of public and private school teacher nonrespondents in 1999–2000.)

**Processing.** As of the 1999–2000 SASS, imaging technology was used instead of data keying. After data entry, the files of scanned data from paper questionnaires are merged with those from the computer-assisted telephone interviews (CATI). The next step is to make a preliminary determination of each case's interview status (ISR); that is, whether it is an interview, a noninterview, or out of scope. Then interview records on the data files are processed through a computer pre-edit program designed to identify inconsistencies and invalid entries. Census staff reviews the problem cases and make corrections whenever possible.

After pre-edit corrections are made, all records (i.e., from all survey components) classified as interviews at this point are subject to a set of computer edits: a range check, a consistency edit, and a blanking edit. After the completion of these edits, the records are put through another edit to make a final determination of whether the case is eligible for the survey, and, if so, whether sufficient data have been collected for the case to be classified as an interview. A final interview status recode (ISR) value is assigned to each case as a result of the edit.

### Estimation Methods

Sample units are weighted to produce national and state estimates for public elementary and secondary school surveys (i.e., schools, teachers, administrators, school districts, and school library media centers); and national estimates for BIA, charter school, and public “combined” school surveys (i.e., schools, teachers, administrators, and school library media centers). The private sector is weighted to produce national and affiliation group estimates. These estimates are produced through the weighting and imputation procedures discussed below.

**Weighting.** Estimates from SASS sample data are produced by using weights. The weighting process for each component of SASS includes adjustment for nonresponse using respondents' data, and adjustment of the sample totals to the frame totals to reduce sampling

variability. The exact formula representing the construction of the weight for each component of SASS is provided in each administration's sample design report (e.g., *1993–94 Schools and Staffing Survey: Sample Design and Estimation*, NCES 96–089). The construction of weights is also discussed in the *Quality Profiles* (NCES 2000–308 and NCES 94–340). Since data for SASS were collected at the same time as for PSS in 1993–94 and 1999–2000, in both those years the number of private schools reported in SASS was made to match the number of private schools reported in PSS.

**Imputation.** In all administrations of SASS, all item missing values are imputed for records classified as interviews. SASS uses a two-stage imputation procedure. The first stage imputation process uses a logical or deductive type of imputation method, such as:

- (1) Using data from other items on the same questionnaire;
- (2) Extracting data from a related SASS component (different questionnaire); and
- (3) Extracting information about the sample case from the Private School Survey or the Common Core of Data, the sampling frames for private and public schools.

In addition, some inconsistencies between items are corrected by ratio adjustment during the first stage imputation.

The second stage imputation process is applied to all items with missing values that were not imputed in the first stage. This imputation uses a hot-deck imputation method, extracting data from a respondent (donor) with similar characteristics to the nonrespondent. If there is still no observed value after collapsing to a certain point, the missing values are imputed by clerical imputation.

### Recent Changes

During the 6-year hiatus between the 1993–94 SASS and the 1999–2000 SASS, a redesign effort was undertaken. NCES involved various programs in the Department of Education and the wider education research and policy community in the planning process for the SASS redesign.

#### **Design changes from 1993–94 to 1999–2000:**

- ▶ For the private sector, the sample was reallocated to publish estimates for one additional association, making a total of 20 associations.
- ▶ A list of Department of Defense (DOD) schools was obtained and included on the sampling frame giving SASS complete coverage of domestic DOD schools.

- ▶ The Department of Education, Institute of Education Sciences (IES), provided a list of public charter schools, giving SASS coverage of charter schools open in the 1998–1999 school year. Questionnaires were prepared to include some items specific to charter schools.
- ▶ The variance methodology was altered: in earlier SASS administrations, it was assumed that there was no variance associated with certainty schools, and that all error from certainty schools reflected bias. In 1999–2000, it was decided to assume that nonresponse from certainty schools followed a random process and so certainty schools could have variance due to this random process.
- ▶ Additional size classes were introduced into all weighting procedures and were customized by state and private school association.
- ▶ The control of the overlap with the previous SASS was dropped and replaced with a procedure designed to minimize the overlap between SASS and National Assessment of Educational Progress (NAEP) sample schools.
- ▶ The bootstrap variance system was refined to produce more stable variance estimates.
- ▶ The LMC sample size was first expanded to include all SASS schools and then, for cost and burden reasons, reduced to exclude charter schools. The charter school questionnaire included a small selection of questions from the LMC questionnaire.

### **Content changes from 1993–94 to 1999–2000.**

For the 1999–2000 school year, these components were dropped from SASS:

- ▶ The Library Media Center Specialist/Librarian component of the 1993–94 SASS was dropped.
- ▶ The student records component of the 1993–94 SASS was dropped.

Changes were also made to existing SASS components, based on two extensive field tests.

- ▶ *Additions to School Questionnaire:* number of computers, access to the Internet, whether there is a computer coordinator in this school, availability of certain types of curricular options, how special education students' needs are met, changes in the school year or weekly schedule, the enrollment capacity of schools, and whether schools have programs for disruptive students. A charter school questionnaire was added to this series; it included elements of the District and Library Media Center Questionnaire since those two components did not add a separate charter school questionnaire.
- ▶ *Deletions to School Questionnaire:* layoff data and counts of students by grade level.

- ▶ *Additions to Principal Questionnaire:* principals'/school heads' frequency of engaging in various school and school-related activities, perceived degree of influence of principals and other groups (state, local, school, and parents) in setting performance standards for students, barriers (e.g., personnel policies, inadequate documentation, lack of support, stress) to dismissing poor or incompetent teachers, rewards or sanctions for success or failure to meet district or state performance goals, and means for assessing progress on school improvement plan. A charter school questionnaire was added to this series.
- ▶ *Deletions to Principal Questionnaire:* degrees earned—other than highest (including their dates, in what field they were earned, and at which college or university a bachelor's degree was earned), the location and grade levels of the previous school at which respondent was principal, breaks in service, year when eligible to retire, and benefits received in addition to salary.
- ▶ *Additions to Teacher Questionnaire:* training, teacher induction, teacher professional development, curriculum development, computer usage and decisionmaking practices. A charter school questionnaire was added to this series.
- ▶ *Additions to School District Questionnaire:* percentage of payroll dedicated to school staff benefits, oversight of home-schooled students and charter schools, use of school performance reports, migrant education, and procedures for recruiting and dismissing teachers.

**Internet reporting option.** In addition to the paper SASS forms, an Internet reporting option was developed for the public and private Library Media Center Questionnaire.

**Questionnaire printing.** The 1999–2000 SASS was the first administration of SASS to use customized printing of questionnaires. For SASS, it was used to:

- ▶ Print respondent's identification information on any page.
- ▶ Provide information to specific respondents to avoid definitional problems.
- ▶ Split-panel wording for an LMC test.
- ▶ Personalize letters to respondents.

### **Future Plans**

SASS administrations are now scheduled on a 4-year cycle. The next administration will be in 2003–2004.

## 5. Data Quality and Comparability

### Sampling Error

The estimators of sampling variances for SASS statistics take the SASS complex sample design into account. For an overview of the calculation of sampling errors, see the *SASS Quality Profiles* (NCES 2000–308 and NCES 94–340).

**Direct variance estimators.** The *balanced half-sample replication (BHR)* method, also called *balanced repeated replication (BRR)* method, was used to estimate the sampling errors associated with estimates from the 1987–88 and 1990–91 SASS. Given the replicate weights, the statistic of interest (such as the number of 12<sup>th</sup> grade teachers from the School Survey) can be estimated from the full sample and from each replicate. The mean square error of the replicate estimates around the full sample estimate provides an estimate of the variance of the statistic.

A bootstrap variance estimator was used for the 1993–94 and the 1999–2000 SASS. The bootstrap variance reflects the increase in precision due to large sampling rates because the bootstrap is done systematically without replacement, as was the original sampling. Bootstrap samples can be selected from the bootstrap frame, replicate weights computed, and variances estimated with standard BHR software. The bootstrap replicate basic weights (inverse of the probability of selection) were subsequently reweighted. For more information about the bootstrap variance methodology and how it applies to SASS see: “A Bootstrap Variance Estimator for Systematic PPS Sampling” in NCES Working Paper 2000–04, *Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings* (this paper describes the methodology used in 1999–2000 SASS), “A Bootstrap Variance Estimator for the Schools and Staffing Survey” and “Balanced Half-sample Replication with Aggregation Units” in NCES Working Paper 94–01, *Schools and Staffing Survey (SASS), Papers Presented at the Meetings of the American Statistical Association; “Comparing Three Bootstrap Methods for Survey Data”* by Randy Sitter, in the Technical Report Series of the Laboratory for Research in Statistics and Probability, published by Carleton University in 1990; “Properties of the Schools and Staffing Survey Bootstrap Variance Estimator” in NCES Working Paper 96–02, *Schools and Staffing Survey (SASS): 1995 Selected papers presented at the 1995 Meeting of the American Statistical Association*; and “The Jackknife, the Bootstrap and other Resampling Plans,” an article by Bradley Efron in *Society for Industrial and Applied Mathematics*, (SIAM) No. 38, 1982.

The replicate weights for all three rounds of SASS are used to compute the variance of a statistic,  $Y$ , as stated below.

$$\text{Variance}(Y) = \frac{1}{n} \sum_r (Y_r - Y)^2$$

where:  $Y_r$  = the estimate of  $Y$  using the  $r$ th set of replicate weights, and

$n$  = the number of replicates ( $n=88$  for 1999–2000 SASS).

SASS variances can be calculated using the 88 replicates of the full sample that are available on the data files with software such as WesVarPC. For examples of other software that support BRR, see K.M. Wolter’s *Introduction to Variance Estimation* (New York: Springer-Verlag, 1985).

**Average design effects.** Design effects (*Deffs*) measure the impact of the complex sample design on the accuracy of a sample estimate, in comparison to the alternative simple random sample design. For the 1990–91 SASS, an average design effect was derived for groups of statistics, and within each group, for a set of subpopulations. Standard errors of 1990–91 and 1993–94 SASS statistics of various groups for various subpopulations can then be calculated approximately from the standard errors based on the simple random sample (using SAS or SPSS) in conjunction with the average design effects provided. For example, average design effects for selected variables in the Public School Survey are 1.60 (public sector) and 1.36 (private sector); in the Principal Survey, 4.40 (public sector) and 4.02 (private sector), and in the Teacher Survey, 3.75 (public sector) and 2.52 (private sector). Examples illustrating the use of SASS average design effect tables are provided in *Design Effects and Generalized Variance Functions for the 1990–91 Schools and Staffing Survey (SASS), Volume I, User’s Manual* (NCES 95–342–I).

**Generalized variance functions (GVF).** GVF tables were developed for use in the calculation of standard errors of totals, averages, and proportions of interest in the 1990–91 SASS components. The 1990–91 GVFs can be used for the 1993–94 SASS because no major design changes were adopted between 1990–91 and 1993–94. Examples illustrating the use of the GVF tables are provided in *Design Effects and Generalized Variance Functions for the 1990–91 Schools and Staffing Survey (SASS), Volume I, User’s Manual* (NCES 95–342–I). Note that the GVF approach, unlike the design effect approach described above, involves no need to calculate the simple random sample variance estimates.

## Nonsampling Error

**Coverage error.** SASS surveys are subject to any coverage error present in CCD and PSS, the NCES data files that serve as their principal sampling frames. The report *Coverage Evaluation of the 1994–95 Common Core of Data: Public Elementary/Secondary Education Agency Universe Survey* (NCES 97–505) found that overall coverage in the Agency Universe Survey was 96.2 percent (in a comparison to state education directories). “Regular” agencies—those traditionally responsible for providing public education—had almost total coverage in the 1994–95 survey. Most coverage discrepancies were attributed to nontraditional agencies that provide special education, vocational education, and other services. However, there is potential for undercoverage bias associated with the absence of schools built between the construction of the sampling frame and time of the SASS survey administration. Further research on coverage can be found in “Evaluating the Coverage of the U.S. National Center for Education Statistics’ Public Elementary/Secondary School Frame” (Hamann 2000) and “Evaluating the Coverage of the U.S. National Center for Education Statistics’ Public and Private School Frames Using Data from the National Assessment of Educational Progress” (Lee, Burke, and Rust 2000).

A capture-recapture methodology was used to estimate the number of private schools in the United States and to estimate the coverage of private schools in the 1999–2000 PSS; the study found that the PSS school coverage rate is equal to 97 percent. (See chapter 2 for a description of CCD and chapter 3 for a description of PSS.)

### Nonresponse error.

**Unit nonresponse.** The weighted unit response rates for public schools have been higher than the weighted unit response rates for private schools in the first three rounds of SASS (rates for 1999–2000 are not available at this time). See table 2. For more information on the analysis of nonresponse rates, refer to *An Analysis of Response Rates in the 1993–94 Schools and Staffing Survey* (NCES 98–243) and *An Exploratory Analysis of Response Rates in the 1990–91 Schools and Staffing Survey (SASS)* (NCES 96–338).

**Item nonresponse.** The percentage of items with response rates of 90 percent or more was generally high across the first three rounds of SASS (rates for 1999–2000 are not available at this time): for example, in 1993–94, for public schools, 91 percent of the School District Surveys had item response rates of 90 percent or more, 92 percent of Principal Surveys, 83 percent of

School Surveys, and 91 percent of Teacher Surveys. Item response rates gradually increased between 1987–88 and 1993–94. They ranged from 11 to 100 percent in the 1987–88 SASS, 25 to 100 percent in the 1990–91 SASS, and 50 to 100 percent in the 1993–94 SASS. (See the *SASS Data File User’s Manuals*, NCES 96–142 and NCES 93–144–I.)

**Measurement error.** Results reported in *An Analysis of Response Rates in the 1993–94 Schools and Staffing Survey* (NCES 98–243) support the contention that, without follow up to mail surveys, nonresponse error would be much greater than it is and that the validity and reliability of the data would be considerably reduced. However, because of the substantial amount of telephone follow up, there is concern about possible bias due to differences in the mode of survey collection. Other possible sources of measurement error include long, complex instructions that respondents either do not read or do not understand, navigation problems related to the format of the questionnaires, and definitional and classification problems. See also *Measurement Error Studies at the National Center for Education Statistics* (NCES 97–464).

Table 2. Summary of overall weighted unit response rates for selected SASS questionnaires

Questionnaire	1987–88	1990–91	1993–94
School District Survey	90.8	93.5	93.9
Public Principal Survey	94.4	96.7	96.6
Public School Survey	91.9	95.3	92.3
Public Teacher Survey*	82.9	85.9	83.8
Private Principal Survey	79.3	90.1	87.6
Private School Survey	78.6	83.9	83.2
Private Teacher Survey*	69.6	75.5	72.9
BIA Principal Survey	†	†	98.7
BIA School Survey	†	†	99.3
BIA Teacher Survey	†	†	86.5

†Not applicable

\*The overall teacher response rates are the percentage of teachers responding in schools that provided teacher lists for sampling. The response rates to the Public Teacher Survey itself ranged from 86.4 (in 1987–88) to 90.3 percent (in 1990–91) and to the Private Teacher Survey from 79.1 (in 1987–88) to 83.6 percent (in 1990–91).

SOURCE: Choy, Medrich, and Henke, *Schools and Staffing in the United States: A Statistical Profile, 1987–88* (NCES 92–120). Gruber, *1990–91 Schools and Staffing Survey: Data File User’s Manual* (NCES 93–144–I). Gruber, Rohr, and Fondelier, *1993–94 Schools and Staffing Survey: Data File User’s Manual* (NCES 96–142). Jabine, *Quality Profile for SASS: Aspects of the Quality of Data in the Schools and Staffing Surveys (SASS)* NCES 94–340.

Several NCES working papers also address measurement error. Reports that study the 1993–94 SASS include: *Cognitive Research on the Teacher Listing Form for the Schools and Staffing Survey* (NCES Working Paper 96–05); *Further Cognitive Research on the Schools and Staffing Survey (SASS)* (NCES Working Paper 97–23); *Report of Cognitive Research on the Public and Private School Teacher Questionnaires for the Schools and Staffing Survey 1993–94 School Year* (NCES Working Paper 97–10), and *Response Variance in the 1993–94 Schools and Staffing Survey: A Reinterview Report* (NCES Working Paper 98–02). Reports that study the 1991–92 SASS include: *1991 Schools and Staffing Survey (SASS) Reinterview Response Variance Report* (NCES Working Paper 94–03) and *The Results of the 1991–92 Teacher Follow-up Survey (TFS) Reinterview and Extensive Reconciliation* (NCES Working Paper 98–02).

## 6. CONTACT INFORMATION

For content information on SASS, contact:

Kathryn Chandler  
 Phone: (202) 502-7486  
 E-mail: kathryn.chandler@ed.gov  
 SASS e-mail: sassdata@ed.gov

### Mailing Address:

National Center for Education Statistics  
 1990 K Street NW  
 Washington, DC 20006-5651

## 7. METHODOLOGY AND EVALUATION REPORTS

### General

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# Chapter 5: SASS Teacher Follow-up Survey (TFS)

## 1. OVERVIEW

The SASS Teacher Follow-up Survey (TFS) is a follow-up survey of elementary and secondary school teachers who participated in the Schools and Staffing Survey (SASS, see chapter 4). TFS is conducted for NCES by the U.S. Bureau of the Census in the school year following the SASS data collection. TFS consists of all sampled teachers who left teaching within the year after the SASS was administered and a subsample of those who continued teaching, including those who remained in the same school as in the previous year and those who changed schools.

### Purpose

To provide estimates of teacher attrition, retention, and mobility in public and private schools and to project demand for teachers; to provide national data on the characteristics of teachers who leave teaching, their reasons for leaving, and their current occupational status; and to provide information on the career paths of persons who remain in teaching. TFS is designed to support estimates of public elementary, secondary, and combined school teachers and private school teachers at the national level.

### Components

TFS is comprised of two questionnaires: one for those who leave the teaching profession (former teachers), and one for those who remain in the teaching profession. These questionnaires ask teachers about their current status, occupational changes and plans, reasons for staying in (or leaving) teaching, and attitudes about the teaching profession. Eligible survey respondents are teachers in public, public charter (as of 2000–2001), private, and Bureau of Indian Affairs (BIA) elementary and secondary schools in the 50 states and the District of Columbia.

***Teacher Followup Survey Questionnaire for Former Teachers.*** This questionnaire collects information on former teachers to ascertain information on current occupation; primary activity; plans to remain in current position; plans for further education, plans for returning to teaching; reasons for leaving teaching; possible areas of satisfaction or dissatisfaction with teaching; salary; marital status; number of children; and other information that may be related to attrition; and reasons for retirement.

***Teacher Followup Survey Questionnaire for Continuing Teachers.*** This questionnaire collects information on continuing teachers to ascertain occupational status (full-time, part-time); primary teaching assignment by field; teaching certificate; level of students taught; areas of satisfaction or dissatisfaction; new degrees earned or pursued; expected duration in teaching; marital status; number of children; academic year base salary; time spent performing school related tasks; use of technology for teaching and learning; effectiveness of school administration; and reasons for leaving previous school.

### SAMPLE FOLLOW-UP SURVEY OF PUBLIC, PRIVATE, CHARTER, AND BIA SCHOOL TEACHERS

SASS collects data on:

- ▶ Stayers
- ▶ Movers
- ▶ Leavers

## Periodicity

The first administration of TFS was in the 1988–89 school year with a sample from the 1987–88 SASS of about 2,500 teachers who had left teaching and 5,000 who were still in teaching. The size of the sample is approximately the same for every cycle of TFS. There have been three more administrations of TFS, 1991–92 and 1994–95, and 2000–2001. Each collection of TFS is a follow up to the SASS sample of the previous year.

## 2. USES OF DATA

Data from TFS are used for a variety of purposes by Congress, state education departments, federal agencies, private school associations, teacher associations, and educational organizations. TFS can be used to address issues related to teacher turnover. Leavers, movers, and stayers can be profiled and compared in terms of teaching qualifications, working conditions, attitudes toward teaching, job satisfaction, salaries, benefits, and other incentives and disincentives for remaining in or leaving the teaching profession. TFS also provides a measure of national teacher attrition in the various fields and updates information on the education, other training, and career paths of teachers. In addition, sampled teachers can be linked to SASS data to determine relationships between local district and school policies/practices, teacher characteristics, and teacher attrition and retention.

## 3. KEY CONCEPTS

For additional terms, see the glossaries in TFS reports, in particular *Characteristics of Stayers, Movers, and Leavers: Results from the Teacher Followup Survey: 1994–95* (NCES 97–450).

**Leavers.** Teachers who left the teaching profession in the year after the last SASS administration.

**Movers.** Teachers who were still teaching in the year after the last SASS administration but had moved to a different school.

**Stayers.** Teachers who were teaching in the same school in the year after the last SASS administration as in the year of the SASS administration.

**Itinerant Teacher.** An individual who teaches at more than one school; for example, a music teacher who teaches three days per week at one school and two days per week at another.

## 4. SURVEY DESIGN

### Target Population

The universe of elementary and secondary school teachers who teach in public, private, public charter (as of 1999–2000), and BIA schools in the 50 states and the District of Columbia in schools that had any of grades 1–12 during the school year of the last SASS administration. This population is divided into two components—those who left teaching after that school year (former teachers) and those who continued teaching (current teachers).

### Sample Design

TFS surveys a sample of teachers who were interviewed in the previous SASS Teacher Survey. The TFS sample is a stratified sample allocated to allow comparisons of stayers, movers, and leavers by sector, experience, and teaching level. The sample is stratified in the following order: (1) Sector (public, private, and, as of the 2000–2001 TFS, charter); (2) Teacher status (leavers, stayers, movers, unknown); (3) Experience (new/experienced); and (4) Teaching level (elementary, secondary).

Within each public TFS stratum, teachers who respond to the previous SASS Teacher Survey are sorted by subject (i.e., the subject that the teacher teaches the most classes in), Census region, urbanicity, school enrollment, and SASS teacher control number. Within each private TFS stratum, responding teachers are sorted by subject, association membership (list frame), affiliation (area frame), urbanicity, school enrollment, and SASS teacher control number.

After they are sorted, teachers are selected within each stratum using a probability proportional to size (pps) sampling procedure. The measure of size is the teacher weight for the previous SASS. (Note that the SASS teacher weight used in 1993–94 did not include a teacher adjustment factor—a ratio adjustment to the school questionnaire report of teacher head counts—since the TFS sampling needed to be completed before the SASS teacher weight was finalized. See *1993–94 Schools and Staffing Survey: Sample Design and Estimation*, NCES 96–089.)

The 1994–95 TFS surveyed approximately 7,200 teachers who had been interviewed in the 1993–94 SASS Teacher Survey. (See chapter 4 for information on the SASS sample design.) A total of 5,025 public school teachers, 2,098 private school teachers, and 50 BIA school teachers were selected, of whom 4,528, 1,751, and 44,

respectively, were interviewed. The target sample sizes for the 2000–2001 TFS include 4,900 stayers and 3,400 leavers.

### Data Collection and Processing

The TFS is conducted using mailed questionnaires with telephone follow up. The U.S. Bureau of the Census is the collection agent.

**Reference dates.** Most data items refer to teacher status at the time of questionnaire completion. Some items refer to the past school year, past semester, past 12 months, or the next school year.

**Data collection.** In September of the year of survey administration, the Census Bureau mails teacher status forms to schools that provided lists of teachers for the previous SASS. On this form, the school principal (or other knowledgeable staff member) is asked to report the current occupational status of each teacher who was sampled in the previous SASS by indicating whether he/she is still at the school in a teaching or nonteaching capacity, or left the school to teach elsewhere or for a nonteaching occupation. If school staff indicate a sample teacher has moved, the Census Bureau tries to obtain the correct home address from the U.S. Postal Service.

The following January, the TFS questionnaires are mailed to selected teachers and former teachers. The Questionnaire for Former Teachers is sent to sample persons reported by school administrators as having left the teaching profession. The Questionnaire for Current Teachers is sent to sample persons who are reported as still teaching at the elementary or secondary level. The questionnaires are mailed to home addresses when available. Otherwise, they are mailed to the sample teacher's school as listed in the previous SASS administration.

In February, the Census Bureau mails a second questionnaire to each sample person who did not return the first questionnaire. Also, for those who returned the first form and indicated that it does not apply to them (because their status was incorrectly reported by their school in the last SASS administration), the appropriate questionnaire is mailed to them at this time.

In late March, Census interviewers begin calling sample persons who did not return a mail questionnaire. In addition to these nonresponse follow-up cases, some “nonmailable” cases (cases with incomplete addresses) are assigned for telephone follow up. If the interviewers are unable to contact a sample teacher through a contact person or through directory assistance, they call the sample

person's school to obtain information about the person's current address or employer. Interviewers use the Telephone Questionnaire for the Teacher Followup Survey to collect the data. This allows the data for current and former teachers to be recorded on the same form. Telephone follow up of nonrespondents is completed by the end of the school year.

**Editing.** Questionnaires undergo several stages of editing. Upon receipt, clerks assign codes to each questionnaire to indicate its status (e.g., complete interview, refusal, deceased) and then perform a general clerical edit that includes reviewing all entries for legibility and making corrections. For the Questionnaire for Former Teachers, clerks assign industry and occupation codes to the respondent's current job. For the Questionnaire for Continuing Teachers, respondents teaching in a different state are assigned a new state FIPS code.

Once the data are keyed, the next step is to make a preliminary determination of each case's interview status—that is, whether it is an interview, a noninterview, or out-of-scope for the survey. The data file is then divided into two files: (1) former teachers (leavers) and (2) current teachers (stayers and movers). Records classified as interviews in the preliminary interview status check are then submitted to a series of computer edits: range checks, consistency edits, and blanking edits. Next, the records undergo a final edit to determine whether the case is eligible for inclusion in the survey and, if so, whether sufficient data have been collected for the case to be classified as an interview. A final interview status recode (ISR) value is then assigned to each case.

### Estimation Methods

Estimates from TFS sample data are produced using weighting and imputation procedures.

**Weighting.** The TFS weighting process includes adjustment for nonresponse using respondents' data and adjustment of the sample totals to the frame totals to reduce sampling variability. The exact formula for TFS weight construction is provided in *1993–94 Schools and Staffing Survey: Sample Design and Estimation* (NCES 96–089).

**Imputation.** In all administrations of TFS, all item missing values are imputed for records classified as interviews. Values are imputed by using data from (1) other items on the questionnaire or the previous SASS Teacher Survey record for the same respondent, or (2) data from the record for a respondent with similar characteristics

(commonly known as the nearest neighbor “hot-deck” method for imputing for item nonresponse).

Although most imputation is carried out through computer processing, there are some cases where entries are clerically imputed for a few items. In these cases, the data record, the SASS teacher file record, and in some cases, the questionnaire are reviewed, and an entry consistent with the information from those sources is imputed. This procedure is used when (1) there is not a suitable record to use as a donor, (2) the computer method produces an entry that is outside the acceptable range for the item, or (3) there are very few cases where an item is unanswered (usually less than 10).

### Recent Changes

Changes between the 1994–95 and 2000–2001 TFS include new items added to measure the impact of retirement policies on teacher supply and the addition of items on general instructional practices across elementary, secondary, and combined schools, particularly as they pertain to the use of computers and other technology in schools. The teacher time use section was also expanded to measure specific demands on teacher time. In some cases, the number of response categories were collapsed for the 2000–01 TFS in response to results of focus group analysis, and several items were slightly altered from the 1994–95 TFS to make them more consistent with the comparable items from the 1999–2000 SASS Teacher Questionnaire.

### Future Plans

After a 6-year hiatus, SASS was fielded in 1999–2000, and TFS in 2000–2001. Subsequent administrations are scheduled on a 4-year cycle.

## 5. DATA QUALITY AND COMPARABILITY

### Sampling Error

Since the TFS sample is a proper subsample of the SASS teacher sample, the SASS teacher replicates are used for the TFS sample. See the discussion of sampling error and variance estimation in chapter 4 on SASS. In the case of TFS, the TFS basic weight for each TFS teacher is multiplied by each of the SASS replicate weights ( $n=48$  for the 1993–94 SASS;  $n=88$  for the 1999–2000 SASS) divided by the SASS teacher full-sample intermediate weight for that teacher. To calculate the replicate weights which should be used for variance calculations, these TFS replicate basic weights are processed through the remainder of the TFS weighting system.

### Nonsampling Error

**Coverage error.** A potential bias may be introduced into TFS because the TFS frame only includes teachers who responded to SASS.

### Nonresponse error.

**Unit nonresponse.** The total weighted response rate in the 1994–95 TFS was 91.6 percent. Rates were similar for current and former teachers: 91.8 percent for current teachers and 88.8 for former teachers. There was greater variation by school type, with private schools generally having lower response rates than public and BIA schools (87.2 percent versus 92.3 and 99.5 percent, respectively).

Cumulative overall response rates for TFS surveys are the product of the SASS Teacher List response rate, the SASS Teacher Survey response rate, and the TFS Teacher response rate. (See table below.)

Table 3. Weighted response rates for 1993–94 SASS Teacher List, 1993–94 SASS Teacher Survey, 1994–95 TFS, and the cumulative overall response rates

	Sector			
	Public		Private	
SASS Teacher List response rate <sup>1</sup>	95.0		91.0	
SASS Teacher Survey response rate <sup>2</sup>	88.2		80.2	
	Current teachers <sup>5</sup>	Former teachers	Current teachers	Former teachers
Teacher Follow-up Survey response rate <sup>6</sup>	92.5	89.2	87.2	87.6
Cumulative overall response rate	77.5	74.7	63.6	63.9

<sup>1</sup> Weighted percent of schools providing teacher lists for the 1993–94 SASS Teacher Survey.

<sup>2</sup> Weighted percent of eligible sample teachers responding to the 1993–94 SASS Teacher Survey.

<sup>3</sup> This rate does not include the 5 percent of the public schools that did not provide teacher lists.

<sup>4</sup> This rate does not include the 9 percent of the private schools that did not provide teacher lists.

<sup>5</sup> Includes stayers and movers.

<sup>6</sup> Weighted percent of eligible sample teachers responding to the 1994–95 Teacher Follow-up Survey.

SOURCE: Whitener, Gruber, Rohr, and Fondelier, *1994–95 Teacher Followup Survey Data File User's Manual Restricted-Use Version* (NCES Working Paper 1999–14).

*Item nonresponse.* Several items in the 1994–95 TFS had a response rate of less than 80 percent. In the Teacher Followup Survey Questionnaire for Former Teachers, the item asking years to retirement had a response rate below 80 percent. In the Teacher Followup Survey Questionnaire for Current Teachers, items with response rates below 80 percent included one item on type of certificate held in field, three items referring to before-tax earning from teaching and other employment during the summer of 1994, two items on jobs outside the school system during the current school year, and an item on the number of dependents other than spouse and children.

**Measurement error.** Reinterviews were conducted for the purpose of measuring response variance in the 1994–95 TFS. The reinterview was conducted through two reinterview questionnaires—one for mail cases and another for telephone cases. Each questionnaire contained a subset of questions from the original questionnaire. Seventy-eight percent of the questions evaluated displayed high response variance; only 5 percent displayed low response variance (all but one of the 54 questions on teaching methods had moderate or high response variance). This reinterview study again confirmed that “mark all that apply” questions tend to be problematic. See *Response Variance in the 1994–95 Teacher Follow-up Survey* (NCES Working Paper 98–13). A similar reinterview study is planned for the 2000–01 TFS.

### Data Comparability

*Caution must be used in the interpretation of change estimates between the TFS surveys prior to 1994–95 and those of 1994–95 and later because of wording changes in the TFS surveys.*

## 6. CONTACT INFORMATION

For content information on TFS, contact:

Kathryn Chandler  
Phone: (202) 502–7486  
E-mail: [kathryn.chandler@ed.gov](mailto:kathryn.chandler@ed.gov)  
Kerry Gruber  
Phone: (202) 502–7349  
E-mail: [kerry.gruber@ed.gov](mailto:kerry.gruber@ed.gov)  
SASS e-mail: [sassdata@ed.gov](mailto:sassdata@ed.gov)

### Mailing Address:

National Center for Education Statistics  
1990 K Street NW  
Washington, DC 20006–5651

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# Chapter 6: National Education Longitudinal Study of 1988 (NELS:88)

## 1. OVERVIEW

The National Education Longitudinal Study of 1988 (NELS:88) is the third major secondary education longitudinal survey sponsored by NCES. The first two surveys—the National Longitudinal Study of the High School Class of 1972 (NLS-72) and the High School and Beyond (HS&B) Study—examined the educational, vocational, and personal development of young people, beginning in high school. (See chapters 7 and 8 for descriptions of these studies.) NELS:88 provides new data about critical transitions experienced by students from 8<sup>th</sup> grade through high school and into postsecondary education or the workforce. It expands the knowledge base of the two previous studies by surveying adolescents at an earlier age and following them into the 21<sup>st</sup> century.

The NELS:88 base year survey included a national probability sample of 1,052 public and private 8<sup>th</sup>-grade schools, with almost 25,000 participating students across the United States. Three follow-up surveys were conducted at 2-year intervals from 1990 to 1994. During 1994 (third follow up), most sample members were 2 years out of high school. A fourth follow up was conducted in 2000. In addition to surveying and testing students, NELS:88 gathered information from the parents of students, teachers, school administrators, and high school transcripts.

### Purpose

To (1) provide trend data about critical transitions experienced by young people as they leave elementary school and progress through high school into postsecondary institutions or the workforce, and (2) provide data for trend comparisons with results of the NLS-72 and HS&B studies.

### Components

NELS:88 has collected survey data from students, dropouts, parents, teachers, and school administrators. Supplementary information has been gathered from high school transcripts and course-offering data provided by the schools, a Base Year Ineligible Study, and a High School Effectiveness Study. The various components are described below.

**Base Year Survey.** The base year survey was conducted during the spring school term in 1988, and included the following:

*Student Questionnaire (8<sup>th</sup>-Grade Questionnaire).* Students were asked to fill out a questionnaire that included items on their home background, language use, family, opinions about themselves, plans for the future, job and chores, school life, schoolwork, and activities. Students also completed a series of curriculum-based cognitive tests in four achievement areas—reading, mathematics, science, and social studies (history/government).

### LONGITUDINAL SAMPLE SURVEY OF THE 8<sup>th</sup>-GRADE CLASS OF 1988; BASE-YEAR SURVEY AND FOUR FOLLOW UPS THROUGH 2000

NELS:88 collected data from:

- ▶ Students and dropouts
- ▶ School administrators
- ▶ Teachers
- ▶ Parents
- ▶ High school transcripts
- ▶ High school course offerings
- ▶ High School Effectiveness Study

*Parent Questionnaire.* One parent of each student completed a questionnaire requesting information about both parents' background and socioeconomic characteristics, aspirations for their children, family willingness to commit resources to their children's education, the home educational support system, and other family characteristics relevant to achievement.

*Teacher Questionnaire.* A teacher questionnaire was administered to selected 8<sup>th</sup>-grade teachers responsible for instructing sampled students in two of the four test subjects—mathematics, science, English, and social studies. The questionnaire collected information in three areas: teachers' perceptions of the sampled students' classroom performances and personal characteristics; curriculum content of areas taught; and teachers' background and activities. Two teachers responded for each student.

*School Administrator Questionnaire.* Completed by an official in the participating school, this questionnaire collected information about school, student, and teacher characteristics; school policies and practices; the school's grading and testing structure; school programs and facilities; parent involvement in the school; and school climate.

**First Follow-up Survey.** The first follow-up survey was conducted in spring 1990. It collected information from students, teachers, and school administrators, but not parents. The student sample was freshened to be nationally representative of students enrolled in the 10<sup>th</sup> grade in spring 1990. In addition, three new components were initiated: the Dropout Questionnaire, the Base Year Ineligible (BYI) Study, and the High School Effectiveness Study (HSES).

Students were again requested to complete a questionnaire and take cognitive tests. The Student Questionnaire collected background information and asked students about such topics as their school and home environments, participation in classes and extracurricular activities, current jobs, goals and aspirations, and opinions about themselves. Dropouts were asked similar questions in a separate *Not Currently In School Questionnaire* (or *Dropout Questionnaire*), which also requested specific information about reason(s) for leaving school and experiences in and out of school. Dropouts were also given cognitive tests.

School administrators provided information about their high schools in the School Administrator Questionnaire, and two teachers for each student completed the Teacher Questionnaire. There were different Teacher Questionnaires for English, mathematics, science, and history. The

School Administrator and Teacher Questionnaires provided information about school administration, school programs and services, curriculum and instruction, and teachers' perceptions about their students' learning.

**Second Follow-up Survey.** The second follow-up survey, conducted in 1992, repeated all components of the first follow-up study and reinstated the Parent Questionnaire. The student sample was again freshened to be nationally representative of students enrolled in the 12<sup>th</sup> grade in spring 1992. A new Transcript Study provided archival data on the academic experience of high school students. Students in high schools designated in the first follow up for HSES were surveyed and tested again in both the main second follow-up survey and a separate HSES survey.

As in the previous waves, students were asked to complete a questionnaire and cognitive tests. The cognitive tests were designed to measure 12<sup>th</sup>-grade achievement and cognitive growth between 1988 and 1992 in mathematics, science, reading, and social studies (history/citizenship/geography). The questionnaire asked students about such topics as academic achievement; perceptions about their curricula and schools; family structures and environments; social relations; and aspirations, attitudes, and values relating to high school, occupations, and postsecondary education. The Student Questionnaire also contained an *Early Graduate Supplement*, which asked early graduates to document the reasons for and circumstances of their early graduation. Students who were first-time participants in NELS:88 completed a *New Student Supplement*, containing basic demographic items requested in the base year but not repeated in the second follow up. First follow-up dropouts were resurveyed and retested. School administrators completed the School Administrator Questionnaire, and one mathematics or science teacher for each student completed the Teacher Questionnaire.

**Third Follow-up Survey.** The third follow-up survey, conducted in 1994, contained only the Student Questionnaire, which collected information on issues of employment and postsecondary education. Specific content areas included academic achievement; perceptions and feelings about school and/or job; work experience and work-related training; application and enrollment in postsecondary education institutions; sexual behavior, marriage, and family; and values, leisure time activities, volunteer activities, and voting behavior.

**Fourth Follow-up Survey.** The fourth follow-up survey, conducted in 2000, contained only the Student Questionnaire, which collected information on issues of

employment and postsecondary education. Specific content areas included academic achievement; perceptions and feelings about school and/or job; work experience and work-related training; application and enrollment in postsecondary education institutions; sexual behavior, marriage, and family; and values, leisure time activities, volunteer activities, and voting behavior.

**Supplemental Studies.** The following supplemental studies were conducted during the course of the NELS:88 project:

*Base Year Ineligible (BYI) Study.* The BYI Study was added to the first follow-up survey to ascertain the status of students who were excluded from the base year survey due to a language barrier or physical or mental disability that precluded them from completing a questionnaire and cognitive tests. Any students found to be eligible at this time were included in the follow-up surveys.

*Followback Study of Excluded Students (FSES).* This study—a part of the second follow-up survey—was a continuation of the first follow-up Base Year Ineligible Study.

*Transcript Study.* This study collected high school transcripts during the second follow-up survey. Complete transcript records were collected for (1) students attending sampled schools in spring 1992; (2) dropouts (including those in alternative programs) and early graduates; and (3) sample members who were ineligible for any wave of the survey due to mental or physical disability or language barriers.

*High School Effectiveness Study (HSES).* To facilitate longitudinal analysis at the school level, a School Effects Augmentation was implemented in the first follow-up survey to provide a valid probability sample of 10<sup>th</sup>-grade schools. From the pool of NELS:88 first follow-up schools, a probability subsample of 251 urban and suburban schools in the 30 largest Metropolitan Statistical Areas was selected for the HSES; 248 of these schools were final HSES participants in the first follow up. The NELS:88 national or “core” student sample in these schools was augmented to obtain a within-school representative student sample large enough to support school effects research (e.g., the effects of school policies and practices on students). These schools and students were followed up in 1992—when the majority of the students were in 12<sup>th</sup> grade—as part of both the main NELS:88 second follow-up survey and the HSES survey. The HSES also provided a convenient framework for a constructed response testing experiment in 1992. The test contained four questions that required students to derive answers

from their own knowledge and experience (e.g., write an explanation, draw a diagram, solve a problem). Mathematics tests were assigned to half of the schools that were willing to commit the extra time required for such testing; the other half were assigned science tests. The second follow-up HSES was also enhanced by the collection of curriculum offerings in the Course Offerings Component. (See below.)

*Course Offerings Component.* This component was added to the second follow up to provide curriculum data that can serve as a baseline for studying student outcomes. Course offerings were collected from the HSES schools. (See above.) These data illuminate trends when contrasted to the transcript studies conducted as part of the 1982 HS&B and the 1987, 1990, 1994, and 1998 National Assessment of Educational Progress.

### Periodicity

Biennial from 1988 to 1994. A fourth follow up was conducted in 2000. A Base Year Ineligible Study was conducted in 1990 as part of the first follow up; a continuation study, the Followback Study of Excluded Students, was conducted in 1992 as part of the second follow up. A High School Effectiveness Study was conducted in the first and second follow ups. A Transcript Study was implemented in the second follow up.

## 2. USES OF DATA

The NELS:88 project was designed to provide trend data about critical transitions experienced by students as they leave elementary school and progress through high school and into postsecondary education or the workforce. Its longitudinal design permits the examination of changes in young people’s lives and the role of school in promoting growth and positive life outcomes. The project collects policy-relevant data about educational processes and outcomes, early and late predictors of dropping out, and school effects on students’ access to programs and equal opportunity to learn. These data complement and strengthen state and local efforts by furnishing new information on how school policies, teacher practices, and family involvement affect student educational outcomes (e.g., academic achievement, persistence in school, and participation in postsecondary education).

NELS:88 data can be analyzed in three ways: cross-wave, cross-sectional, and cross-cohort (by comparing NELS:88 findings with those of the NLS-72 and HS&B studies). By following young adolescents at an earlier age (8<sup>th</sup> grade)

and into the 21<sup>st</sup> century, NELS:88 expands the base of knowledge established in the NLS-72 and HS&B studies. NELS:88 first follow-up data provide a comparison point to high school sophomores 10 years earlier, as studied in HS&B. Second follow-up data allow trend comparisons of the high school class of 1992 with the 1972 and 1980 seniors studied in the NLS-72 and HS&B studies, respectively. The third follow up allows comparisons with NLS-72 and HS&B related to postsecondary outcomes. The three studies together provide measures of educational attainment in the United States and rich resources for studying the reasons for and consequences of academic success and failure.

More specifically, NELS:88 data can be used to investigate:

- ▶ *transitions from elementary to secondary school*: how students are assigned to curricular programs and courses; how such assignments affect their academic performance as well as future career and postsecondary education choices;
- ▶ *academic growth over time*: family, community, school, and classroom factors that promote growth; school classroom characteristics and practices that promote learning; effects of changing family composition on academic growth;
- ▶ *features of effective schools*: school attributes associated with student academic achievement; school effects analyses;
- ▶ *dropout process*: contextual factors associated with dropping out; movement in and out of school, including alternative high school programs;
- ▶ *role of the school in helping the disadvantaged*: school experiences of the disadvantaged; approaches that hold the greatest potential for helping them;
- ▶ *school experiences and academic performance of language minority students*: variation in achievement levels; bilingual education needs and experiences;
- ▶ *attracting students to mathematics and science*: math and science preparation received by students; student interest in these subjects; encouragement by teachers and school to study advanced mathematics and science; and
- ▶ *transitions from high school to college and postsecondary access/choice*: planning and application behaviors of the high school class of 1992; subsequent enrollment in postsecondary institutions.

### 3. KEY CONCEPTS

Some of the key terms related to NELS are defined below.

***Cognitive Test Battery.*** Cognitive tests measuring student achievement in mathematics, reading, science, and social studies (history/citizenship/geography) were administered in the base year, first follow up, and second follow up. The contents was as follows: (1) reading (21 items, 21 minutes); (2) mathematics (40 items, 30 minutes); (3) sciences (25 items, 20 minutes); and (4) social studies (30 items, 14 minutes—the base year test included history and government items, the first and second follow-up tests included history, citizenship, and geography items).

***Socioeconomic Status (SES).*** A composite variable constructed from five questions on the Parent Questionnaire: father's education level, mother's education level, father's occupation, mother's occupation, and family income. When all parent variables were missing, student data were used to compute socioeconomic status, substituting household items (e.g., dictionary, computer, more than 50 books, washing machine, calculator) for the family income variable. There are separate SES variables derived from parent data in the base year and the second follow up. The database also included variables for SES quartiles.

***Dropout.*** Used both to describe an event (leaving school before graduating) and a status (an individual who was not in school and not a graduate at a defined point in time). The NELS:88 "cohort dropout rate" is based on a measurement of the enrollment status of 1988 8<sup>th</sup> graders 2 and 4 years later (in spring 1990 and spring 1992) and of 1990 sophomores 2 years later (in spring 1992). For a given point in time, a respondent is considered to be a dropout if he/she had not graduated from high school or attained an equivalency certificate and had not attended high school for 20 consecutive days (not counting excused absences). Transferring to another school is not regarded as a dropout event, nor is delayed graduation if a student was continuously enrolled but took an additional year to complete high school. A person who dropped out of school may have returned later and graduated. This person would be considered a "dropout" at the time he/she initially left school and a "stopout" at the time he/she returned to school.

## 4. SURVEY DESIGN

### Target Population

Students enrolled in the 8<sup>th</sup> grade in “regular” public and private schools located in the 50 states and the District of Columbia during the spring 1988 school term. The sample was freshened in both the first and second follow ups to provide valid probability samples that would be nationally representative of 10<sup>th</sup> graders in spring 1990 and 12<sup>th</sup> graders in spring 1992. The NELS:88 project excludes the following types of schools: Bureau of Indian Affairs schools, special education schools for the handicapped, area vocational schools that do not enroll students directly, and schools for dependents of U.S. personnel overseas. The following students are also excluded: mentally handicapped students and students not proficient in English, for whom the NELS:88 tests would be unsuitable; and students having physical or emotional problems that would make participation in the survey unwise or unduly difficult. However, a Base Year Ineligible Study (in the first follow up) and a Followback Study of Excluded Students (in the second follow up) sampled excluded students and added those no longer considered ineligible to the freshened sample of the first and second follow ups, respectively.

### Sample Design

NELS:88 was designed to follow a nationally representative longitudinal component of students who were in the 8<sup>th</sup> grade in spring 1988. It also provides a nationally representative sample of schools offering 8<sup>th</sup> grade in 1988. In addition, by freshening the student sample in the first and second follow ups, NELS:88 provides nationally representative populations of 10<sup>th</sup> graders in 1990 and 12<sup>th</sup> graders in 1992. To meet the needs for cross-sectional, longitudinal, and cross-cohort analyses, NELS:88 involved complex research designs, including both longitudinal and cross-sectional sample designs.

**Base Year Survey.** In the base year, students were selected using a two-stage stratified probability design, with schools as the first-stage units and students within schools as the second-stage units. From a national frame of about 39,000 schools with 8<sup>th</sup> grades, a pool of 1,032 schools was selected through stratified sampling with probability of selection proportional to their estimated 8<sup>th</sup>-grade enrollment; private schools were oversampled to assure adequate representation. A pool of 1,032 replacement schools was selected by the same method to be used as substitutions for ineligible or refusal schools in the initial pool. A total of 1,057 schools cooperated in

the base year; of these, 1,052 schools (815 public and 237 private) contributed usable student data. The sampling frame for NELS:88 was the school database compiled by Quality Education Data, Inc. of Denver, Colorado, supplemented by racial/ethnic data obtained from the U.S. Office for Civil Rights and school district personnel.

Student sampling produced a random selection of 26,435 8<sup>th</sup> graders in 1988; 24,599 participated in the base year survey. Hispanic and Asian/Pacific Islander students were oversampled. Within each school, approximately 26 students were randomly selected (typically, 24 regularly sampled students and 2 oversampled Hispanic or Asian/Pacific Islander students). In schools with fewer than 24 8<sup>th</sup> graders, all eligible students were selected. Potential sample members were considered ineligible and excluded from the survey if disabilities or language barriers were seen as obstacles to successful completion of the survey. The eligibility status of excluded members was reassessed in the first and second follow ups. (See below.)

**First Follow-up Survey.** There were three basic objectives for the first follow-up sample design. First, the sample was to include approximately 21,500 students who were in the 8<sup>th</sup>-grade sample in 1988 (including base year nonrespondents), distributed across 1,500 schools. Second, the sample was to constitute a valid probability sample of all students enrolled in the 10<sup>th</sup> grade in spring 1990. This entailed “freshening” the sample with students who were 10<sup>th</sup> graders in 1990 but who were not in the 8<sup>th</sup> grade in spring 1988 or who were out of the country at the time of base-year sampling. The freshening procedure added 1,229 10<sup>th</sup> graders; 1,043 of this new group were found to be eligible and were retained after final subsampling for the first follow-up survey. Third, the first follow up was to include a sample of students who had been deemed ineligible for base-year data collection due to physical, mental, or linguistic barriers to participation. The Base Year Ineligible Study reassessed the eligibility of these students so that those able to take part in the survey could be added to the first follow-up student sample. Demographic and school enrollment information was also collected for all students excluded in the base year, regardless of their eligibility status for the first follow up.

While schools covered in the NELS:88 base year survey were representative of the national population of schools offering the 8<sup>th</sup> grade, the schools in the first follow up were not representative of the national population of high schools offering the 10<sup>th</sup> grade. By 1990, the 1988 8<sup>th</sup>

graders had dispersed to many high schools, which did not constitute a national probability sample of high schools. To compensate for this limitation, HSES was designed to sustain analyses of school effectiveness issues; HSES was conducted in conjunction with the first follow up. From the pool of participating first follow-up schools, a probability subsample of 251 urban and suburban schools in the 30 largest Metropolitan Statistical Areas was designated as HSES schools. The NELS:88 core student sample was augmented to obtain a within-school representative student sample large enough to support school effects research. The student sample was increased in HSES schools by an average of 15 students to obtain within-school student cluster sizes of approximately 30 students.

**Second Follow-up Survey.** The second follow-up sample included all students and dropouts selected in the first follow up. From within the schools attended by the sample members, 1,500 12<sup>th</sup>-grade schools were selected as sampled schools. Of these, the full complement of component activities occurred in 1,374 schools. For students attending schools other than those 1,374 schools, only the Student and Parent Questionnaires were administered. As in the first follow up, the student sample was augmented through freshening to provide a representative sample of students enrolled in the 12<sup>th</sup> grade in spring 1992. Freshening added into the sample 243 eligible 12<sup>th</sup> graders who were not in either the base year or first follow-up sampling frames. Schools and students designated for the HSES in the first follow up were followed up again—as part of both the NELS:88 second follow-up national survey and the HSES survey. The Followback Study of Excluded Students was a continuation of the first follow-up Base Year Ineligible Study. In addition, two new components—the Transcript Study and the Course Offerings Component—were added to the second follow up.

**Third Follow-up Survey.** The third follow-up student sample was created by dividing the second follow-up sample into 18 groups based on students' response history, dropout status, eligibility status, school sector type, race, test scores, socioeconomic status, and freshened status. Each sampling group was assigned an overall selection probability. Cases within a group were selected such that the overall group probability was met, but the probability of selection within the group was proportional to each sample member's second follow-up design weight. Assigning selection probabilities in this way reduced the variability of the third follow-up raw weights and conse-

quently increased the efficiency of the resulting sample from 40.1 percent to 44.0 percent.

**Fourth Follow-up Survey.** The fourth follow-up student sample was the same as the third follow-up student sample.

### Data Collection and Processing

NELS:88 compiled data from five primary sources: students, parents, school administrators, teachers, and high school administrative records (transcripts, course offerings, and course enrollments). Data collection efforts for the base year through third follow up extended from spring 1988 to summer 1994. Self-administered questionnaires, cognitive tests, and telephone or personal interviews were used to collect the data. The follow-up surveys involved extensive efforts to locate and collect data from sample members who were school dropouts, school transfers, or otherwise mobile individuals. Coding and editing conventions adhered as closely as possible to the procedures and standards previously established for the NLS-72 and HS&B. The National Opinion Research Center (NORC) at the University of Chicago was the prime contractor for the NELS:88 project from base year through the third follow up, but Research Triangle Institute conducted the fourth follow up.

**Reference dates.** In the base year survey, most questions referred to the student's experience up to the time of administration in spring 1988. In the follow ups, most questions referred to experiences that occurred between the previous survey and the current survey. For example, the second follow up largely covered the period between 1990 (when the first follow up was conducted) and 1992 (when the second follow up was conducted).

**Data collection.** Prior to each survey, it was necessary to secure a commitment to participate in the study from the administrator of each sampled school. For public schools, the process began by contacting the Council of Chief State School Officers and the officer in each state. Once approval was gained at the state level, contact was made with District Superintendents and then with school principals. For private schools, the National Catholic Educational Association and the National Association of Independent Schools were contacted for endorsement of the project, followed by contact of the school principals. The principal of each cooperating school designated a School Coordinator to serve as a liaison between NORC staff and selected respondents—students, parents, teachers, and the school administrator. The School Coordinator

(most often a guidance counselor or senior teacher) handled all requests for data and materials, as well as all logistical arrangements for student-level data collection on the school premises. Coordinators were asked to identify students whose physical or learning disabilities or linguistic deficiencies would preclude participation in the survey and to classify all eligible students as Hispanic, Asian-Pacific Islander, or “other” race.

For the base year through second follow-up surveys, Student Questionnaires and test batteries were primarily administered in group sessions at the schools on a scheduled Survey Day. The sessions were monitored by NORC field staff, who also checked the questionnaires for missing data and attempted data retrieval while the students were in the classroom. Makeup sessions were scheduled for students who were unable to attend the first session. In the first and second follow ups, off-campus sessions were used for dropouts and for sample members who were not enrolled in a first follow-up school on Survey Day. The School Administrator, Teacher, and Parent Questionnaires were self-administered. NORC followed up by telephone with individuals who had not returned their questionnaires by mail within a reasonable amount of time.

The first follow-up data collection required intensive tracing efforts to locate base-year sample members who, by 1990, were no longer in their 8<sup>th</sup>-grade schools but had dispersed to many high schools. Also, in order to derive a more precise dropout rate for the 1988 8<sup>th</sup>-grade cohort, a second data collection was undertaken 1 year later, in spring 1991. At this time, an attempt was made to administer questionnaires—by telephone or in person—to sample members who had missed data collection at their school or who were no longer enrolled in school. The first follow up also included a Base Year Ineligible (BYI) Study, which surveyed a sample of students considered ineligible in the base year due to linguistic, mental, or physical deficiencies. The BYI Study sought to determine if eligibility status had changed for the excluded students so that newly eligible students could be added to the longitudinal sample. If an excluded student was now eligible, an abbreviated Student Questionnaire or a Dropout Questionnaire was administered, as appropriate. For those students who were still ineligible, their school enrollment status was ascertained and basic information about their sociodemographic characteristics was recorded.

Tracing efforts continued in the second and third follow ups. In the second follow up (conducted in 1992), previously excluded students were surveyed through the

Followback Study of Excluded Students. The second follow up also collected transcripts, course offerings, and course enrollments from the high schools; reminder postcards were sent to principals who did not respond within a reasonable period. Data collection for HSES was conducted concurrently with the collection for the second follow up. Because of the overlap in school and student samples, survey instruments and procedures for HSES were almost identical to those used in the main NELS:88 survey.

By 1994, when the third follow up was conducted, most sample members had graduated from high school and it was no longer feasible to use group sessions to administer Student Questionnaires. Instead, the dominant form of data collection was one-on-one administration through computer-assisted telephone interviewing (CATI). In-person interviews were used for sample members who required intensive in-person locating or refusal conversion. Only the Student Questionnaire was administered in the third follow up.

By 2000, when the fourth follow up was conducted, most sample members who attended college and technical schools had completed their postsecondary education. The survey was conducted primarily by computer-assisted telephone interviewing.

**Processing.** Data processing activities were quite similar for the base year survey and the first and second follow ups. An initial check of student documents for missing data was performed on-site by NORC staff so that data could be retrieved from the students before they left the classroom. Special attention was paid to a list of “critical items.” Once the questionnaires and tests were received at NORC, they were again reviewed for completeness, and a final disposition code was assigned to the case indicating which documents had been completed by the sample member. Postsecondary institutions reported by the student were coded using the standard Integrated Postsecondary Education Data System (IPEDS) codes. Data entry for both Student Questionnaires and cognitive tests was performed through optical scanning. New Student Supplements and Dropout Questionnaires were converted to machine-readable form using key-to-disk methods. All cognitive tests were photographed onto microfilm for archival storage.

In the third follow up, a CATI system captured the data at the time of the interview. The system evaluated the responses to completed questions and used the results to route the interviewer to the next appropriate question.

The CATI program also applied the customary edits, described below under “Editing.” At the conclusion of an interview, the completed case was deposited in the database ready for analysis. There was minimal post-data entry cleaning because the interviewing module itself conducted the majority of necessary edit checking and conversion functions.

Verbatim responses were collected in the third follow up for a number of items, including occupation and major field of study. When respondents indicated their occupation, the CATI interviewers recorded the verbatim response. The system checked the response using a keyword search to match it to a subset of standard industry and occupation codes, and then presented the interviewer with a set of choices based on the keyword matches. The interviewer chose the option which most closely matched the information provided by the respondent, probing for additional information when necessary. Quality control was ensured by a reading and recoding, if necessary, of the verbatim responses by professional readers.

**Editing.** In the base year through second follow-up surveys, detection of out-of-range codes was completed during scanning or data entry for all closed-ended questions. Machine editing was used to: (1) resolve inconsistencies between filter and dependent questions; (2) supply appropriate missing data codes for questions left blank (e.g., legitimate skip, refusal); (3) detect illegal codes and convert them to missing data codes; and (4) investigate inconsistencies or contradictions. Frequencies and crosstabulations for each variable were inspected before and after these steps to verify the accuracy and appropriateness of the machine editing. Items with unusually high nonresponse or multiple responses were further checked by verifying the responses on the questionnaire. A final editing step involved recoding Student Questionnaire responses for some items to the codes for the same items in earlier NELS:88 waves or in HS&B. Once this was done, codes that differed on the Dropout Questionnaire were recoded to coincide with the codes used for Student Questionnaire responses.

In the third follow up, machine editing was replaced by the interactive edit capabilities of the CATI system, which tested responses for valid ranges, data field size, data type (numeric or text), and consistency with other answers or data from previous rounds. If the system detected an inconsistency because of an interviewer’s incorrect entry, or if the respondent simply realized that he or she made a reporting error earlier in the interview, the interviewer could go back and change the earlier response. As the

new response was entered, all of the edit checks performed at the first response were again performed. The system then worked its way forward through the questionnaire using the new value in all skip instructions, consistency checks, and the like until it reached the first unanswered question, and control was then returned to the interviewer. When problems were encountered, the system could suggest prompts for the interviewer to use in eliciting a better or more complete answer.

## Estimation Methods

Sample weighting is required that NELS:88 data are representative. Imputation for missing nonresponses, however, has not yet been systematically provided for data analysis.

**Weighting.** Weighting is used in NELS:88 data analysis to accomplish a number of objectives, including: (1) to expand counts from sample data to full population levels; (2) to adjust for differential selection probabilities (e.g., the oversampling of Asian and Hispanic students); (3) to adjust for differential response rates; and (4) to improve representativeness by using auxiliary information. Multiple “final” (or nonresponse-adjusted) weights have been provided for analyzing the different populations that NELS:88 data represent (i.e., base year schools; 8<sup>th</sup> graders in 1988 and 2, 4, and 6 years later; 1990 sophomores; 1992 seniors). Weights should be used together with the appropriate flag in order to analyze the sample for a particular targeted population.

Weights have not been constructed for all possible analytic purposes. In cases where no specific weight is available, existing weights may provide reasonable approximations. For instance, base year parent and cognitive test completion rates were so high relative to student questionnaire completion that the student weight can be used for them with minimal bias.

NELS:88 weights were calculated in two steps: (1) unadjusted weights were calculated as the inverse of the probabilities of selection, taking into account all stages of the sample selection process; and (2) these initial weights were adjusted to compensate for nonresponse, typically carried out separately within multiple weighting cells. For detailed discussions of the calculation of weights for each wave, users are referred to the methodology reports for the individual surveys.

**Scaling (item response theory).** Item response theory (IRT) was used to calibrate item parameters for all cognitive test items administered to students in NELS:88

assessments. The tests conducted in each NELS:88 survey generated achievement measures in standardized scores, and grade 12 mathematics scores equivalent to those in the National Assessment of Educational Progress (NAEP) surveys, among others. For detail about IRT-based cognitive test design, see chapter 20.

**Imputation.** NELS:88 surveys have not involved large-scale imputation of missing data. Only a few variables have been imputed: student's sex, race/ethnicity, and school enrollment status. For example, when sex was missing in the data file, the information was looked for on earlier school rosters. If it was still unavailable after this review, sex was assumed from the sample member's name (if unambiguous). As a final resort, sex was randomly assigned.

## 5. DATA QUALITY AND COMPARABILITY

A number of studies have been conducted to address data quality issues relating to the NELS:88 project. During the course of data collection and processing, systematic efforts were made to monitor, assess, and maximize data quality. Subsequent studies were conducted to evaluate the data quality in comparison with earlier longitudinal surveys.

### Sampling Error

Because the NELS:88 sample design involved stratification, disproportionate sampling of certain strata, and clustered (i.e., multistage) probability sampling, the calculation of exact standard errors (an indication of sampling error) for survey estimates can be difficult and expensive. NORC used the Taylor Series procedure to calculate the standard errors for NELS:88 estimates.

Standard errors and design effects for about 30 key variables in each NELS:88 wave from the base year through the second follow up were calculated using SUDAAN software. These can be used to approximate the standard errors if users do not have access to specialized software.

**Design effects.** A comparative study of design effects across NELS:88 waves and between NELS:88 and HS&B was done. When comparing NELS:88 base year student questionnaire data to the results from HS&B—the 30 variables from the NELS:88 student questionnaire were selected to overlap as much as possible with those variables examined in HS&B—the design effects indicate

that the NELS:88 sample was slightly more efficient than HS&B. The smaller design effects in the NELS:88 base year may reflect its smaller cluster size (24 students plus, on average, two oversampled Hispanics and Asian from each NELS:88 school versus the 36 sophomore and 36 senior selections from each HS&B school). The mean design effect for base year students is 2.54.

In the comparative study of design effects across NELS:88 waves, the design effects in the first follow up were somewhat higher than those of the base year, a result of the subsampling procedures used for the first follow up. The mean design effect for 1<sup>st</sup> follow up students and dropouts is 3.80. The conditional design effects in the 2<sup>nd</sup> follow up are lower than those in the 1<sup>st</sup> follow up, but higher than those in the base year. The conditional mean design effect for 2<sup>nd</sup> follow up students and dropouts is 3.71. (See *NELS:88 Base Year Through Second Follow-up Final Methodology Report*, NCES Working Paper 98–06.)

### Nonsampling Error

**Coverage error.** Exclusion and undercoverage of certain groups of schools and students in NELS:88 generated coverage error. In the base year survey, for example, students who had linguistic, mental, or physical obstacles were excluded from the study. Consequently, the national populations for such student groups were not fully covered by the sample.

To correct this coverage bias, a Base Year Ineligible (BYI) Study collected eligibility information for 93.9 percent of the sample members excluded in the base year survey. For those who were reclassified as eligible in the BYI Study, Student or Dropout Questionnaires were administered in person or over the telephone during the first follow up. Cognitive tests were also administered to a small percentage of these students. For students who remained ineligible, school enrollment status and other key characteristics were obtained. The BYI Study permitted an evaluation of coverage bias in NELS:88 and a means of reducing undercoverage by identifying newly eligible students who could then be added into the sample to ensure cross-sectional representativeness. This effort also provided a basis for making corrected dropout estimates, taking into account both 1988-eligible and 1988-ineligible 8<sup>th</sup> graders 2 years later. For details on the BYI Study, see *Sample Exclusion in NELS:88: Characteristics of Base Year Ineligible Students; Changes in Eligibility Status After Four Years* (NCES 96-723).

**Nonresponse error.** Both unit nonresponse (nonparticipation in the survey by a sample member)

and item nonresponse (missing value for a given questionnaire/test item) have been evaluated in NELS:88 data.

*Unit nonresponse.* In the NELS:88 base year survey the initial school response rate was 69 percent. This low rate prompted a follow-up survey to collect basic characteristics from a sample of the nonparticipating schools. These data were then compared to the same characteristics among the participating schools to assess the possible impact of response bias on the survey estimates. The school-level nonresponse bias was found to be small to the extent that schools could be characterized by size, control, organizational structure, student composition, and other factors. Bias at the school level was not assessed for the follow-up surveys because (1) sampling for the first and second follow ups was student-driven (i.e., the schools were identified by following student sample members) and the third follow up did not involve schools; and (2) school cooperation rates were very high (up to 99 percent). Even if a school refused to cooperate, individual students were pursued outside of school (although school context data were not collected). The student response rates are shown in the table below.

*Student-level nonresponse* analysis was conducted with a focus on *panel nonresponse* since a priority of the NELS:88 project is to provide a basis for longitudinal analysis. Nonresponse was examined for the 8<sup>th</sup>-grade and 10<sup>th</sup>-grade cohorts. Any member of the 8<sup>th</sup>-grade cohort who did not complete a survey in three rounds (base year, first follow up, and second follow up) and any member in the 10<sup>th</sup>-grade cohort who did not complete a survey in

the second and third rounds (first and second follow ups) was considered a panel nonrespondent for that cohort. Panel nonresponse to cognitive tests in the two cohorts were defined the same way. The nonresponse rate was defined as the proportion of the selected students (excluding deceased students) who were nonrespondents in any round in which data were collected.

Nonresponse rates for both cohorts were calculated by school- and student-level variables that were assumed to be stable across survey waves (e.g., sex and race). These variables allowed comparison between participants and nonparticipants even though the data for the latter were missing in some rounds. Estimates were made with both weighted and unweighted data. The weight used was the second follow-up raw panel weight (not available in the public release data set). About 18 percent of the 8<sup>th</sup>-grade cohort and 10 percent of the 10<sup>th</sup>-grade cohort were survey nonrespondents at one or more points in time. Approximately 43 percent of the 8<sup>th</sup>-grade cohort and 35 percent of the 10<sup>th</sup>-grade cohort did not complete one or more cognitive tests in their rounds of testing.

Nonresponse bias was calculated as the difference in the estimates between the respondent and all selected students. On the whole, the analysis revealed only small discrepancies between the two cohorts. Bias estimates were higher, however, for the 8<sup>th</sup>-grade cohort than for the 10<sup>th</sup>-grade cohort because of the 8<sup>th</sup>-grade cohort's more stringent definition of participation. The discrepancies between cognitive test completers and noncompleters were larger than between survey participants and nonparticipants; this pattern held for both

Table 4. Unit level and overall level weighted response rates for selected NELS:88 student populations

Population	Unit level weighted response rate				
	Base year 1 <sup>st</sup> level	Base year 2 <sup>nd</sup> level	1 <sup>st</sup> follow up	2 <sup>nd</sup> follow up	3 <sup>rd</sup> follow up
Interviewed students	*63.7	93.4	91.1	91.0	90.9
Tested students	*63.7	90.2	94.1	76.6	†
Dropouts	*63.7	†	91.0	88.0	†
Tested dropouts	*63.7	†	48.6	41.7	†
	Overall level weighted response rate				
	Base year 1 <sup>st</sup> level	Base year 2 <sup>nd</sup> level	1 <sup>st</sup> follow up	2 <sup>nd</sup> follow up	3 <sup>rd</sup> follow up
Interviewed students	*63.7	59.4	58.0	58.0	57.9
Tested students	*63.7	57.5	59.9	37.4	†
Dropouts	*63.7	†	58.0	56.1	†
Tested dropouts	*63.7	†	31.0	26.6	†

\*Unweighted response rate

†Not applicable

SOURCE: Seastrom, Salvucci, Walter, and Shelton (forthcoming), *A Review of the Use of Response Rates at NCES*.

cohorts. In brief, the magnitude of the bias was generally small—few percentage estimates were off by as much as 2 percent in the 8<sup>th</sup>-grade cohort and 1 percent in the 10<sup>th</sup>-grade cohort. Such bias reflects the raw weight. The nonresponse-adjusted weight should correct for differences by race and sex to produce correct population estimates for each subgroup.

Further analysis was done using several other student and school variables. The results showed rather similar patterns of bias. When compared with estimates from HS&B, the student nonresponse bias estimates in NELS:88 were consistently lower. However, the two studies seem to share certain common patterns of nonresponse. For example, both studies generated comparatively higher nonresponse rates among students enrolled in schools in the West, Black students, students in vocational or technical programs, students in the lowest test quartile, and dropouts.

*Item nonresponse.* Item nonresponse was examined in base year through second follow-up data obtained from surveys of students, parents, and teachers. Differences emerged among student subgroups in the level of nonresponse to a wide range of items—from language background, family composition, and parents' education to perception of school safety. Nonresponse was often two to five times as great for one subgroup as for the other subgroups. High item nonresponse rates were associated with such attributes as not living with parents, having low socioeconomic status, being male, having poor reading skills, and being enrolled in a public school. Compared with parent nonresponse to items about college choice and occupational expectations, student nonresponse rates were generally lower. For items about student's language proficiency, classroom practices, and student's high school track, students had consistently lower nonresponse rates than observed among their teachers. See *NELS:88 Survey Item Evaluation Report* (NCES 97-052) for further detail.

**Measurement error.** NCES has conducted studies to evaluate measurement error in (1) student questionnaire data compared to parent and teacher data, and (2) student cognitive test data.

*Parent-student convergence and teacher-student convergence.* A study of measurement error in data from the base year through second follow-up surveys focused on the convergence of responses by students and parents and by students and teachers. (See *NELS:88 Survey Item Evaluation Report*, NCES 97-052.) Response convergence (or discrepancy) across respondent groups can be interpreted as an indication of measurement reliability, validity, and

communality, although data are often not sufficient to determine which response is more accurate.

The student and parent components of this study covered such variables as sibling size, student's work experience, language background, parents' education, parent-student discussion of issues, perceptions about school, and college and occupation expectations. Parent-student convergence varied from very high to very low, depending on the item. For example, convergence was high for the number of siblings, regardless of student-level characteristics such as socioeconomic status, sex, reading scores, public versus private school enrollment, and whether or not living with parents. In contrast, parent-student convergence was low for items related to the student's work experience; there was also more variation across student subgroups for these items. In general, convergence tended to be high for objective items, for items worded similarly, and for nonsensitive items.

Teacher-student convergence was examined through variables about student's English proficiency, classroom practices, and student's high school track. Again, convergence was found to vary considerably across data items and student subgroups. Convergence was high for student's native language but low for student's English proficiency. Across student subgroups, there was a greater range in the correlations for English proficiency than for native language. Teachers and students differed quite dramatically on items about classroom practices.

*Cognitive test data.* In-depth studies of measurement error issues related to cognitive tests administered in the base year through second follow-up surveys are also available. (See *Psychometric Report for the NELS:88 Base Year Test Battery*, NCES 91-468, and *Psychometric Report for the NELS:88 Base Year Through Second Follow-up*, NCES 95-382.)

The first study addressed issues related to test speediness (the limited testing time in relation to the outcome), reliability, item statistics, performance by racial/ethnic and gender groups, and Item Response Theory (IRT) parameters for the battery. The results indicate that the test battery either met or exceeded all of its psychometric objectives. Specifically, the following findings were reported: (1) while the allotted testing time was only 1½ hours, quite acceptable reliabilities were obtained for the tests on reading comprehension, mathematics, history/citizenship/geography, and, to a somewhat lesser extent, science; (2) the internal consistency reliabilities were sufficiently high to justify the use of IRT scoring, and thus provide the framework for constructing 10<sup>th</sup>- and

12<sup>th</sup>-grade forms that would be adaptive to the ability levels of the students; (3) there was no consistent evidence of differential item functioning (item bias) for gender or racial/ethnic groups; (4) factor analysis results supported the discriminant validity of the four tested content areas; convergent validity was also indicated by salient loadings of testlets composed of “marker items” on their hypothesized factors; and (5) in addition to providing the usual normative scores in all four tested areas, behaviorally anchored proficiency scores were provided in both the reading and math areas.

The second study focused on issues relating to the measurement of gain scores. Special procedures were designed into the test battery design and administration to minimize the floor and ceiling effects that typically distort gain scores. The battery used a two-stage multilevel procedure that attempted to tailor the difficulty of the test items to the performance level of a particular student. Thus, students who performed very well on their 8<sup>th</sup>-grade mathematics test received a relatively more difficult form in 10<sup>th</sup> grade than students who had not performed well on their 8<sup>th</sup>-grade test. There were three forms of varying difficulty in mathematics and two in reading in both grades 10 and 12. Since 10<sup>th</sup> and 12<sup>th</sup> graders were taking forms that were more appropriate for their level of ability/achievement, measurement accuracy was enhanced and floor and ceiling effects could be minimized. The remaining two content areas—science and history/citizenship/geography—were only designed to be grade-level adaptive (i.e., a different form for each grade but not multiple forms varying in difficulty within grade).

To maximize the gain from using an adaptive procedure, special vertical scaling procedures were used that allow for Bayesian priors on subpopulations for both item parameters and scale scores. In comparing more traditional non-Bayesian approaches to scaling longitudinal measures with the Bayesian approach, it was found that the multilevel approach did increase the accuracy of the measurement. Further, when used in combination with the Bayesian item parameter estimation, the multilevel approach reduced floor and ceiling effects when compared to the more traditional item response theory approaches.

### **Data Comparability**

NELS:88 is designed to facilitate both longitudinal and trend analyses. Longitudinal analysis calls for data compatibility across survey waves whereas trend analysis requires data compatibility with other longitudinal

surveys. Data compatibility issues may relate to survey instruments, sample design, and data collection methods.

#### ***Comparability within NELS:88 across survey waves.***

A large number of variables are common across survey waves. (See *NELS:88 Second Follow-up Student Component Data File User's Manual* for a listing of common Student Questionnaire variables in the base year, first follow up, and second follow up.) However, compatibility of NELS:88 data across waves can still be an issue because of subtle differences in question wording, sample differences (e.g., with or without dropouts and freshening students, sample attrition, nonresponse) and data collection methods (e.g., on-campus group session, off-campus individual survey, telephone interview).

One NCES study compared 112 pairs of variables repeated from the base year to the first and second follow-up surveys. (See *NELS:88 Survey Item Evaluation Report*, NCES 97-052.) These variables cover student family, attitudes, education plans, and perceptions about schools. The results suggest that the interpretations of NELS:88 items depend on the age level at which they were administered. Data convergence tended to be higher for pairs of first and second follow-up measures than for pairs of base year and second follow-up measures. Some measures were more stable than others. Students responded nearly identically to the base year and second follow-up questions about whether English was their native language. Their responses across survey waves were also fairly stable as to whether their curriculum was intended to prepare them for college, whether they planned to go to college, and their religiosity. It should be noted that cross-wave discrepancies may reflect a change in actual student behavior rather than a change in response for a status quo situation.

#### ***Comparability within NELS:88 across respondent groups.***

While different questionnaires were used to collect data from different respondent groups (students, parents, teachers, school administrators), there are overlapping items among these instruments. One study examined the extent to which the identical or similar items in different questionnaires generated compatible information. It found considerable discrepancies between students and parents, and even greater discrepancies between students and teachers, in their responses to selected groups of overlapping variables. (See earlier section on “Measurement error.”)

***Comparability with NLS-72 and HS&B.*** NELS:88 surveys contain many items that were also covered in

NLS-72 and HS&B—a feature that enables trend analyses of various designs. (See *NELS:88 Second Follow-up Student Component Data File User's Manual* for a cross-walk of common variables and a discussion of trend analyses.) To examine data compatibility across the three studies, one should consider their sample designs and data contents, including questionnaires, cognitive tests, and transcript records.

*Sample designs* for the three studies are similar. In each base year, students were selected through a two-stage stratified probability sample, with schools as the first-stage units and students within schools as the second-stage units. In NLS-72, all baseline sample members were spring term 1972 high school seniors. In HS&B, all members of the student sample were spring term 1980 sophomores or seniors. Because NELS:88 base year sample members were 8<sup>th</sup> graders in 1988, its follow ups encompass students (both in the modal grade progression sequence and out of sequence) and dropouts. Sample freshening was used in NELS:88 to provide cross-sectional nationally representative samples. Despite similarities, however, the sample designs of the three studies differ in three major ways: (1) the NELS:88 first and second follow ups had relatively variable, small, and unrepresentative within-school student samples, compared to the relatively uniform, large, and representative within-school student samples in the NLS-72 and HS&B studies; (2) unlike the two earlier projects, NELS:88 did not provide a nationally representative school sample in its follow ups; and (3) there were differences in school and subgroup sampling and oversampling strategies in the three studies. These sample differences imply differences in respondent populations covered by the three studies.

*Questionnaire overlap is apparent among the three studies but, nevertheless, requires caution when making trend comparisons. Some items were repeated in identical form across the studies; others appear to be essentially similar but have small differences in wording or response categories.*

*Item response theory (IRT) was used in the three studies to put math, vocabulary, and reading test scores on the same scale for 1972, 1980, and 1982 seniors. Additionally, there were common items in the HS&B and NELS:88 math tests that provide a basis for equating 1980–1990 and 1982–1992 math results. In general, however, the tests in the three studies differed in many ways. Although group differences by standard deviation units may profitably be examined, caution should be exercised in drawing time-lag comparisons for cognitive test data.*

*Transcript studies* in NELS:88, HS&B, and the National Assessment of Educational Progress (NAEP) were designed to support cross-cohort comparisons. The NAEP and NELS:88 studies, however, provide summary data in Carnegie units, whereas the HS&B provides course totals. Note too that course offerings were only collected for schools that were part of the High School Effectiveness Study in the NELS:88 second follow up whereas course offerings were collected for *all* schools in HS&B. (See chapter 8.)

*Other factors* should be considered in assessing data compatibility. Differences in mode and time of survey administration across the cohorts may affect compatibility. NELS:88 seniors were generally surveyed earlier in the school year than were NLS-72 seniors. NLS-72 survey forms were administered by school personnel while HS&B and NELS:88 survey forms were administered primarily by contractor staff. There were also differences in questionnaire formats; the later tests had improved mapping and different answer sheets.

## 6. CONTACT INFORMATION

For content information on the NELS:88 project, contact:

Jeffrey Owings  
Phone: (202) 502-7423  
E-mail: jeffrey.owings@ed.gov

### Mailing Address:

National Center for Education Statistics  
1990 K Street NW  
Washington, DC 20006-5651

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# Chapter 7: National Longitudinal Study of the High School Class of 1972 (NLS-72)

## 1. OVERVIEW

In response to the need for policy-relevant, time-series data on nationally representative samples of elementary and secondary students, NCES instituted the National Longitudinal Studies Program, a continuing long-term project. The general aim of this program is to study the educational, vocational, and personal development of students at various grade levels, and the personal, familial, social, institutional, and cultural factors that may affect that development. The National Longitudinal Study of the High School Class of 1972 (NLS-72) was the first in the series. The first three studies—NLS-72, the High School and Beyond Study (see chapter 8), and the National Education Longitudinal Study of 1988 (see chapter 6)—cover the educational experience of youth from the 1970s into the 1990s.

NLS-72 collected comprehensive base-year data from a nationally representative sample of high school seniors in spring 1972, prior to high school graduation. Additional information about students and schools was obtained from school administrators and counselors. Over the course of the project—extending from the base-year survey in 1972 to the fifth follow-up survey in 1986—data were collected on nearly 23,000 students. A number of supplemental data collection efforts were also undertaken, including a Postsecondary Education Transcript Study (PETS) in 1984–85, and a Teaching Supplement in 1986.

### Purpose

To provide information on the transitions of young adults from high school through postsecondary education and into the workplace.

### Components

NLS-72 collected data from students (seniors in 1972), school administrators, and school counselors. Data were primarily collected in a base-year and five follow-up surveys. The project also included periodic supplements completed by 1972 seniors and a collection of postsecondary transcripts from colleges and universities attended by the students.

**Base-Year Survey.** The base-year survey was conducted in spring 1972 and comprised the following:

*Student Questionnaire.* Students reported information about their personal and family background (age, sex, race, physical handicap, socioeconomic status of family and community); education and work experiences (school characteristics and performance, work status, performance and satisfaction); future plans (work, education, and/or military); and aspirations, attitudes, and opinions. Students also completed a *Test Battery*—six timed aptitude tests which measured verbal and nonverbal abilities. These tests covered

### LONGITUDINAL SAMPLE SURVEY OF THE HIGH SCHOOL SENIOR CLASS OF 1972. BASE-YEAR SURVEY AND FIVE FOLLOW UPS, ENDING IN 1986

NLS-72 collected data from:

- ▶ Students
- ▶ School administrators
- ▶ School counselors
- ▶ Postsecondary transcripts

vocabulary, picture number (two parts), reading, letter groups, mathematics, and mosaic comparisons (three parts).

*Student Record Information Form (SRIF).* School administrators completed this form for each student sample member. The SRIF collected data on each student's high school curriculum, credit hours in major courses, grade point average, and (if applicable) his or her position in ability groupings, remedial-instruction record, involvement in certain federally supported programs, and scores on standardized tests.

*School Questionnaire.* School administrators provided data on program and student enrollment information, such as grades covered, enrollment by grades, curricula offered, attendance records, racial/ethnic composition of school, dropout rates by sex, number of handicapped and disadvantaged students, and percentage of recent graduates in college.

*Counselor Questionnaire.* One or two counselors in each school provided data on their sex, race, and age; college courses in counseling and practice background; total years of counseling and years at present school; prior counseling experience with racial/ethnic minority groups; sources of support for postsecondary education recommended to/used by students; job placement methods used; number of students assigned for counseling and number counseled per week; time spent in counseling per week; time spent with students about various problems, choices, and guidance; and time spent in various other activities (e.g., conferences with parents and teachers).

**Follow-up Surveys.** In 1973, 1974, 1976, 1979, and 1986, NCES conducted follow-up surveys of students in the 1972 base-year sample and of students in an augmented sample selected for the first follow up. These surveys collected information from the 1972 seniors on marital status; children; community characteristics; education, military service, and/or work plans; educational attainment (schools attended, grades received, credits earned, financial assistance); work history; attitudes and opinions relating to self-esteem, goals, job satisfaction, and satisfaction with school experiences; and participation in community affairs or political activities. School Questionnaires and retrospective high school data were collected during the first follow up for sample schools and students who had not participated in the base-year survey.

Concurrently with the second follow up, an *Activity State Questionnaire* was administered to sample members who had not provided this information in the base-year or first follow-up surveys. Data were collected on pursuits in which the sample member was active in October of 1972 and 1973, including education, work, military service, being a housewife, and other activities. Background information about the sample member's high school program and about parents' education and occupation was also requested.

During the fourth follow-up survey, a subsample of sample members was retested on a subset of the base-year Test Battery. In addition, a *Supplemental Questionnaire* was administered to respondents who had not reported certain information in previous surveys. The information asked for retrospectively covered the sample member's school and employment status in October 1972 to 1976 and his/her license or diploma status as of October 1976. The questionnaires were tailored to the sample member's pattern of missing responses and consisted of two to four of the possible sections.

The fifth follow-up survey offered the opportunity to gather information on experiences and attitudes of a sample for whom an extensive history already existed. It differed from the previous follow ups in that it was only sent to a subsample of the original respondents and targeted certain subgroups in the population. About 10 pages of new questions on marital history, divorce, child support, and economic relationships in families were included. The fifth follow up also included a sequence of questions aimed at understanding the kinds of individuals who apply for and enroll in graduate management programs, as well as several questions about attitudes toward the teaching profession.

A *Teaching Supplement* was administered concurrently with the fifth follow up. A separate questionnaire was sent to fifth follow-up respondents who indicated on the main survey form that they had teaching experiences or had been trained for teaching. The instrument focused on the qualifications, experiences, and attitudes of current and former elementary and secondary school teachers, and on the qualifications of persons who had completed a degree in education or who had received certification but had not actually taught. Items included reasons for entering the teaching career, degrees and certification, actual teaching experience, allocation of time while working, pay scale, satisfaction with teaching, characteristics of the school in which the respondent taught, and professional activities. Former teachers were asked about their

reasons for leaving the teaching profession and the career (if any) they pursued afterward. Current teachers were asked about their future career plans, including how long they expected to remain in teaching. The supplement included six critical items: type of certification, certification subject(s), first year of teaching, beginning salary of the district where the respondent was currently teaching, years of experience, and the grade level taught.

### ***Postsecondary Education Transcript Study (PETS).***

To provide data on coursework and credits for analysis of occupational and career outcomes, NCES requested official transcripts from all academic and vocational schools attended by the 1972 seniors since leaving high school. This study, conducted during 1984–85, collected transcripts from all postsecondary institutions reported by sample members in the first through fourth follow-up surveys. Information from transcripts include terms of attendance, fields of study, specific courses taken, and grades and credits earned. As the study covered a 12-year period, dates of attendance and term dates were recorded from each transcript received, allowing analysis over the whole period or any defined part.

### **Periodicity**

The base-year survey was conducted in the spring of 1972, with five follow ups in 1973, 1974, 1976, 1979, and 1986. Supplemental data collections were administered during all but the third follow up. Postsecondary transcripts were collected in 1984–85.

## **2. USES OF DATA**

NLS-72 is the oldest of the longitudinal studies sponsored by NCES. It is probably the richest archive ever assembled on a single generation of Americans. Young people's success in making the transition from high school or college to the workforce varies enormously for reasons only partially understood. NLS-72 data can provide information about quality, equity, and diversity of educational opportunity and the effect of those factors on cognitive growth, individual development, and educational outcomes. It can also provide information about changes in educational and career outcomes and other transitions over time.

The Teaching Supplement data can be used to investigate policy issues related to teacher quality and retention. These data can be linked to data from prior waves of the Student Questionnaire for analysis of antecedent conditions and events that may have influenced respondents'

career decisions. The data can also be merged with results from the fifth follow-up questionnaire, which included special questions related to teaching.

The history of members of the Class of 1972 from their high school years through their early 30s is widely considered as the baseline against which the progress and achievements of subsequent cohorts are to be measured. Researchers have drawn on this archive since its inception. To date, the principal comparisons have been with the other two NELS studies: High School and Beyond (HS&B) and the National Education Longitudinal Study of 1988 (NELS:88). These three studies together provide a particularly rich resource for examining the changes that have occurred in American education during the past 20 years. Data from these studies can be used to examine how student academic coursework, achievement, values, and aspirations have changed, or remained constant, throughout this period.

The NELS studies offer a number of possible time points for comparison. Cohorts can be compared on an *intergenerational or cross-cohort time-lag basis*. Both cross-sectional and longitudinal time-lag comparisons are possible. For example, cross-sectionally, NLS-72 seniors in 1972 can be compared to HS&B base-year seniors in 1980 and to NELS:88 second follow-up seniors in 1992. Longitudinally, changes measured between the senior year and 2 years after graduation can be compared across studies. *Fixed time comparisons* are also possible; groups within each study can be compared to each other at different ages though at the same point in time. Thus, NLS-72 seniors, HS&B seniors, and HS&B sophomores can all be compared in 1986—some 14, 6, and 4 years after each respective cohort completed high school. Finally, *longitudinal comparative analyses* of the cohorts can be performed by modeling the history of the age/grade cohorts. The possible comparison points and the considerations of content and design which may affect the comparability of data across the cohorts are discussed in *National Education Longitudinal Study of 1988: Trends Among High School Seniors, 1972–1992* (NCES 95–380).

## **3. KEY CONCEPTS**

A few key terms relating to NLS-72 are defined below.

**Test Battery.** Six cognitive tests administered during the base year: (1) Vocabulary (15 items, 5 minutes), a brief test using a synonym format; (2) Picture Number (30 items, 10 minutes), a test of associative memory

consisting of a series of drawings of familiar objects, each paired with a number; (3) Reading (20 items, 15 minutes), a test of comprehension of short passages; (4) Letter Groups (25 items, 15 minutes), a test of inductive reasoning which required the student to draw general concepts from sets of data or to form and try out hypotheses in a nonverbal context; (5) Mathematics (25 items, 15 minutes), a quantitative comparison in which the student indicated which of two quantities was greater, or asserted their equality or the lack of sufficient data to determine which quantity was greater; and (6) Mosaic Comparisons (116 items, 9 minutes), a test measuring perceptual speed and accuracy through items which required detection of small differences between pairs of otherwise identical mosaics or tile-like patterns.

**Socioeconomic Status (SES).** A composite scale developed as a sum of standardized scales of father's education, mother's education, 1972 family income, father's occupation, and household items. The latter two underlying scales were computed from base-year Student Questionnaire responses. The other three underlying scales were derived from base-year responses as augmented by first follow-up responses and responses to a second follow-up resurvey to obtain this (and other) information from sample members who had failed to provide it previously. Each index component was first subjected to factor analysis that revealed a common factor with approximately equal weights for each component. Each of the components was then standardized, and an equally weighted combination of the five standard scores yielded the SES composite. The data file contains both the raw score and a categorized SES score (SES Index).

## 4. SURVEY DESIGN

### Target Population

The population of students who, in spring 1972, were 12<sup>th</sup> graders (high school seniors) in public and private schools located in the 50 states and the District of Columbia. Excluded were students in schools for the physically or mentally handicapped, students in schools for legally confined students, early (mid-year) graduates, dropouts, and individuals attending adult education classes.

### Sample Design

The NLS-72 sample was designed to be representative of the approximately 3 million high school seniors enrolled in more than 17,000 schools in the United States in spring

1972. The base-year sample design was a stratified, two-stage probability sample of students from all public and private schools, in the 50 states and the District of Columbia, which enrolled 12<sup>th</sup> graders during the 1971–1972 school year. Excluded were schools for the physically or mentally handicapped and schools for legally confined students. A sample of schools was selected in the first stage. In the second stage, a random sample of 18 high school seniors was selected within each participating school.

The base-year first-stage sampling frame was constructed from computerized school files maintained by the U.S. Department of Education and the National Catholic Educational Association. The original sampling frame called for 1,200 schools; that is, 600 strata with two schools per stratum. The strata were defined based upon the following variables: type of control (public or private), geographic region, grade 12 enrollment size, geographic proximity to institutions of higher education, proportion of minority group enrollment (for public schools only), income level of the community, and degree of urbanization. Schools were selected with equal probabilities for all but the smallest size stratum (schools with enrollment under 300). In that stratum, schools were selected with probability proportional to enrollment. All selections were without replacement. To produce sufficient sizes for intensive study of disadvantaged students, schools in low-income areas and schools with high proportions of minority group enrollment were sampled at twice the rate used for the remaining schools. Within each stratum, four schools were selected, and then two of the four were randomly designated as the primary selections. The other two schools were retained as backup or substitute selections (for use only if one or both of the primary schools did not cooperate).

The second stage of the base-year sampling procedure consisted of first drawing a simple random sample of 18 students per school (or all if fewer than 18 were available) and then selecting 5 additional students (if available) as possible replacements for nonparticipants. In both cases, the students within a school were sampled with equal probabilities and without replacement. Dropouts, early (mid-year) graduates, and those attending adult education classes were excluded from the sample. The oversampling of schools in low-income areas and schools with relatively high minority enrollment led to oversampling of low-income and minority students.

**Sample redefinitions and augmentations.** At the close of the base-year survey, 1,043 (948 primary schools and 95 backup schools) of a targeted 1,200 schools and an additional 26 “extra” backup schools had participated (school participation being defined as students from that school contributing SRIFs, Test Batteries, or Student Questionnaires). A backup school was termed “extra” if, ultimately, both primary sample schools from that stratum also participated. An additional 21 primary schools indicated that they had no 1972 seniors. At this point, there remained several strata with no participating schools and many more with only one school. To reduce the effects of the large base-year school nonresponse, a resurvey activity was implemented in the summer of 1973 prior to the first follow-up survey. An attempt was made to elicit cooperation from the 231 nonparticipating base-year primary schools and to obtain replacement schools to fill empty or partially filled strata utilizing backup schools if necessary. The resurvey was successful in 205 of the 231 primary sample schools. Students from 36 backup schools were also included so as to obtain at least two participating schools in the first follow-up survey from each of the 600 original strata. Students from the 26 “extra” base-year schools were not surveyed during the first follow up; however, 18 of the 26 “extra” schools were included in the second and subsequent follow-up surveys to avoid elimination of cases with complete base-year data.

To compensate for base-year school undercoverage, samples of former 1972 senior students were selected for inclusion in the first and subsequent follow ups from 16 sample augmentation schools (8 new strata); these schools were selected from those identified in 200 sample school districts canvassed to identify public schools not included in the original sampling frame. As before, 18 students per school were selected (as feasible) by simple random sample.

The number of students in the final sample from each sample school was taken as the number of students who were offered a chance to be in the sample and who also were eligible. This included all sample eligibles, both respondents and nonrespondents, but excluded students who were not eligible for the study—such as dropouts, early (mid-year) graduates, and those attending adult education classes. The final NLS-72 sample included 23,451 former 1972 seniors and 1,339 sample schools—1,153 participating primary schools, 21 primary schools with no 1972 seniors, 131 backup sample schools, 18 “extra” schools in which base-year student data had been completed, and 16 augmentation schools.

Retests of a subset of the base-year Test Battery were targeted for a subsample of 1,016 of the 14,628 eligible fourth follow-up sample members who had completed both a Student Questionnaire and a Test Battery in the base-year survey. Because a self-weighting subsample would have yielded an inadequate number of Black subsample members, a design option that oversampled Blacks was adopted. In addition to the stratification by race, the sample was controlled within strata on three factors believed to be highly correlated with retest ability scores: base-year ability, socioeconomic status, and postsecondary educational achievement. The control was achieved by applying an implicit stratification procedure. Test results were obtained from 692 of those in the subsample. Additional retest data were requested for all fourth follow-up sample members who had participated in the base-year testing and who were scheduled for a personal interview. This resulted in additional test data for 1,956 individuals (50.3 percent of those defined as request-eligible).

**Fifth Follow-up Survey.** The fifth follow-up sample was an unequal probability subsample of the 22,652 students who had participated in at least one of the five previous waves of NLS-72. The fifth follow up retained the essential features of the initial stratified multistage design but differed from the base-year design in that the secondary sampling unit selection probabilities were unequal, whereas they were equal in the base-year design. This inequality of selection probabilities allowed oversampling of policy-relevant groups and enabled favorable cost-efficiency tradeoffs.

In general, the retention probabilities for students were inversely proportional to the initial sample selection probabilities. The exceptions were: (1) sample members who were retained with certainty or at a higher rate than others because of their special policy relevance; (2) persons with very small initial selection probabilities who were retained with certainty; and (3) nonparticipants in the fourth follow up who were retained at a lower rate than other sample members because they were expected to be more expensive to locate and because they would be less useful for longitudinal analysis.

The subgroups of the original sample retained with certainty were: (1) Hispanics who participated in the fourth follow-up survey; (2) teachers and “potential teachers” who participated in the fourth follow-up survey (a “potential teacher” was defined as a person who majored in education in college or was certified to teach, or whose background was in the sciences); (3) persons with a

4-year or 5-year college degree or a more advanced degree; and (4) persons who were divorced, widowed, or separated from their spouses, or never-married parents. These groups overlapped and did not comprise distinct strata in the usual sense.

**Teaching Supplement.** The fifth follow-up sample included all sample members known to be teachers or potential teachers as of 1979 (the fourth follow up). To identify those sample members who had become teachers between the fourth and fifth follow ups, a direct question was included in the fifth follow-up main questionnaire. Respondents were selected for the Teaching Supplement sample if they indicated that they were (1) currently an elementary or secondary teacher, (2) formerly an elementary or secondary teacher, or (3) trained as an elementary or secondary teacher but never went into teaching. Of the 12,841 fifth follow-up respondents, 1,517 were eligible for the Teaching Supplement.

**Postsecondary Education Transcript Study (PETS).** In the first through fourth follow-up surveys, approximately 14,700 members of the NLS-72 cohort reported enrollment at one or more postsecondary institutions. An attempt was made to obtain a transcript from each school named by a respondent. Thus, no probabilistic sampling was done to define the PETS sample.

### Data Collection and Processing

The base-year survey was administered through group administration. For the first four follow-up surveys, field operations began in the summer/fall of the survey year and continued through the spring of the following year; for example, the third follow-up survey (1976) data collection began in October 1976 and continued through June 1977. For the fifth follow-up survey, the data collection began in March 1986 and ended in mid-September 1986. The Educational Testing Service (ETS) administered the base-year survey; the Research Triangle Institute (RTI) carried out the first through fourth follow-up surveys; and the National Opinion Research Center (NORC) conducted the fifth follow-up survey.

**Reference dates.** Sample members in each of the first four follow-up surveys were asked about family information (marital status, spouse's status, number of children), location, and what they were doing with regard to work, education, and/or training during the first week of October of the survey year; fifth follow-up participants were asked the same questions for the first week of February 1986. Family income was requested for the preceding two years, and political and volunteer activities were

requested for the past 24 months. Participants in each follow-up survey were also asked for summaries of educational and work experiences and activities for the intervening year(s) since the last survey. For the first four follow-up surveys, this information was requested as of the month of October in the intervening year(s) or sometimes overall for each year preceding the survey; fifth follow-up survey participants were asked detailed questions for up to four jobs and for attendance at up to two educational institutions since October 1979.

**Data collection.** Data collection instruments and procedures for the base-year survey were designed during the 1970–71 school year and were tested on a small sample of seniors in spring 1971. One year later, the full-scale NLS-72 study was initiated. Through an in-school group administration in the base year, each student was asked to complete a Test Battery measuring both verbal and nonverbal aptitude and to complete applicable portions of a Student Questionnaire containing 104 questions distributed over 11 major sections. Students were given the option of completing the Student Questionnaire in school or taking it home and answering the questions with the assistance of their parents. In addition, school administrators at each participating school were asked to complete a Student Record Information Form (SRIF) for each student in the sample and a School Questionnaire. One or two counselors from each school in the sample were asked to complete a Counselor Questionnaire.

**Follow-up surveys.** In fall 1973, 1974, 1976, and 1979 and spring 1986, sample members (or a subsample) were again contacted. After extensive tracing to update the name and address files, follow-up questionnaires were mailed to the last known addresses of sample members whose addresses appeared sufficient and correct and who had not been removed from active status by prior refusal, reported death, or other reason. Respondents to the third through fifth follow-ups were offered small monetary incentives for completing the questionnaires. These mailouts were followed by a planned sequence of reminder postcards, additional questionnaire mailings, reminder mailgrams (for the first four follow ups) and telephone calls, personal interviews, and, for the third to fifth follow ups only, telephone interviews to nonrespondents. During personal interviews, the entire questionnaire was administered. During telephone interviews conducted in the last three follow ups, only critical items that were suitable for telephone administration were administered. In order to make survey procedures comparable, respondents were asked to keep a copy of the questionnaire in front of them for both telephone and in-person interviews.

In all follow ups, returned questionnaire cases missing critical items were flagged during data entry, and data were retrieved by specially-trained telephone interviewers. Although most questions were of the forced-choice type, coding was required for the open-ended questions on occupation, industry, postsecondary school, field of study, state where marriage and divorce occurred, and relationship. Occupational and industry codes were obtained from the U.S. Department of Commerce, Bureau of the Census' *Classified Index of Industries and Occupations, 1970* and *Alphabetical Index of Industries and Occupations, 1970*. These same sources were used in all follow ups. Coding of the names of postsecondary schools attended by the respondents was accomplished by using codes taken from NCES' *Education Directory, Colleges and Universities*. Field of study information was coded using NCES' *A Classification of Instructional Programs (CIP)*. In the fifth follow up, for the first time, all codes were loaded into a computer program for quicker access. Coders entered a given response, and the program displayed the corresponding numerical code.

Prior to the fifth follow up, all data were entered via direct access terminals. The fifth follow-up survey marked the first time that NLS-72 data were entered with a combination of keyed entry and optical scanning procedures. Using a computer-assisted data entry (CADE) system, operators were able to combine data entry with traditional editing procedures. All critical items and filter items (plus error-prone data like dollar amounts and numbers in general) were processed by CADE. The rest of the data were optically scanned.

*Teaching Supplement.* Data collection procedures used for the Teaching Supplement, administered concurrently with the fifth follow up, were similar to those used for the follow-up surveys.

*Postsecondary Education Transcript Study (PETS).* Packets of transcript survey materials were mailed to the postsecondary schools in July 1984, with a supplemental mailing in November 1984. Altogether, 24,431 transcripts were initially requested from 3,983 institutions for 14,759 NLS-72 sample members. Telephone follow up of nonresponding schools began in September 1984, when transcripts had been received from about two-thirds of the schools.

After investigating several alternatives, NORC adapted its CADE system for processing postsecondary transcripts. A single member of the specially-trained data preparation staff analyzed the transcript document to determine

its general organization and special characteristics; abstracted standard information from the highly varied documents into a common format; assigned standard numerical codes to such transcript data elements as major and minor fields of study, degrees earned, types of academic term, titles of courses taken, grades and credits; and entered all pertinent information into a computer file. Combining these steps ensured that transcripts would be handled as internally consistent, integrated records of an individual's educational activity. Moreover, since all transcript processing occurred at a single station, the use of CADE reduced the number of steps at which records might be lost or misrouted, or other errors introduced into the database.

**Editing.** For the base-year through fourth follow-up surveys, an extensive manual or machine edit of all NLS-72 data was conducted in preparing the release file for public use. Editing involved rigorous consistency checking of all routing patterns within an instrument (not just skip patterns containing "key" or critical items), as well as range checks for all items and the assignment of error or missing data codes as necessary. Checks of the hardcopy sources were required in some cases for error resolution.

Unlike the earlier surveys, all editing for the fifth follow up was carried out as part of CADE. The machine-editing steps used in the prior follow ups were implemented for scanned items. Since most of the filter questions in the fifth follow up were CADE-designated items, there were few filter-dependent inconsistencies to be handled in machine editing. Validation procedures for the fifth follow up centered on verification of data quality through item checks and verification of the method of administration for 10 percent of each telephone or personal interviewer's work. Field managers telephoned the respondent to check several items of fact and to confirm that the interviewer had conducted a personal or telephone interview, or had picked up a questionnaire. No cases failed validation.

*Postsecondary Education Transcript Study (PETS).* The CADE program enforced predetermined range and value limitations on each field. The program performed three types of error-screening: (1) through a check-digit system, the program disallowed entry of incorrect identification data (school FICE codes, student ID numbers, and combinations of schools and students); (2) each data field was programmed to disallow entry of illogical or otherwise incorrect data; and (3) each CIP code selected to classify a field of study or a course was confirmed by automatically displaying the CIP program name for the

code next to the name (from the original CADE transcript) that the coder had entered. A sample of CADE transcripts was selected and printed from every completed data disk for supervisory review.

### Estimation Methods

Weighting was in NLS-72 to adjust for sampling and nonresponse. Various composite variables have also been computed to assist in data analyses.

**Weighting.** The weighting procedures used for the various NLS-72 survey data are described below.

*Student files.* NLS-72 student weights are based upon the inverse of the probabilities of selection through all stages of the sampling process and upon nonresponse adjustment factors computed within weighting classes. Unadjusted raw weights—the inverses of sample inclusion probabilities—were calculated for all students sampled in each survey year. These weights are a function of the school selection probabilities and the student selection probabilities within school. The raw weight for a case equals the raw weight for the base-year sample divided by the conditional probability of selection into that follow-up survey, given that the case was selected into the base-year sample.

Because of the various sample redefinitions and augmentations and nonresponse to the various student instruments, several sets of adjusted weights were computed for each NLS-72 survey wave. Each weight is appropriate for a particular respondent group. The general adjustment procedure used was a weighting class approach, which distributes the weights of nonrespondents to respondents who are in the same weighting class. The adjustment involves partitioning the entire student sample (respondents and nonrespondents) into weighting classes (homogeneous groups with respect to survey classification variables), and performing the adjustments within weighting class. Adjusted weights for nonrespondents are set to 0, and their adjusted weights are distributed to respondents proportionally to the respondents' unadjusted weights. Differential response rates for students in different weighting classes are reflected in the adjustment, and the weight total within each weighting class (and thus for the sample as a whole) is maintained.

The weighting class cells were defined by cross-classifying cases by several variables. For the first through fourth follow-up surveys, the weighting class cells were: sex, race, high school program, high school grade point average, and parents' education. For the fifth follow-up survey, the

weighting class cells were similar except that postsecondary education attendance was substituted for parents' education. In some instances, cells were combined by pooling across certain weighting class cells.

The third and fourth follow-up adjusted weights are applicable only to key items of these questionnaires or specified combinations of those items with items from other instruments. The restriction is related to a change in data collection procedures. One or two item nonresponse adjustment factors were calculated for each of these two surveys for the nonkey items that were not asked on the telephone. The appropriate adjusted weight for these two surveys should be multiplied by its nonresponse adjustment factor to provide a new weight that is appropriate to items on that questionnaire that are not key or combinations of such nonkey items with items from other instruments.

Refer to the NLS-72 user's manuals for complete weighting procedures and a specification of available weights and appropriate variables to which the weights apply.

*Teaching Supplement file.* One set of weights was specifically developed to compensate for unequal probabilities of retention in the Teaching Supplement sample and to adjust for nonresponse. Theoretically, the weights project to the population of high school seniors of 1972 who have taught elementary or secondary school or who were trained to teach but never went into teaching. The weighting procedures were similar to those used in the follow-up surveys and consisted of two basic steps. The first step was the calculation of a preliminary weight based on the inverse of the cumulative probabilities of selection for the Teaching Supplement. The preliminary weight for the Teaching Supplement is the fifth follow-up adjusted weight. The second weight carried out the adjustment of this preliminary weight to compensate for unit nonresponse. Respondents were cross-classified into weighting cells by race, high school grades, and status as a teacher (current or former teacher, or never taught).

*School file.* During the sequential determination of final school sampling memberships (including augmentations), several school sampling weights were computed. The principal purpose of the various school weights was to serve as a basis for subsequent computation of student weights as applicable to one or more of the several student instruments. Only two of the eight weights are of direct use in analyzing School File or other school-level data. The School File sample weight is appropriate for analyzing school-level data that potentially could be supplied by all 1,318 schools. This includes the School Questionnaire data.

The adjusted counselor weight should be used only in analyzing the responses to the Counselor Questionnaire; however, care must be exercised when analyzing these data. This questionnaire was only administered at base-year responding schools, and data were collected from either one or two counselors at each school.

*Postsecondary Education Transcript Study (PETS) file.* Because the PETS did not introduce any additional subsampling into the NLS-72 sample design, it was not necessary to calculate a new raw weight for this study. Instead the raw weight for the base-year survey was used. Three adjusted weights were created specifically for the analysis of transcript data. They are not meant to be associated with individual transcripts, but rather with all data for a particular individual. The first weight is a simple adjustment for nonresponse to the transcript study itself, where response is defined as an eligible case having one or more coded transcript records in the data file. The other two adjusted weights account for multiple instances of nonresponse (e.g., no transcripts, no response to the fourth follow-up survey, missing data for critical items). Nonresponse adjustments were computed as ratio adjustments within 39 separate weighting classes. Cases were assigned to each weight class based on sex, race/ethnicity, high school grades, and high school program, and within each group by whether or not only proprietary school(s) were attended. The final adjusted weights are the product of the raw weight for the “completed” case and the nonresponse adjustment factor for the weighting class to which the case belongs.

**Imputation.** The problem of missing data was resolved for certain items by supplemental data collections, the creation of composite variables, and some imputation of activity state and other variables. Most of the variables were created by pooling information from various items. For example, the activity states for 1972 and 1973 were updated with information gleaned from the Activity State Questionnaires that were administered concurrently with second follow-up operations. While some procedures for imputing missing data for activity state variables were incorporated in the steps of defining and recoding variables, two further phases of imputation procedures were implemented. The first phase involved direct logical inferences (e.g., type of school from name and address of school); the second phase involved indirect logical inferences (e.g., impute studying full-time for those whose study time is unknown but who are studying and not working).

## 5. DATA QUALITY AND COMPARABILITY

The survey was implemented after an extensive period of planning, which included the design and field test of survey instrumentation and procedures. Any additional questions were field-tested prior to inclusion in the survey. The NLS-72 sampling design and weighting procedures assured that participants’ responses could be generalized to the population of interest. Quality control activities were used throughout the data collection and processing of the survey.

### Sampling Error

Statistical estimates derived from the NLS-72 survey data are subject to sampling variability. Like almost all national samples, the NLS-72 sample is not a simple random sample. Taylor Series estimation techniques were used to compute standard errors in published NLS-72 reports.

It is often useful to report design effects and the root mean design effect in addition to standard errors for complex surveys such as NLS-72. Results from several NLS-72 studies suggest that a straightforward multiplicative adjustment of the simple random sample standard error equation adequately estimates the actual standard error estimate for a percentage. The three generalized mean design effects for the first, second, and third follow-up surveys are, respectively, the square root of 1.39, 1.35, and 1.44. To be conservative, the higher value—the square root of 1.44—can be used as an estimate for fourth follow-up data. For the NLS-72 fifth follow up, the mean design effect for the overall NLS-72 sample is 2.64. The mean design effects indicate that an estimated percentage in the NLS-72 data is—on average—more than twice as variable as the corresponding statistic from a simple random sample of the same size. The mean design effects vary across the domains from a low of 2.0 for the respondents from the highest socioeconomic (SES) quartile to a high of 3.8 for Black respondents.

### Nonsampling Error

The major sources of nonsampling error in NLS-72 were coverage error and nonresponse error.

**Coverage error.** To identify public schools not included in the original sample frame, an additional sample of 200 school districts was contacted after the base-year survey was completed. Forty-five additional schools were identified. To compensate for the base-year undercoverage, samples of former 1972 senior students from 16 of these

“augmentation” schools were included in the first and subsequent follow-up surveys. In addition, at the end of the base-year survey, several strata had no participating schools and many more had only one school (out of two planned in the original sample design). To compensate for this large school nonresponse, 205 base-year noncooperating primary schools and 36 additional backup schools were added to the sample prior to the first follow-up survey for “resurveying” with the original design. The former 1972 seniors from these augmented and resurveyed schools were asked some retrospective (senior year) questions during the first follow-up survey. These individuals—who redress the school frame undercoverage bias in the base year—do not appear on the NLS-72 base-year files that would typically be employed for comparisons of high school seniors, although the presence of some retrospective data for these individuals permits refinement of comparisons grounded in 1972 data.

Also, while every effort was made to include in the fifth follow up all persons who experienced teaching, it is conceivable that some individuals who entered teaching late were among the 6,000 cases not included in the fifth follow-up subsample. These individuals would not have had a chance to participate in the Teaching Supplement.

**Nonresponse error.** Detailed rates of response to various surveys and the availability of specific data items are provided in NLS-72 user’s manuals.

*Unit nonresponse.* For the NLS-72 student surveys, there were two stages of sample selection and hence two types of unit nonresponse—school and student. During the base year, sample schools were asked to permit selection of individual seniors from the schools for the collection of questionnaire and test data. Schools that refused to cooperate in either of these activities were dropped from the sample. The bias introduced by base-year school-level refusals is of particular concern since it carried over into successive rounds of the survey. To the extent that the students in refusal schools differed from students in cooperating schools during later survey waves, the bias introduced by base-year school nonresponse persisted from one wave to the next. (Base-year school nonresponse is addressed under “Coverage error” above.)

Also, individual students at cooperating schools could fail to take part in the base-year survey. Student nonresponse would not necessarily carry over into subsequent waves since student nonrespondents in the base year remained eligible for sampling throughout the study. However, a study of third follow-up responses indicated

that response to earlier survey waves was the most important predictor of response to the third follow up.

Due to intensive data collection procedures, the response rates to the individual NLS-72 surveys were high (80 percent or better) among eligible sample members. At the conclusion of fourth follow-up activities, a total of 12,980 individuals had provided information on each of the first five questionnaires (base-year and all four follow-up surveys), representing 78 percent of the 16,683 base-year respondents. As a result of the various retrospective data collection efforts, the number of individuals with some key data elements for all time points through the fourth follow-up survey is 16,450—73 percent of the 22,652 respondents who participated in at least one survey. In conjunction with the supplemental data collection efforts, this led to a high degree of sample integrity among the key longitudinal data elements.

Only sample members who had participated in at least one of the previous five waves were eligible for selection into the fifth follow-up sample. Of the 14,431 fifth follow-up sample members (excluding the deceased), 89.0 percent (unweighted) completed questionnaires in the fifth follow up; 92.2 percent participated in at least five of the six waves; and 62.1 percent participated in all six waves. There was moderate variation in weighted nonresponse rates by region; nonresponse was greater in the West and Northeast regions, lower in the South, and lowest in the North Central region. The relationship between urbanization and nonresponse was about the same as region—13 percent for rural schools, 15 percent for urban schools, and 18 percent for suburban schools. There was marked variation in nonresponse by race; Blacks showed the highest nonresponse (22.1 percent), followed closely by Hispanics (19.8 percent) and Whites (14.0 percent). Males had a higher nonresponse rate (17.3 percent) than females (13.6 percent).

In PETS, one or more transcripts were received for 91.1 percent of the 13,831 sample members reporting postsecondary school attendance since leaving high school. A single transcript was received for 55 percent of this group, two transcripts for 27 percent, and three or more transcripts for over 9 percent. At the transcript level, 87 percent of the 21,866 “in-scope” transcripts requested were supplied by the postsecondary schools (2,565 of the 24,431 transcripts initially requested could not be obtained because the school had no record of the student’s attendance). Response rates varied from a high of 93 percent for transcripts sought from public 4-year colleges and universities to a low of 55 percent from the voca-

tional and proprietary schools. The higher response rates for the public and private nonvocational schools may be attributable to their typically longer period of existence and the relative permanence of their student files. Telephone follow-up calls to nonresponding schools revealed that nearly half of the vocational school transcripts requested for NLS-72 students were unavailable.

*Item nonresponse.* While unit nonresponse can be adjusted for by weighting, this approach is impractical for item nonresponse. Researchers should take into account that NLS-72 respondents often skipped questions incorrectly or gave unrecognizable answers. However, efforts were made to retrieve missing data for critical items by telephone, with a success rate of over 90 percent.

Most item nonresponse in NLS-72 resulted from respondents' limited recall of past events or misinterpretation of questions and routing instructions. Many items in the Student Files appear to have high (greater than 10 percent) nonresponse. In most instances, these items are associated with the routing patterns in the instruments. (A routing question is one that implicitly or explicitly directs a respondent around other questions in the instrument, e.g., skip patterns.) Rather conservative rules were used to label blanks as either missing (illegitimate skip—code 98) or inapplicable (legitimate skip—code 99). With the more complex routing patterns, a large section of items was sometimes coded illegitimate (code 98) due to just one inconsistency in the pattern. The user should be careful in interpreting data coded 98 and 99. When analysis requires data that lie within complex routing patterns, it is advisable to further examine the data within the routing items. Similarly, data labeled as suspect during the editing stage should be reexamined and possibly reclassified for specific analytic purposes.

*Measurement error.* The survey data were monitored for quality of processing and evaluated to determine the extent of any problems and the sources of errors. Some examples are given below.

*Study of edit failures.* If the respondent failed to answer certain key items properly, the questionnaire failed an edit and the respondent was contacted by telephone. A special study of survey responses in the third follow up was conducted to determine why so many questionnaires (over 60 percent) failed the edit process. This study concluded that: (1) the majority of edit failures associated with itemized financial questions involved the respondent's failure to supply answers to each of the requested line items; (2) items structured as "check all responses that

apply" were likely to be failed by a substantial number of respondents; and (3) overall data entry errors were low except for items requiring itemized financial information.

*Review of routing patterns.* Quality control, completeness, routing, and consistency indices were created for use with the Student Files. Routing indices, computed identically for each survey, indicate the percentage of the routing questions that were ambiguously answered by an individual for a given instrument. The first four follow-up questionnaires contained 33, 52, 67, and 61 routine patterns, respectively. In general, 56–68 percent of all respondents proceeded through an instrument without violating any routing patterns; about 20–30 percent violated 1–5 routing patterns; and 7–15 percent violated 6–10 patterns. In all four instruments, there was a small number (3–7 percent) of sample members who had great difficulty with the routing patterns and violated the routing instructions in more than 10 different patterns.

*Monitoring of data entry.* For the first through fourth follow-up surveys, direct data entry terminals were used to key the survey data. Data entry error rates were computed for the fourth follow-up survey based on three keyings. After the initial keying, a random sample of questionnaires from each batch was selected for rekeying by two additional operators. The results were within the overall error rate tolerance established for NLS-72. The variable error rate across samples and operators on the selected supplemental questionnaires was 0.00040; the estimated character error rate was 0.00023.

### Data Comparability

One of the major goals of the NELS Program is to make the data sufficiently comparable to allow cross-cohort comparisons between studies (NLS-72 vs. HS&B vs. NELS:88), as well as comparative analyses of data across waves of the same study. Nevertheless, the user should be aware of some variations in sample design, questionnaire and test content, and data collection methods that could impact the drawing of valid comparisons.

*Sample design changes.* Although the general NLS-72 sample design was similar for all waves, there were some differences worth noting. The original sample design called for two schools to be surveyed from each of 600 strata; however, at the end of the base-year survey, several strata had no participants and many more had only one. As a result of a resurvey effort during the first follow-up survey, the final sample included *at least* two participating schools from each stratum. The fifth follow-up sample

design differed from the base-year design in that the student selection probabilities were equal in the base-year design but unequal in the fifth follow up.

**Reporting period differences.** The first four follow ups requested data as of October of the survey year, whereas the fifth follow up used February 1986 as the reference date.

**Content changes.** Due to the increased interest in event history analysis, the fifth follow-up survey collected more detailed information than did earlier surveys on the time periods during which respondents held jobs or were in school. Instead of recording one start and stop date for each school and job, up to eight time periods (or start and stop dates) were shown. To allow for maximum user flexibility, the responses were coded into pairs of start and stop dates.

**Comparisons between NLS-72 student data and PETS data.** There are substantial discrepancies between student-reported postsecondary attendance in the NLS-72 follow-up surveys and the evidence obtained from official school transcripts collected in the Postsecondary Education Transcript Study. One interpretation is that NLS-72 respondents overreported instances of postsecondary school attendance by about 10 percent (unweighted). If so, researchers analyzing postsecondary schooling using only the survey data would overestimate significantly the extent of this activity. Coding errors could offer further explanation for the discrepancies.

**Comparisons with HS&B and NELS:88.** The three NELS studies—NLS-72, HS&B, and NELS:88—were specifically designed to facilitate comparisons with each other. At the student level, three different kinds of comparative analyses are possible. (See section 2, Uses of Data for more detail.) The overall sample design is similar and a core of questionnaire items is comparable across all three studies. Additionally, item response theory methods can be used to place mathematics, vocabulary, and reading scores on the same scale for 1972, 1980, and 1982 seniors.

However, despite the considerable similarity between the NLS-72, HS&B, and NELS:88 studies, the differences in sample definition and statistical design have implications for intercohort analysis. Also, sampling error tends to be a greater problem for intercohort comparisons than for intracohort comparisons because there is sampling error each time an independent sample is drawn. In addition, a number of nonsampling errors may arise when estimating trends based on results from two or more

sample surveys. For example, student response rates differed across the three NELS studies, and the characteristics of the nonrespondents may have differed as well. The accuracy of intercohort comparisons may also be influenced by differences in context and question order for trend items in the various student questionnaires; differences in test format, content, and context; and other factors such as differences in data collection and methodology. While some effort was made to maintain trend items over time in the NELS studies, strict test and questionnaire overlap was not considerable across the three studies. More specifically, differences exist in questionnaire construction and in mode and type of survey administration. See chapter 8 (HS&B) and chapter 6 (NELS:88) for additional information on the comparability of the three NELS studies.

## 6. CONTACT INFORMATION

For content information on NLS-72, contact:

Aurora D'Amico  
Phone: (202) 502-7334  
E-mail: [aurora.d'amico@ed.gov](mailto:aurora.d'amico@ed.gov)

### Mailing Address:

National Center for Education Statistics  
1990 K Street NW  
Washington, DC 20006-5651

## 7. METHODOLOGY AND EVALUATION REPORTS

### General

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# Chapter 8: High School and Beyond (HS&B) Longitudinal Study

## 1. OVERVIEW

The High School and Beyond (HS&B) Study was the second study conducted as part of NCES' National Longitudinal Studies Program. This program was established to study the educational, vocational, and personal development of young people, beginning with their elementary or high school years and following them over time as they take on adult roles and responsibilities. The HS&B Study included two high school cohorts—a senior cohort (the graduating class of 1980) and a sophomore cohort (the sophomore class of 1980). Students, school administrators, teachers, parents, and administrative records provided data for the study. HS&B results can be compared with the results of two other longitudinal studies—the National Longitudinal Study of the High School Class of 1972 (NLS-72) and the National Education Longitudinal Study of 1988 (NELS:88). (See chapters 7 and 6 for descriptions of these studies.)

The HS&B Study covered more than 30,000 high school seniors and 28,000 high school sophomores. It primarily consisted of a base year survey in 1980 and four follow-up surveys in 1982, 1984, 1986, and 1992. Record studies were also conducted to obtain key supplemental data on students. As part of the first follow up, high school transcripts were requested for the sophomore cohort, providing information on the sophomores' course-taking behavior through their 4 years of high school. Postsecondary transcripts were collected in 1984 for the senior cohort and in 1987 and 1993 for the sophomore cohort. In addition, student financial aid data were obtained from administrative records in 1984 for the senior cohort and in 1986 for the sophomore cohort. The HS&B project ended in 1993 after the completion of the fourth follow-up survey and related transcripts study of the sophomore cohort.

### Purpose

To (1) study longitudinally *the given cohorts'* educational, vocational, and personal development, beginning with their high school years, and the personal, familial, social, institutional, and cultural factors that may affect that development; and (2) compare the results with data from the NLS-72 and NELS:88 studies to facilitate *cross-cohort* studies of American youth's schooling and socialization.

### Components

The HS&B Study compiled data from a sample of students, parents, teachers, and school administrators in a base year and four follow-up surveys. It also collected high school and postsecondary transcripts and administrative financial aid records. The various components are described below.

### LONGITUDINAL SAMPLE SURVEY OF THE HIGH SCHOOL SOPHOMORE AND SENIOR CLASSES OF 1980; BASE- YEAR SURVEY AND FOUR FOLLOW UPS, ENDING IN 1992

HS&B collected data from:

- ▶ Students and dropouts
- ▶ School administrators
- ▶ Teachers
- ▶ Parents
- ▶ High school transcripts
- ▶ Postsecondary transcripts
- ▶ Postsecondary financial aid records

**Base Year Survey.** The base year survey was conducted in spring 1980 and comprised the following:

*Student Questionnaire.* Students were asked to (1) fill out a Student Identification Pages booklet, which included several items on the use of non-English languages as well as confidential identifying information; (2) complete a questionnaire that focused on the student's individual and family background, high school experiences, work experiences, future educational plans, future occupational goals, and plans for and ability to finance postsecondary education; and (3) take timed cognitive tests that measured verbal and quantitative abilities. The sophomore test battery included achievement measures in science, writing, and civics, while seniors were asked to respond to tests measuring abstract and nonverbal abilities.

*School Questionnaire.* Completed by an official in the participating school, this questionnaire collected information about enrollment, staff, educational programs, facilities and services, dropout rates, and special programs for handicapped and disadvantaged students.

*Teacher Comment Checklist.* At each grade level, teachers had the opportunity to answer questions about the traits and behaviors of sampled students who had been in their classes. The typical student in the sample was rated by an average of four different teachers.

*Parent Questionnaire.* A sample of parents provided information about family attitudes, family income, employment, occupation, salary, financial planning, and how these affect postsecondary education and goals. The results include responses from the parents of about 3,600 sophomores and 3,600 seniors.

**First Follow-up Survey.** The first follow-up survey was conducted in spring 1982. As in the base survey, information was collected from students, school administrators, and parents. For the 1980 senior cohort, high school and postsecondary experiences were the main focus of the survey; seniors were asked about their school and employment experiences, family status, and attitudes and plans. For the 1980 sophomore cohort, the survey gathered information on school, family, work experiences, educational and occupational aspirations, personal values, and test scores of sample participants. A high school transcript collection was also part of the first follow up for sophomore cohort members. (See below for more detail.)

Sophomores were classified by high school status as of 1982 (i.e., dropout, same school, transfer, or early

graduate). Dropouts completed a *Not Currently in High School Questionnaire*, which included some questions from the regular Student Questionnaire but focused on the student's reasons for dropping out and the impact on his/her educational and career development. In addition to the regular Student Questionnaire, a *Transfer Supplement* was completed by members of the sophomore cohort who had transferred out of the base year sample high school to another high school. This supplement gathered information on reasons for transferring and for selecting a particular school, length of interruption in schooling and reasons, and particulars about the school itself (type, location, entrance requirements, size of student body, grades). Sophomore cohort members who graduated from high school ahead of schedule completed an *Early Graduate Supplement* in addition to the regular questionnaire. The Early Graduate Supplement documented reasons for and circumstances of early graduation, adjustments required to finish early, and respondents' activities compared with those of other out-of-school survey members (i.e., dropouts, 1980 seniors).

**Second Follow-up Survey.** This survey was conducted in spring 1984. For both the sophomore and senior cohorts, the survey collected data on the student's work experience, postsecondary schooling, earnings, periods of unemployment, and so forth. For seniors, postsecondary transcripts and financial aid records were also collected. (See below for more detail.)

**Third Follow-up Survey.** This survey was administered in spring 1986, using the same questionnaire for both the sophomore and senior cohorts. To maintain comparability with prior waves, many questions from earlier follow-up surveys were repeated. Respondents were asked to update background information and to provide information about their work experience, unemployment history, education and other training, family information (including marriage patterns), income, and other experiences and opinions. Financial aid records and postsecondary transcripts were collected for sophomores. (See below for more detail.)

**Fourth Follow-up Survey.** This survey was administered in spring 1992 to only the sophomore cohort. The survey sought to obtain valuable information on issues of access to and choice of undergraduate and graduate educational institutions, persistence in obtaining educational goals, progress through the curriculum, rates of degree attainment and other assessments of educational outcomes, and rates of return to the individual and society. A second collection of postsecondary transcripts for sopho-

more cohort members took place in 1993. (See below for more detail.)

**Record Studies.** The following record studies were conducted during the course of the HS&B project.

*High School Transcript Study.* In fall 1982, as part of the first follow up, nearly 16,000 high school transcripts were collected for sophomore cohort students who were seniors in 1982. This data collection allows the study of the course-taking behavior of the sophomore cohort throughout their four years of high school. Data include a six-digit course number for each course taken; course credit, expressed in Carnegie units (a standard of measurement that represents one credit for the completion of a 1-year course); course grade; year course was taken; grade point average; days absent; and standardized test scores.

*Postsecondary Education Transcript Study.* This study gathered data on students' academic histories since leaving high school. As part of the second follow up in 1984, postsecondary transcripts were collected for the senior cohort. Transcripts were requested from all postsecondary institutions reported by senior cohort members in the first and second follow-up surveys. Transcript data include dates of attendance; fields of study; degrees earned; and the titles, grades, and credits of every course attempted at each institution.

In 1987 and again in 1993, postsecondary transcripts were collected for the sophomore cohort. The latter collection allowed information to be obtained on sophomore cohort members who had received their baccalaureate degrees and then went on to pursue graduate, doctoral, and first professional degrees.

*Student Financial Aid Records.* In 1984, HS&B collected institutional financial aid records and federal records of the Guaranteed and Student Loan Program and the Pell Grant Program for seniors who had indicated postsecondary attendance. The federal financial aid records were obtained for the sophomore cohort in 1986.

## Periodicity

The base year survey was conducted in 1980, with four follow ups in 1982, 1984, 1986, and 1992 (only the sophomore cohort). High school transcripts were collected for the sophomore cohort in 1982. Postsecondary transcripts were collected for the senior cohort in 1984 and for the sophomore cohort in 1987 and 1993. Student financial aid records were collected for the senior cohort in 1984 and the sophomore cohort in 1986.

## 2. USES OF DATA

The HS&B Study provides information on the educational, vocational, and personal development of young people as they move from high school into postsecondary education or the workforce and then into adult life. The initial longitudinal study (NLS-72) laid the groundwork for comparison with HS&B. It recorded the economic and social conditions surrounding high school seniors in 1972 and, within that context, their hopes and plans; subsequently, it measured the outcomes while also observing the intervening processes. The HS&B base year survey of 1980 seniors is directly comparable to NLS-72 data on 1972 seniors. With the follow-up data, trend comparisons can be made for the period 1972 to 1984. (See *A Guide to Using NELS:88 Data*, by J. Owings et al.) By comparing the results of the HS&B and NLS-72 studies, researchers can determine how plans and outcomes differ in response to changing conditions, or remain the same despite such changes. HS&B permits researchers to further monitor change by, for example, measuring the economic returns of postsecondary education for minorities and delineating the need for financial aid.

The HS&B Study allows both cross-sectional and longitudinal analyses of the students who were sophomores or seniors in 1980. The data are used to address issues of educational attainment, employment, family formation, personal values, and community activities since 1980. For example, a major study on high school dropouts used HS&B data to demonstrate that a large number of dropouts return to school and earn a high school diploma or an equivalency certificate. Other examples of issues and questions that can be addressed are:

- ▶ How, when, and why do students enroll in postsecondary education institutions?
- ▶ Did those who (while in high school) expected to complete the baccalaureate degree actually do so?
- ▶ How has the percentage of recent graduates from a given cohort who enter the workforce in their field changed over the past years?
- ▶ What are the long-term effects of not completing high school in the traditional way? How do employment and earnings event histories of traditional high school graduates differ from those who did not finish high school in the traditional manner?
- ▶ Do individuals who attend college earn more than those who do not attend college? What is the effect of student financial aid?

- ▶ What percentage of college graduates is eligible or qualified to enter a public service profession such as teaching?
- ▶ How many enter the workforce full-time in the area for which they are qualified?
- ▶ How and in what ways do public and private schools differ?

### 3. KEY CONCEPTS

Some of the key terms related to HS&B are defined below.

**Cognitive Tests.** Achievement tests administered to both cohorts in the base year survey and to only sophomores in the first follow up. The content was as follows: (1) Vocabulary (21 items, 7 minutes), using a synonym format; (2) Reading (20 items, 15 minutes), consisting of short passages (100–200 words) followed by comprehension questions and a few analysis and interpretation items; (3) Mathematics (38 items, 21 minutes), in which students were asked to determine which of two quantities was greater, whether they were equal, or whether there was insufficient data to answer the question; (4) Science (20 items, 10 minutes), based on science knowledge and scientific reasoning ability; (5) Writing (17 items, 10 minutes), based on writing ability and knowledge of basic grammar; and (6) Civics Education (16 questions, 5 minutes), based on various principles of law, government, and social behavior.

**Course Offering and Course Taking.** Course-offering data were collected from the School Questionnaires filled out by school administrators; course offerings include regular and advanced placement curricula provided by the schools. Course-taking data were collected in different ways for the sophomore and senior cohorts. For sophomores, official high school transcripts provided records of students' coursework. For the senior cohort, high school transcripts were not available; instead, coursework was self-reported by seniors in a series of items asking retrospectively about the courses and hours taken. Despite these differences in data collection, the listings of courses for the two cohorts were consistent, including major subjects in both regular and advanced placement curricula.

**Socioeconomic Status (SES).** Indicated by a set of composite variables, constructed from base year and first follow-up data—using father's occupation, father's education, mother's education, family income, and material possessions in the household.

## 4. SURVEY DESIGN

### Target Population

High school students who were in the 10<sup>th</sup> or 12<sup>th</sup> grade in U.S. public and private schools in spring 1980.

### Sample Design

HS&B was designed to provide nationally representative data on 10<sup>th</sup>- and 12<sup>th</sup>-grade students in the United States.

**Base Year Survey.** In the base year, students were selected using a two-stage, stratified probability sample design, with secondary schools as the first-stage units and students within schools as the second-stage units. Sampling rates for each stratum were set so as to select in each stratum the number of schools needed to satisfy study design criteria regarding minimum sample sizes for certain types of schools. The following types of schools were oversampled to make the study more useful for policy analyses: public schools with a high percentage of Hispanic students; Catholic schools with a high percentage of minority group students; alternative public schools; and private schools with high achieving students. Thus, some schools had a high probability of inclusion in the sample (in some cases, equal to 1.0), while others had a low probability of inclusion. The total number of schools in the sample was 1,122, selected from a frame of 24,725 schools with grades 10 or 12 or both. Within each stratum, schools were selected with probabilities proportional to the estimated enrollment in their 10<sup>th</sup> and 12<sup>th</sup> grades.

Within each school, 36 seniors and 36 sophomores were randomly selected. In those schools with fewer than 36 seniors or 36 sophomores, all eligible students were drawn in the sample. Students in all but the special strata were selected with approximately equal probabilities. The students in special strata were selected with higher probabilities. Special efforts were made to identify sampled students who were twins or triplets so that their co-twins or co-triplets could be invited to participate in the study.

Substitution was carried out for schools that refused to participate in the survey. There was no substitution for students who refused, for students whose parents refused, or for students who were absent on Survey Day and makeup days.

**First Follow-up Survey.** The first follow-up sophomore and senior cohort samples were based on the base year samples, retaining the essential features of a stratified multistage design. (For details beyond those given below,

see *High School and Beyond First Follow-Up (1982) Sample Design Report*, by R.E. Tourangeau, et al.)

For the sophomore cohort, all of the 1,015 schools selected for the base year sample were included in the first follow up except 40 schools that had no 1980 sophomores, had closed, or had merged with other schools in the sample. The sample also included 17 schools that received two or more students from base year schools; school-level data from these institutions were eventually added to students' records as contextual information. However, these schools were not added to the existing probability sample of schools.

The sophomores still enrolled in their original base year schools were retained with certainty since the base year clustered design made it relatively inexpensive to resurvey and retest them. Sophomores no longer attending their original base year schools were subsampled (i.e., dropouts, early graduates, students who transferred as individuals to a new school). Certain groups were retained with higher probabilities in order to support statistical research on such policy issues as excellence of education throughout the society, access to postsecondary education, and transition from school to the labor force.

Students who transferred as a class to a different school were considered to be still enrolled if their original school had been a junior high school, had closed, or had merged with another school. Students who had graduated early or had transferred as individuals to other schools were treated as school leavers for the purposes of sampling. The 1980 sophomore cohort school leavers were selected with certainty or according to predesignated rates designed to produce approximately the number of completed cases needed for each of several different sample categories. School leavers who did not participate in the base year were given a selection probability of 0.1.

For the 1980 senior cohort, students selected for the base year sample had a known, nonzero chance of being selected for the first and all subsequent follow-up surveys. The first follow-up sample consisted of 11,995 selections from the base year probability sample. This total included 11,500 selections from among the 28,240 base year participants and 495 selections from among the 6,741 base year nonparticipants. In addition, 204 nonsampled co-twins or co-triplets (who were not part of the probability sample) were included in the first follow-up sample, resulting in a total of 12,199 selections.

**High School Transcript Study (1980 Sophomore Cohort).** Subsequent to the first follow-up survey, high school transcripts were sought for a probability subsample of nearly 18,500 members of the 1980 sophomore cohort. The subsampling plan for the transcript study emphasized the retention of members of subgroups of special relevance for education policy analysis. Compared to the base year and first follow-up surveys, the transcript study sample design further increased the overrepresentation of racial and ethnic minorities, students who attended private high schools, school dropouts, transfers, early graduates, and students whose parents completed the base year Parent Questionnaire on financing postsecondary education. Transcripts were collected and processed for nearly 16,000 members of the sophomore cohort.

**Second and Third Follow-up Surveys.** The sample for the second follow-up survey of the 1980 sophomore cohort was based upon the design of the High School Transcript Study. A total of 14,825 cases were selected from among the nearly 18,500 retained for the transcript study. The second follow-up sample included disproportionate numbers of sample members from policy-relevant subpopulations. The members of the senior cohort selected into the second follow-up sample consisted exactly of those selected into the first follow-up sample. The senior and sophomore cohort samples for the third follow-up survey were the same as those used for the second follow up. The third follow up was the last survey conducted for the senior cohort. Postsecondary school transcripts were collected for all members of the senior cohort members who reported attending any form of postsecondary schooling in either of the follow-up surveys. Over 7,000 individuals reported more than 11,000 instances of postsecondary school attendance.

**Fourth Follow-up Survey.** The fourth follow up was composed solely of members from the sophomore cohort, and consisted exactly of those selected into the second and third follow-up sample. For any student who ever enrolled in postsecondary education, complete transcript information was requested from the institutions indicated by the student.

### Data Collection and Processing

HS&B compiled data from six primary sources: students, school administrators, teachers, parents of selected students, high school administrative records (transcripts), and postsecondary administrative records (transcripts and financial aid). Data collection began in fall 1979 (when

information from school administrators and teachers was first gathered) and ended in 1993 (when postsecondary transcripts of sophomore cohort members were collected). The National Opinion Research Center (NORC) at the University of Chicago was the contractor for the HS&B project.

**Reference dates.** In the base year survey, most questions referred to the student's experience up to the time of administration in spring 1980 (i.e., all 4 high school years for the senior cohort and the first 2 high school years for the sophomore cohort). In the follow ups, most questions referred to experiences that occurred between the previous survey and the current survey. For example, the second follow up largely covered the period between 1982 (when the first follow up was conducted) and 1984 (when the second follow up was conducted).

**Data collection.** In both the base year and first follow-up surveys, it was necessary to secure a commitment to participate in the study from the administrator of each sampled school. For public schools, the process began by contacting the chief state school officer. Once approval was gained at the state level, contact was made with District Superintendents and then with school principals. Wherever private schools were organized into an administrative hierarchy (e.g., Catholic school dioceses), approval was obtained at the superior level before approaching the school principal or headmaster. The principal of each cooperating school designated a School Coordinator to serve as a liaison between the NORC staff, school administrator, and selected students. The School Coordinator (most often a senior guidance counselor) handled all requests for data and materials, as well as all logistical arrangements for student-level data collection on the school premises.

In the 1980 base year survey, a single data collection method—on-campus administration—was used for both the sophomore and senior cohorts. In the first follow up, members of the sophomore cohort (nearly all of whom were then in the 12th grade) were resurveyed using methods similar to those of the base year survey. Since some of the 1980 sophomores had left school by 1982, the first follow-up survey involved on-campus administration for in-school respondents and off-campus group administration for school leavers (transfers, dropouts, early graduates). On-campus surveys generally were similar to those used in the base year. Off-campus survey sessions were held afterwards for school leavers in the sophomore cohort. Personal or telephone interviews were conducted with individuals who did not attend the sessions.

Members of the 1980 senior cohort were surveyed primarily by mail. Nonrespondents to the mail survey (approximately 25 percent) were interviewed either in person or by telephone.

By the time of the second follow up, the sophomore cohort was out of school. In the second (1984) and third (1986) follow ups, data for both the sophomore and senior cohorts were collected through mailed questionnaires. Telephone and personal interviews were conducted with sample members who did not respond to the mailed survey within 2–3 months. Only the sophomore cohort was surveyed in the fourth follow up (1992). Computer-assisted telephone interviewing (CATI) was used to collect these data. The CATI program included two instruments; the first was used to locate and verify the identity of the respondent, while the second contained all of the survey questions. The average administration time for an interview was 30.6 minutes. Intensive telephone locating and field intervention procedures were used to locate respondents and conduct interviews.

**Processing.** Although procedures varied across survey waves, all Student Questionnaires in all waves were checked for missing critical items. Approximately 40 items in each of the main survey instruments were designated as critical or “key” items. Cases failed this edit if a codable response was missing for any of the key items. Such cases were flagged and then routed to the data retrieval station, where staff called respondents to obtain missing information or otherwise resolve the edit failure.

The base year procedures for data control and preparation differed significantly from those in the follow-up surveys. Since the base year student instruments were less complex than later instruments, the completed documents were sent directly from the schools to NORC's optical scanning subcontractor for conversion to machine-readable form. The scanning computer was programmed to perform the critical item edit on Student Questionnaires and to generate listings of cases missing critical data, which were then sent to NORC for data retrieval. School and Parent Questionnaires were converted to machine-readable form by the conventional key-to-disk method at NORC.

All follow-up questionnaires were sent to NORC for receipt control and data preparation prior to being shipped to the scanning subcontractor. The second follow-up survey contained optically scannable grids for the answers to numeric questions; staff examined numeric responses for correct entry (e.g., right justification, omission of

decimal points). In the third follow up, a portion of the instrument was designed for computer-assisted data entry (CADE), while the rest was prepared for optical scanning. All major skip items and all critical items were entered by CADE. With this system, operators were able to combine data entry with the traditional editing procedures. The CADE system stepped question-by-question through critical and numeric items, skipping over questions that were slated for scanning and questions that were legitimately skipped because of a response to a filter question. Ranges were set for each question, preventing the accidental entry of illegitimate responses. CADE operators were also responsible for the critical item edit; those critical items that did not pass the edit were flagged for retrieval, both manually and by the CADE system. After the retrieved data were keyed, questionnaires were shipped to the scanning firm.

For the fourth follow up, a CATI system captured the data at the time of the interview. The CATI program examined the responses to completed questions and used that information to route the interviewer to the next appropriate question. It also applied the customary edits, described below under “Editing.” At the conclusion of an interview, the completed case was deposited in the database ready for analysis. There was minimal post-data entry cleaning because the interviewing module itself conducted the majority of necessary edit checking and conversion functions. A CADE program was designed to enter and code transcript data.

The first through fourth follow ups required coding of open-ended responses on occupation and industry; postsecondary schools; major field of study for each postsecondary school; licenses, certificates, and other diplomas received; and military specialized schools, specialty, and pay grade. Coding was compatible with the coding done in NLS-72, using the same sources from NCES and the U.S. Bureau of the Census. (See chapter 7.) In the first follow up, staff also coded open-ended questions in the Early Graduate and Transfer Supplements, and transformed numeric responses to darkened ovals to facilitate optical scanning. In the third follow up, all codes were loaded into a computer program for more efficient access. Coders typed in a given response, and the program displayed the corresponding numeric code.

In the fourth follow up, interviewers received additional coding capabilities by temporarily exiting the CATI program and executing separate programs that assisted them in coding the open-ended responses. Data from the coding programs were automatically sent to the CATI

program for inclusion in the data set. In addition to the online coding tasks, interviewers recorded verbatim descriptions of industry and occupation. The coding scheme for industry in the fourth follow up was a simplified version of the scheme used in previous rounds of HS&B (verbatim responses are available for more detailed coding). The coding scheme for occupation coding was adapted from verbatim responses received in the third follow up. Postsecondary institutions were coded with Federal Interagency Committee on Education (FICE) codes.

**Editing.** In addition to the critical item edit described above, a series of edits checked the data for out-of-range values and inconsistencies between related items. In the base year, machine editing was limited to examining responses for out-of-range values. No interim consistency checks were performed since there was only one skip pattern.

In the first and second follow ups, several sections of the questionnaire required respondents to follow skip instructions. Computer edits were performed to resolve inconsistencies between filter and dependent questions, detect illegal codes, and generate reports on the incidence of correctly and incorrectly answered questions. After improperly answered questions were converted to blanks, the student data were passed to another program for conversion to appropriate missing-data codes (e.g., “legitimate skip,” “refused”). Detection of out-of-range codes was completed during scanning for all questions except those permitting an open-ended response. Hand-coded data for open-ended questions (occupation, industry, institution, field of study) were matched by computer against lists of valid codes.

In the third follow up, CADE carried out many of the steps that normally occur during machine editing. The system enforced skip patterns, range checking, and appropriate use of reserved codes—allowing operators to deal with problems or inconsistencies while they had the document in hand. For scanned items, the same machine-editing steps as those used in prior follow ups were implemented. Since most of the filter questions were CADE-designated items, there were few filter-dependent inconsistencies to be handled in machine editing.

In the fourth follow up, machine editing was replaced by the interactive edit capabilities of the CATI system, which tested responses for valid ranges, data field size, data type (numeric or text), and consistency with other answers or data from previous rounds. If the system detected an

inconsistency due to a miskey by the interviewer, or if the respondent simply realized that he or she made a reporting error earlier in the interview, the interviewer could go back and change the earlier response. As the new response was entered, all of the edit checks performed at the first response were again performed. The system then worked its way forward through the questionnaire using the new value in all skip instructions, consistency checks, and the like until it reached the first unanswered question, and control was then returned to the interviewer. When problems were encountered, the system could suggest prompts for the interviewer to use in eliciting a better or more complete answer.

### Estimation Methods

Weighting is used to adjust for sampling and unit nonresponse.

**Weighting.** The weights are based on the inverse of the selection probabilities at each stage of the sample selection process and on nonresponse adjustment factors computed within weighting cells. While each wave provided weights for statistical estimation, the fourth follow-up weights can illustrate the concept of weighting. The fourth follow up generated survey data and postsecondary transcript data. Weights were computed to account for nonresponse in both of these data collections.

First, a raw weight, unadjusted for nonresponse in any of the surveys, was calculated and included on the data file. The raw weight provides the basis for analysts to construct additional weights adjusted for the presence of any combination of data elements. However, *caution should be used if the combination of data elements results in a sample with a high proportion of missing cases*. For the survey data, two weights were computed. The first weight (was computed for all fourth follow-up respondents. The second weight was computed for all fourth follow-up respondents who also participated in the base year and first, second, and third follow-up surveys.

Two additional weights were computed to facilitate the use of the postsecondary transcript data. The collection of transcripts was based upon sophomore cohort reports of postsecondary attendance during either the third or fourth follow up. A student may have reported attendance at more than one school. The first transcript weight was computed for students for whom at least one transcript was obtained. It is therefore possible for a student who was not a respondent in the fourth follow up but who was a respondent in the third follow up, to have a nonzero

value for the first transcript weight. The second transcript weight is more restrictive. It was designed to assign weights only to cases that were deemed to have complete data. Only students who responded during the fourth follow up (and hence students for whom a complete report of postsecondary education attendance was available and for whom all requested transcripts were received) were assigned a nonzero value for the second transcript weight. For students who did not complete the fourth follow-up interview, complete transcripts may have been obtained in the 1987 transcript study, but since it was not certain that these transcripts were complete, they were given a weight of zero.

**Imputation.** No imputation was performed in the HS&B Study.

## 5. DATA QUALITY AND COMPARABILITY

### Sampling Error

Because the sample design for the HS&B cohorts involved stratification, disproportionate sampling of certain strata, and clustered probability sampling, the calculation of exact standard errors (an indication of sampling error) for survey estimates can be difficult and expensive.

Sampling error estimates for the first and second HS&B follow ups were calculated by the method of Balanced Repeated Replication (BRR) using BRRVAR, a Department of Education statistical subroutine. The BRR programs, WesVar and SUREG, are now available commercially. For the base year and the third and fourth follow ups, Taylor Series approximations were employed. More detailed discussions of the BRR and Taylor Series procedures can be found in the *High School and Beyond Third Follow-Up Sample Design Report*, CS 88-402. The Data Analysis System (DAS), included as part of the public release file, automatically reports design-corrected Taylor Series standard errors for the tables it generates. Therefore, users of the DAS need make no adjustments to these estimates.

While design effects cannot be calculated for every estimate of interest to users, design effects will be similar from item to item within the same subgroup or population. Users can calculate approximate standard error estimates for items by multiplying the standard error under the simple random sample assumption by the square root of the average design effect for the population being studied.

## Nonsampling Error

Nonsampling errors include coverage, nonresponse, and measurement errors.

**Coverage error.** Bias caused by explicit exclusion of certain groups of schools and students (e.g., special types of schools or students with disabilities or language barriers) is not addressed in HS&B technical reports. Potential coverage error in HS&B may relate to the exclusion of schools that refused to cooperate in the base year survey. Students who refused to participate in the base year survey were not excluded in the follow ups. Since students were randomly selected from the sampled schools, the HS&B sample design did not entail exclusion of specified groups. (See section 4, Sample Design.)

### **Nonresponse error.**

**Unit nonresponse.** HS&B base year student-level estimates include two components of unit nonresponse bias: bias introduced by nonresponse at the school level, and bias introduced by nonresponse on the part of students attending cooperating schools. At the school level, some schools refused to participate in the base year survey. Substitution was carried out for refusal schools within stratum when there were two or more schools within the stratum. The bias introduced by base year school-level refusals is of particular concern since it carried over into successive rounds of the survey. Students attending refusal schools were not sampled during the base year and had no chance for selection into subsequent rounds of observation. To the extent that these students differed from students from cooperating schools in later waves of the study, the bias introduced by base year school nonresponse would persist. Student nonresponse did not carry over in this way since student nonrespondents remained eligible for sampling in later waves of the study.

In general, the lack of survey data for nonrespondents prevents the estimation of unit nonresponse bias. However, during the first follow up, School Questionnaire data were obtained from most of the base year refusal schools, and student data were obtained from most of the base year student nonrespondents selected for the first follow-up sample. These data provide a basis for assessing the magnitude of unit nonresponse bias in base year estimates.

Overall, 1,122 schools were selected in the original sample, and 811 of those schools (72 percent) participated in the survey. An additional 204 schools were drawn in a replacement sample. Student refusals and absences resulted in a weighted student completion rate of 88 percent in the base year survey. Participation was higher

in most follow-up surveys. Completion rates in the first follow up were: 94 percent for seniors; 96 percent for sophomores eligible for on-campus survey administration; and 89 percent for sophomores who had left school between the base year and first follow up surveys (dropouts, transfer students, and early graduates). In the second follow up, 91 percent of senior cohort members and 92 percent of sophomore cohort members completed the survey. In the third follow up, completion rates were 88 percent for seniors and 91 percent for sophomores. Only the sophomore cohort was surveyed in the fourth follow up; 86 percent of the sample members participated.

As results from the fourth follow up illustrate, student nonresponse varied by demographic and educational characteristics. Males had a slightly higher nonresponse rate than females (a difference slightly over 3 percent). Blacks and Hispanics showed similarly high rates of nonresponse (around 20 percent), whereas nonresponse among White students was about 10 percent. Nonresponse increased as socioeconomic status decreased. Students who were in general or vocational programs during the base year were more likely to be nonrespondents than students in academic programs. Dropouts had higher nonresponse rates than other students. Students with lower grades and lower test scores showed higher nonresponse than students with higher grades and test scores. Students who were frequently absent from school showed higher nonresponse than students absent infrequently. Students with no postsecondary education by the time of the second follow up had higher nonresponse than students with some postsecondary education. By selected school characteristics, the highest nonresponse rates were among students from alternative public schools, schools with large enrollments, schools in urban areas, and schools in the Northeast and West.

The patterns were similar in earlier rounds of HS&B. Nonresponse analyses conducted by NORC support the following general conclusions:

- (1) The school-level bias component in HS&B estimates is small, averaging less than 2 percent for base year and first follow-up estimates. It is probably of a similar magnitude for fourth follow-up estimates.
- (2) The student-level bias component in base year estimates is also small, averaging about 0.5 percent for percentage estimates.
- (3) The student-level bias component in first, second, and third follow-up estimates is limited by the nonresponse rates, which were about three-fourths of the base year rates.

- (4) The student-level bias component in the fourth follow up is limited by the nonresponse rate, which was slightly higher than the base year rate.

The first and second conclusion together suggests that nonresponse bias is not a major contributor to error in base year estimates. The first and third suggest that nonresponse bias is not a major contributor to error in the first, second, and third follow-up estimates either. The first and fourth conclusion suggest that the fourth follow-up nonresponse bias might be a little greater than for the previous follow ups, but probably not by much. Each of these conclusions must be given some qualifications. The analysis of school-level nonresponse is based on data concerning the schools, not the students attending them. The analyses of student nonresponse are based on survey data and are themselves subject to nonresponse bias. Despite these limitations, the results consistently indicate that nonresponse had a small impact on base year and follow-up estimates.

*Item nonresponse.* Among students who participated in the survey, some did not complete the questionnaire or gave invalid responses to certain questions. The amount of item nonresponse varied considerably by item. For example, in the second follow up, a very low nonresponse rate of 0.1 percent was observed for a question asking whether the respondent had attended a postsecondary institution. A much higher nonresponse rate of 12.2 percent was obtained for a question asking if the respondent had used a micro or minicomputer in high school. Typical item nonresponse rates ranged from 3 to 4 percent.

Imputation was not used to compensate for item nonresponse in HS&B. However, an attempt was made in the fourth follow up to reduce item nonresponse. In previous rounds, interviews were conducted by self-administered questionnaires (SAQs). Unfortunately, respondents often skipped questions incorrectly or gave unrecognizable answers. Thus, more data were missing than would have occurred through personal interviewing. In the fourth follow up, interviewing was conducted using computer-assisted telephone interviewing (CATI). Unlike SAQs, CATI interviewing virtually eliminated missing data attributable to improperly skipped questions.

To evaluate the effectiveness of CATI interviewing, 25 items from both the third and fourth follow-up data were selected for comparison. Refusal and “don’t know” responses were considered to be missing, but legitimate skips were not. For these 25 items, the overall percentage of missing items dropped from 4.36 percent in the third follow up to 1.88 percent in the fourth follow up.

CATI also eliminated all multiple responses and resulted in uncodable verbatims for only the two income variables. In addition, more was known about the missing data in the fourth follow up. In the third follow up, only 7.2 percent of the missing data were classified as refusals or “don’t know” responses. In the fourth follow up, 50.9 percent of the missing data were classified as refusals or “don’t know” responses. The fact that most of the 25 comparisons showed a “very significant” decline in missing data supports a contention that missing data were reduced in the fourth follow up.

**Measurement error.** An examination of consistency between responses to the third and fourth follow ups provides an indication of the reliability of HS&B data.

*Race/ethnicity.* Race/ethnicity is one characteristic of the respondent that should not change between surveys. Overall, of the 12,309 respondents who reported their race/ethnicity on both questionnaires, 93.8 percent gave the same response in both years. However, certain race/ethnicity categories (e.g., Native American) had substantially less agreement. Only 53.4 percent of the respondents who classified themselves as Native Americans during the third follow up classified themselves as Native Americans again during the fourth follow up.

One explanation for these discrepancies may be the change in the method of survey administration. Unlike the third follow up, which involved self-administered questionnaires, the fourth follow up was conducted by telephone. The questionnaires mailed during the third follow up had the five race/ethnicity categories listed for the respondent to see. In the fourth follow up, respondents were simply asked over the telephone, “What is your race/ethnicity?” The interviewer coded the response. It is possible that Native Americans, Hispanics, and Asian/Pacific Islanders classified themselves as Black or White (not knowing that there was a more specific category for them), hence resulting in more Blacks and Whites in the fourth follow-up results.

*Marital status.* In the third follow up, respondents were asked about their marital status *in the first week* of February 1986. In the fourth follow up, respondents were asked about their marital status *during and since* February 1986. Although both questions asked about marital status during February 1986, respondents who had a change in marital status during the last three weeks of February could have given a different answer in the fourth follow up than in the third follow up. Overall, of the 11,854 respondents who gave their marital status on both questionnaires, 95.4 percent had answers that agreed.

Unlike the race/ethnicity question, memory and timing play an important role in matching answers for marital status. In this case, the recall period for third follow-up respondents was years shorter than the recall period for respondents in the fourth follow up. Respondents in the third follow up, which took place in spring 1986, were asked about a recent event. Respondents in the fourth follow up, which was conducted in spring 1992, were asked to recall their status back in February 1986. As with the race/ethnicity question, the method of administering the question differed between rounds—namely, the question formatting had changed and the fourth follow up used preloaded data to verify marital status.

### Data Comparability

A goal of the National Longitudinal Studies Program is to allow comparative analysis of data generated in several waves of the same study and also to enable cross-cohort comparisons with the other longitudinal studies. While the HS&B and NLS-72 studies are largely compatible, a number of variations in sample design, questionnaires, and data collection methods should be noted to caution data users.

**Comparability within HS&B.** While many data items were highly compatible across waves, the focus of the questionnaires necessarily shifted over the years in response to the changes in the cohorts' life cycle and the concerns of education policymakers. For seniors in the base year survey and for sophomores in both the base year and first follow-up surveys, the emphasis was on secondary schooling. In subsequent follow ups, increasingly more items were collected dealing with postsecondary education and employment. Also, a major change in the data collection method occurred in the fourth follow up, when CATI was introduced as the primary approach. Earlier waves used mailed questionnaires supplemented by telephone and personal interviews.

**Comparability with NLS-72.** The HS&B Study was designed to build on NLS-72 in three ways. First, the HS&B base year survey included a 1980 cohort of high school seniors that was directly comparable to the NLS-72 cohort (1972 seniors). Replication of selected 1972 Student Questionnaire items and test items made it possible to analyze changes subsequent to 1972 and their relationship to federal education policies and programs in that period. Second, the introduction of the sophomore cohort in HS&B provided data on the many critical educational and vocational choices made between the sophomore and senior years in high school, thus

permitting a fuller understanding of the secondary school experience and how it affects students. Third, HS&B expanded the NLS-72 focus by collecting data on a range of life cycle factors, such as family formation, labor force behavior, intellectual development, and social participation.

The sample design was largely similar for both the HS&B and NLS-72 studies, except that HS&B included a sophomore sample in addition to a senior sample. The questionnaires for the two studies contained a large number of identical or similar items dealing with secondary education and postsecondary work experience and education. The academic tests were also highly compatible. Of the 194 test items administered to the HS&B senior cohort in the base year, 86 percent were identical to items that had been given to NLS-72 base year respondents. Item response theory (IRT) was used in both studies to put math, vocabulary, and reading test scores on the same scale for 1972, 1980, and 1982 seniors. With the exception of CATI in the HS&B fourth follow up, both NLS-72 and HS&B used group administration of questionnaires and tests in the earliest surveys and mailed questionnaires in the follow ups. HS&B, however, involved more extensive efforts to supplement the mailings by telephone and personal interviews.

## 6. CONTACT INFORMATION

For content information on HS&B, contact:

Aurora M. D'Amico  
Phone: (202) 502-7334  
E-mail: [aurora.d'amico@ed.gov](mailto:aurora.d'amico@ed.gov)

### Mailing Address:

National Center for Education Statistics  
1990 K Street NW  
Washington, DC 20006-5651

## 7. METHODOLOGY AND EVALUATION REPORTS

### General

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