

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

Website: <http://nces.ed.gov/surveys/nls72/>

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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 (NLS) 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 four studies—NLS:72, the High School and Beyond Longitudinal Study (HS&B) (see HS&B chapter), the National Education Longitudinal Study of 1988 (NELS:88) (see NELN chapter), and the Education Longitudinal Study of 2002 (ELS:2002) (see ELS chapter)—cover the educational experience of youth from the 1970s into the 21st century.

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 transition of young adults from high school through postsecondary education and into the workplace.

Components

NLS:72 collected data from students (high school 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 high school seniors and a collection of postsecondary transcripts from the 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 handicaps, socioeconomic status [SES] 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 that measured verbal and nonverbal abilities. These tests covered vocabulary, picture number, reading, letter groups, mathematics, and mosaic comparisons. (See “Test Battery” in Section 3. Key Concepts.)

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, and grade point average (and, if applicable, the student’s 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 grade, 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.

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

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 Black, Hispanic, and other race/ethnicity 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 high school 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 activity 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, and being a housewife, among others. 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 respondents 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 from October 1972 through October 1976 and his or 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 11 possible sections.

The fifth follow-up survey offered the opportunity to gather information on the experiences and attitudes of sample members 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*, which was administered concurrently with the fifth follow-up, was a separate questionnaire that was sent to fifth follow-up respondents who indicated on the main survey form that they had teaching experience or training. The supplement 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. The supplement included items that asked about 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 in the district where the respondent was currently teaching, years of experience, and grade level taught.

Postsecondary Education Transcript Study (PETS). To obtain 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. The information gathered from the transcripts included 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.

Data Availability

Information concerning how to access the restricted-use data for NLS:72 through the fifth follow-up is available at <https://nces.ed.gov/pubsearch/licenses.asp>.

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 the quality, equity, and diversity of educational opportunity and the effect of these 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 the 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 three longitudinal studies: HS&B, NELS:88, and ELS:2002. Together, these four studies provide a particularly rich resource for examining the changes that have occurred in American education during the past 30 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 NLS 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, NELS:88 second follow-up seniors in 1992, and ELS:2002 first follow-up seniors in 2004. 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, but 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 that may affect the comparability of data across the cohorts are discussed in *Trends Among High School Seniors, 1972–1992* (Green, Dugoni, and Ingels 1995) and *United States High School Sophomores: A Twenty-Two Year Comparison, 1980–2002* (Cahalan et al. 2006).

3. KEY CONCEPTS

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

Test Battery. Six cognitive tests were 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 that 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 the use of items that required detection of small differences between pairs of otherwise identical mosaic, 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 in order 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 score. 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 12th 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

Base-year survey. 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 that enrolled 12th graders in the 1971–72 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 Black, Hispanic, and other race/ethnicity student enrollment (for public schools only), income level of the community, and degree of urbanization. Schools were selected with equal probability 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 Black, Hispanic, and other race/ethnicity student 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 students, if fewer than 18 were available) and then selecting 5 additional students (if available) as possible substitutes for nonparticipants. In both cases, the students within a school were sampled with equal probability and without replacement. Dropouts, early (mid-year) graduates, and individuals attending adult education classes were excluded from the sample. The oversampling of schools in low-income areas and schools with relatively high Black, Hispanic, and other race/ethnicity student enrollment led to oversampling of low-income and Black, Hispanic, and other race/ethnicity students.

Sample redefinitions and augmentations. At the close of the base-year survey, 1,040 schools (950 primary and 100 backup) of a targeted 1,200 schools and 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 sample schools and to obtain backup schools to fill empty or partially filled strata. The resurvey was successful in 205 of the 231 primary sample schools. Students from 36 backup schools were also included in order 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” backup schools from the base-year survey were not surveyed during the first follow-up; however, students from 18 of these 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 high school seniors 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 were eligible

for the study. This included both respondents and nonrespondents, but excluded ineligible students, such as dropouts, early (mid-year) graduates, and those attending adult education classes. The final NLS:72 sample included 23,450 former 1972 high school seniors and 1,340 sample schools—1,150 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.

A subsample of 1,020 of the 14,630 eligible fourth follow-up sample members (those who had completed both a Student Questionnaire and a Test Battery in the base-year survey) was targeted for retests on a subset of the base-year Test Battery. 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, SES, 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 1,960 individuals (50.3 percent of those defined as retest-eligible).

Fifth follow-up survey. The fifth follow-up sample was an unequal probability subsample of the 22,650 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 for (1) sample members with special policy relevance, who were retained with certainty or at a higher rate than other sample members; (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 the fourth follow-up in 1979. 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. Sample members 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 12,840 fifth follow-up respondents, 1,520 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 or fall of the survey year and continued through the spring of the following year; for example, the third follow-up survey 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 their family (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 2 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 high school 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 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 School Questionnaire and an SRIF for each student in the sample. 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. The 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 of nonrespondents. During personal interviews, the entire questionnaire was administered. During the 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. Census Bureau's *Classified Index of Industries and Occupations, 1970* and *Alphabetical Index of Industries and Occupations, 1970*. These sources were used in all follow-ups. Coding of the names of postsecondary schools attended by respondents was accomplished using codes from NCES's *Education Directory, Colleges and Universities*. Field of study information was coded using classification of instructional program (CIP) codes from NCES's *Classification of Instructional Programs*. 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 remaining 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, 24,430 transcripts were initially requested from 3,980 institutions for 14,760 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 document 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, and 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 hard-copy 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 system enforced predetermined range and value limitations on each field. It performed three types of error screenings: (1) a check-digit system, which disallowed entry of incorrect identification data (school codes from the Federal Interagency Committee on Education (FICE), student identification 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

Data were weighted 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 a 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 adjusted weights in the third and fourth follow-ups are applicable only to key items in these surveys (or specified combinations of these 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 surveys for the nonkey items that were not asked. The appropriate adjusted weight for each survey should be multiplied by its nonresponse adjustment factor to provide a new weight that is appropriate to items in that survey that are not key (or combinations of such nonkey items with items from other instruments).

Refer to the NLS:72 *Fifth Follow-Up (1986) Final Technical Report* (Sebring et al. 1987) 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 the unequal probabilities of retention in the Teaching Supplement sample and to adjust for unit 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 step 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 sample membership (including augmentations), several school sample weights were computed. The principal purpose of the various school weights was to serve as a basis for the subsequent computation of student weights applicable to one or more of the student instruments. Only two of the eight weights computed 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 schools, including 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 to create three adjusted weights 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 schools 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 sample 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 NLS:72 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.

In addition to standard errors, it is often useful to report design effects and the root mean design effect 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 highest value—the square root of 1.44—can be used as an estimate for fourth follow-up data. For the 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 respondents from the highest 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 200 school districts were contacted after the base-year survey was completed, resulting in the identification of 45 augmentation schools. To compensate for the base-year undercoverage, samples of former 1972 high school seniors from 16 of these 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 (whereas the original sample design called for two schools). To compensate for this large school nonresponse, 205 base-year noncooperating primary schools and 36 backup schools were added to the sample prior to the first follow-up survey for “resurveying” with the original design. The former 1972 high school 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 in the NLS:72 base-year files that would typically be employed for comparisons of high school seniors; however, 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 with teaching experience, 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 *Fifth Follow-Up (1986) Final Technical Report* (Sebring et al. 1987).

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 the selection of individual high school seniors for the collection of questionnaire and test data. Schools that refused to cooperate in either stage of sample selection 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 in each of the first five survey waves (base-year and all four follow-up surveys), representing 78 percent of the 16,680 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 22,650 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 14,430 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, lower in the South, and lowest in the North Central region. The relationship between urbanization and nonresponse was about the same as for 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 13,830 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 21,870 “in-scope” transcripts requested were supplied by the postsecondary schools (2,570 of the 24,430 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 vocational and proprietary schools. The higher response rates for 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 nonresponse rates (i.e., above 10 percent). In most instances, these items are associated with the routing, or skip, patterns in the instruments. (A routing question is one that implicitly or explicitly directs a respondent around other questions in the instrument.) 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 data user should be careful in interpreting data coded 98 and 99 and should further examine data that lie within complex routing patterns when they are required for analysis. 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 to 68 percent of all respondents proceeded through an instrument without violating any routing patterns; about 20 to 30 percent violated 1 to 5 routing patterns; and 7 to 15 percent violated 6 to 10 patterns. In all four instruments, a small percentage (3 to 7 percent) of sample members had great difficulty with the routing patterns and violated the instructions in more than 10 different patterns.

Monitoring of data entry. For the first four follow-up surveys, direct data entry terminals were used to key the survey data. For the Supplemental Questionnaires administered in the fourth follow-up survey, data entry error rates were computed based on three keyings. After the initial keying, a random sample of the 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 questionnaires was 0.00040; the estimated character error rate was 0.00023.

Data Comparability

One of the major goals of the NLS Program is to make the data sufficiently comparable to allow cross-cohort comparisons between studies (NLS:72 vs. HS&B vs. NELS:88 vs. ELS:2002), as well as comparative analyses of data across waves of the same study. Nevertheless, data users 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 are 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 PETS. 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 among NLS:72, HS&B, NELS:88, and ELS:2002. The four NLS studies 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 four studies. Additionally, item response theory methods can be used to place mathematics, vocabulary, and reading scores on the same scale for 1972, 1980, 1992, and 2004 high school seniors.

However, despite the considerable similarities among NLS:72, HS&B, NELS:88, and ELS:2002, 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 differ across the four NLS studies, and the characteristics of the nonrespondents may differ 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 has been made to maintain trend items over time, strict test and questionnaire overlap is not considerable across the four NLS studies. More specifically, differences exist in questionnaire construction and in mode and type of survey administration. See HS&B chapter (HS&B), NELS chapter (NELS:88), and ELS chapter (ELS:2002) for additional information on the comparability of the four NLS studies.

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