User's Manual   September 1994

NATIONAL EDUCATION LONGITUDINAL STUDY OF 1988

**SECOND FOLLOW-UP: STUDENT COMPONENT
DATA FILE USER'S MANUAL**

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"The purpose of the Center shall be to
collect, and analyze, and disseminate
statistics and other data related to
education in the United Sates and in
other nations."--Section 406(b) of the
General Education Provisions Act, as
amended (20 U.S.C. 1221e-1).

September 1994

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Foreword

This manual has been produced to familiarize data users with the procedures followed for data collection and processing of the second follow-up student component of the National Education Longitudinal Study of 1988 (NELS:88). A corollary objective is to provide the necessary documentation for use of the data file.

Use of the data set does not require the analyst to be a sophisticated statistician or computer programmer. Most social scientists and policy analysts should find the data set organized and equipped in a manner that facilitates straightforward production of statistical summaries and analyses. This manual provides extensive documentation of the content of the data file and how to use it. **Chapter VII and Appendix I, in particular, contain essential information that allows the user to immediately proceed with minimal startup cost. A careful reading of Chapter VII and Appendix I will help users to avoid common mistakes that result in costly computer job failures or incorrect results.**

The rest of the manual provides a wide range of information on the design and conduct of the National Education Longitudinal Study of 1988 (NELS:88). Chapter I begins with an overview and history of NCES's National Education Longitudinal Studies program and the various studies that it comprises. Chapter II contains a general description of the data collection instruments used in the NELS:88 second follow-up.

The sample design and weighting procedures used in the second follow-up study are documented in Chapter III, as well as standard errors and design effects, non-sampling measurement errors, and problematic variables.

Data collection procedures, schedules, and results are presented in Chapter IV. Chapter V describes data control and preparation activities such as monitoring receipt of questionnaires, editing, and data retrieval. Chapter VI describes data processing activities including machine editing and construction of the cleaned data tape. Finally, Chapter VII describes the organization and contents of the data file and provides important suggestions for using it.

The appendices contain a list of other NCES NELS:88 publications; guidelines for Statistical Analysis System (SAS) users; the second follow-up student questionnaire; the record layout for the student questionnaire; specifications for the composite variables; the content areas of the second follow-up components; a glossary of project terms; a discussion of conducting cross-cohort trend analyses of students; and a codebook for the student questionnaire data.

In addition to the study described in this manual, a number of supplemental NELS:88 components are also described in Appendix A.

Earlier NCES longitudinal studies that may be of interest to NELS:88 users are described in Appendix B including the following: the High School and Beyond (HS&B) base year files; merged HS&B first, second, third, and fourth follow-up files; related HS&B files; and assorted files related to the National Longitudinal Study of the High School Class of 1972 (NLS-72).

A Note on Data Use and Confidentiality

The NELS:88 second follow-up data files are released in accordance with the provisions of the General Education Provisions Act (GEPA) [20-USC 122e 1] and the Carl D. Perkins Vocational Education Act. The GEPA assures privacy by ensuring that respondents will never be individually identified.

The National Center for Education Statistics (NCES) is responsible under the Privacy Act and Public Law 100-297 for protecting the confidentiality of individually identifiable respondents, and is releasing this data set to be used for statistical purposes only. Record matching or deductive disclosure by any user is prohibited.

To ensure that the confidentiality provisions contained in PL 100-297 and the Privacy Act have been fully implemented, procedures commonly applied for disclosure avoidance in other Government-sponsored surveys were used in preparing the data file associated with this manual. These include suppressing, abridging, and recoding identifiable variables. Every effort has been made to provide the maximum research information that is consistent with reasonable confidentiality protection. Deleted, abridged, and/or recoded variables appear with an explanatory footnote in the codebook attached to each user's manual.

Acknowledgements

A study such as this is built first and foremost upon the students, dropouts, teachers, school administrators, and parents who have so generously provided its basic data. We are grateful for their cooperation. We also thank the considerable numbers of school personnel who have assisted in the implementation of NELS:88.

We wish to acknowledge the role of a number of other individuals in the realization of the aims of this study. Donald Rock and Judith Pollack of Educational Testing Service served as task leaders for cognitive test development. Miriam Clarke provided counsel on management issues in the main study. Leslie Scott contributed significantly to the conceptualization and development of file specifications and composite variables for the components of the study.

We are also grateful to the members of NCES staff in the Longitudinal and Household Studies Branch who worked closely with us on this project. Jeffrey Owings, chief of the Longitudinal and Household Studies Branch; Peggy Quinn, project officer for the second follow-up; as well as other branch staff--Ralph Lee, Shi-Chang Wu, and Jerry West--who contributed to various aspects of this study. Bob Burton of the Statistical Standards and Methodology Division supplied statistical advice and review.

Three individuals in other agencies have worked particularly hard and effectively to help realize and extend the potential of NELS:88. Larry Suter of the National Science Foundation, Dick Berry (formerly of the National Science Foundation), and Carmen Simich-Dudgeon (formerly of the Office of Bilingual Education and Minority Languages Affairs (OBEMLA) of the U.S. Department of Education). We are grateful for their efforts.

In addition, we would like to express our appreciation to the members of what began in the base year as our National Advisory Panel, and became in 1989 the NELS:88 Technical Review Panel. The panelists--Jerald G. Bachman, Gordon Ensign, Lyle V. Jones, Nancy Karweit, Richard J. Murnane, Patricia Shell, Marshall S. Smith, and John Stiglmeier--provided wise counsel on many difficult issues of design, instrumentation and implementation. As consultants to the second follow-up, Aaron Pallas, Joan Talbert, Leigh Burstein, Anthony Bryk, and Senta Raizen also contributed importantly to the design and ultimate success of the study.

Steven J. Ingels was overall NELS:88 second follow-up project director. Lisa Thalji was associate project director responsible for securing school cooperation and locating NELS:88 cohort members. Katy Dowd was associate project director responsible for the student component during data collection. Laura Reed and Virginia Bartot were the data processing managers, and Martin R. Frankel was the task leader for sampling and statistics.

Table of Contents

Appendices

Appendix A: NELS:88 Sources of Contextual Data: Parent, Teacher,
School Administrator, Transcript, and Course Offerings
Components

Appendix O

Glossary of NELS:88 Terms

GLOSSARY OF NELS:88 TERMS

Note: Words in the glossary have been cross-referenced. If a word used in a definition has its own entry elsewhere in the glossary, the word appears in italics in its first usage under each entry.

Alternative completer: The NELS:88 second follow-up distinguished three levels of enrollment status: students enrolled in a regular high school program, *dropouts* who had enrolled in (or had completed) some alternative (non-diploma) high school equivalency accrediting program (for example, preparation classes for the *GED test*), and dropouts receiving no alternative instruction. The term "alternative completer" was used for dropouts receiving any sort of instruction to prepare them for equivalency certification, and for dropouts who had already received the GED or other equivalency certification. In terms of questionnaire completion, alternative completers were treated in two ways. Dropouts receiving alternative instruction in preparation for possible equivalency certification were administered the dropout questionnaire. Those dropouts who had received the GED or other high school equivalency certification were treated as school completers, and were administered the *student questionnaire*.

ASCII: American Standard Code for Information Interchange. A standard method for encoding characters; includes codes representing upper and lower case letters, numerals, and punctuation.

Augmentation students: See State augmentation students.

Base year ineligible (BYI) study: A NELS:88 First follow-up study which sought to locate and survey eligible respondents who were part of the Base Year *sample*, yet were ineligible to participate in the Base Year due to mental or physical incapacity, language barrier, or other factors. (See entry for "Followback study of excluded students.")

Bias (due to nonresponse): Difference that occurs when respondents differ as a group from nonrespondents on a characteristic being studied.

Bias (due to undercoverage): This bias arises because some portion of the potential sampling frame is missed or excluded. For example, if the school list from which a school *sample* is drawn is incomplete or inaccurate, school undercoverage may occur. In NELS:88 the most important potential source of undercoverage bias was exclusion of 5.37 percent of the potential sample of eighth graders in the base year. (See entry for "Base year ineligible study" and "Followback study of excluded students.")

Bias (of an estimate): The difference between the expected value of a *sample* estimate and the corresponding true value for the *population*.

Burden: Formally, this is the aggregate hours realistically required for data providers to participate in a data collection. Burden also has a subjective or psychological dimension: the degree to which providing information is regarded as onerous may depend on the salience to the respondent of the questions that are being posed and on other factors such as competing time demands.

BY: NELS:88 Base Year Study conducted in 1988.

Carnegie units: A standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year.

CCD: Common Core of Data. Data annually collected from all public schools in the United States by the National Center for Education Statistics.

CD-ROM: Compact Disk Read-Only Memory. A computer storage disk in the same physical form as an audio CD. A CD-ROM can store approximately 650 megabytes of digital data. NELS:88 data are available both in magnetic media, such as tapes, as well as in optical laser disc media, such as CD-ROM.

Ceiling effect: The result of a cognitive test having insufficient numbers of the more difficult items. In a *longitudinal* study, ceiling effects in the follow-up testings can cause change scores to be artificially constrained for high ability examinees. More information (that is, smaller error of measurement) is obtained with respect to ability level if high ability individuals receive relatively harder items (and if low ability individuals receive proportionately easier items). The matching of item difficulty to a person's ability level yields increased *reliability* at the extremes of the score distribution where it is most needed for studies of longitudinal change. That is, the measurement problems related to *floor* and ceiling effects in combination with regression effects found at the extreme score ranges seriously hamper the accuracy of change measures in longitudinal studies. Hence one strategy employed in NELS:88 to minimize ceiling effects was to develop test forms that are "adaptive" to the ability level of the examinee. The multilevel tests used in the first and second follow-ups of NELS:88--with test assignment based on prior test performance--work to minimize the possibility of ceiling effects biasing the estimates of the score gains. (See entry for "Floor effect.")

Certainty school: A first or second follow-up school attended by four or more NELS:88 *sample* members, as determined by *tracing* and

data collection efforts. These schools are included in the sample with certainty (probability = 1). All NELS:88 first follow-up sample members in the school at the time of data collection were included in the second follow-up.

Closed-ended: A type of question in which the data provider's responses are limited to given alternatives as opposed to an *open-ended* question. (See entry for "Open-ended.")

Cluster size: The number of NELS:88 *sample* members attending a particular high school.

Codebook: A *record* of each variable being measured, including variable name, columns occupied by each variable in the data matrix, values used to define each variable, unweighted frequencies, unweighted percents, and weighted valid percents. (See entry for "electronic codebook.")

Cognitive test battery: One of the two parts of the Student Survey (the second part being the *student questionnaire*). Four achievement areas (mathematics, reading, science, and social studies [history/ citizenship/geography]) were measured.

Cohort: A group of individuals who have a statistical factor in common, for example, year of birth or grade in school or year of high school graduation. NELS:88 embraces three overlapping but distinct nationally-representative grade cohorts: 1987-88 eighth graders, 1989-90 high school sophomores, and 1991-92 high school seniors.

Composite variables: A composite variable is one that is constructed through either the combination of two or more variables (socioeconomic status, for example) or calculated through the application of a mathematical function to a variable. Also called a "derived variable" or "constructed variable."

Confidence interval: A *sample*-based estimate expressed as an interval or range of values within which the true *population* value is expected to be located (with a specified degree of confidence).

Contextual data: In NELS:88, the primary unit of analysis is the student (or *dropout*), and information from the other study components, referred to as the contextual data, should be viewed as extensions of the student data--for example, as *school administrator*, *teacher*, and *parent* reports on the student's school learning environment or home situation.

Core school: School that was selected between Phases 1 and 2 of the second follow-up to receive the full complement (*School Administrator, Teacher*, Transcript) of study components, and for in-school data collection sessions.

Core student: Students who are part of the primary *cohort* of NELS:88, in contrast to *state augmentation* or *School Effectiveness Study* students. The core students include those chosen as eighth graders in the 1988 Base Year Study and those added to the *sample* through *freshening* procedures during the first or second follow-up.

Core study: The original NELS:88 study, in contrast to the study with additions and follow-up additions like the *state augmentation* studies and the *School Effectiveness Study*.

Course offerings: School-level summaries of courses offered and of course enrollment levels; while in *HS&B* course offerings data were collected for all schools, in NELS:88 such data have been collected only for schools in the *School Effectiveness Study*.

Cross-sectional survey: A cross-sectional design represents events and statuses at a single point in time. For example, a cross-sectional survey may measure the cumulative educational attainment (achievements, attitudes, statuses) of students at a particular stage of schooling (for example, eighth grade, tenth grade, or twelfth grade). In contrast, a *longitudinal* (or repeated measurement of the same *sample* units) survey measures the change or growth in educational attainments that occurs over a particular period of schooling. The longitudinal design of NELS:88 generates--by means of sample "*freshening*"--three representative cross-sections (eighth graders in 1988, high school sophomores in 1990, seniors in 1992) and permits analysis of individual level change over time through longitudinal analysis and of group level and intercohort change through the cross-sectional comparisons. (See entry for "Longitudinal or Panel Survey.")

Data element: The most basic unit of information. In data processing it is the fundamental data structure. It is defined by its size (in characters) and data type (e.g. alphanumeric, numeric only, true/false, date) and may include a specific set of values or range of values.

Design effect: A measure of *sample* efficiency. The design effect (DEFF) is the *variance* of an estimate divided by the variance of the estimate that would have occurred if a sample of the same size had been selected using simple random sampling. Sometimes it is more useful to work with *standard errors* than with variances. The root design effect (DEFT) expresses the relation between the actual standard error of an estimate and the standard error of the corresponding estimates from a simple random sample.

Dropout: The term is used both to describe an event--leaving school before graduating--and a status--an individual who is not in school and is not a graduate at a defined point in time. The

"*cohort* dropout rate" in NELS:88 is based on measurement of enrollment status of 1988 eighth graders two and four years later (that is, in the spring term of 1990 and the spring term of 1992) and of 1990 sophomores two years later. A respondent who has not graduated from high school or attained an equivalency certificate and who has not attended high school for 20 consecutive days (not counting any excused absences) is considered to be a dropout. In contrast, transferring schools--for example, from a public to a private school--is not regarded as a dropout event, nor is delayed graduation (as when a student is continuously enrolled but takes an additional year to complete school). A person who drops out of school may later return and graduate: at the time the person left school initially, he or she is called a "dropout," and at the time the person returns to school, he or she is called a "*stopout*."

Early graduate: A student who graduated from high school in less than the typical amount of time. For example, if a student graduated in December of his/her senior year (when the majority of his/her classmates graduate the following May or June), the student is categorized as an early graduate. In the main study data collection, early graduates were administered a special supplement in the *student questionnaire* along with the *cognitive test battery*.

Electronic codebook (ECB): While hardcopy *codebooks* with item stems, response categories, associated response frequency distributions, unweighted percents, and weighted valid percents are contained within the NELS:88 user's manuals, NELS:88 data are also available on *CD-ROM* in an electronic codebook (ECB) format. For example, the electronic codebook created for the combined base year first follow-up NELS:88 data is a menu-driven system that allows users to perform functions such as the following: (a) search a list of NELS:88 *BY-F1* database variables based upon key words or variable names/labels; (b) display weighted and unweighted percentages for each variable in the database; (c) display question text for each variable in the database; (d) select or tag variables for subsequent analysis; (e) generate SAS-PC or SPSS-PC+ program code/command statements for subsequently constructing a system file of the selected variables; and (f) generate a codebook of the selected variables. An electronic codebook is also being prepared for the NELS:88 second follow-up data, and will again be housed on a CD-ROM.

ETS: Educational Testing Service. *NORC*'s subcontractor for NELS:88 cognitive test development and evaluation.

F1: The NELS:88 first follow-up, conducted in 1990.

F2: The NELS:88 second follow-up, conducted in 1992.

File: Refers to a data file containing a set of related computerized *records*.

Floor effect: The result of a cognitive test being too difficult for a large number of the examinees, causing the low ability examinees to receive chance scores on the first testing, and on subsequent testings if the test remains too difficult. Floor effects result in an inability to discriminate among low ability individuals at time one or time two, and there will be no reliable discrimination among examinees with respect to amounts of change. A possible solution, utilized in NELS:88, is to develop test forms that are "adaptive" to the ability level of the examinee, which tends to minimize the possibility of floor effects biasing the estimates of the score gains.

Followback study of excluded students: A continuation in the NELS:88 second follow-up of a special substudy begun in the first follow-up as (see entry for) the *base year ineligibles study*.

Freshening: A NELS:88 sampling procedure by which high school sophomores were added in the first follow-up who were not in the eighth grade in the U.S. two years before. This process was repeated in the second follow-up, adding high school seniors who were not in the eighth grade in the U.S. four years before, and not in the tenth grade in the U.S. two years before. This process ensured that the *sample* would be representative of the 1992 senior class by allowing 1992 seniors who did not have a chance for selection into the base year (or the first follow-up) sample to have some probability of 1992 selection.

GED recipient: A person who has obtained certification of high school equivalency by meeting state requirements and passing an approved exam, which is intended to provide an appraisal of the person's achievement or performance in the broad subject matter areas usually required for high school graduation. (See entry for "GED test" and "Alternative completer.")

GED test: General Educational Development test. A test administered by the American Council on Education as the basis for awarding a high school equivalent certification.

HS&B: High School and Beyond. The second in the series of *longitudinal* education studies sponsored by NCES. The HS&B Base Year study surveyed sophomore and senior students in 1980.

IEP: Individualized Education Program in special education for students with a mental or physical disability.

IRT: Item Response Theory. A method of estimating achievement level by considering the pattern of right, wrong, and omitted responses on all items administered to an individual student. Rather than merely counting right and wrong responses, the IRT procedure also considers characteristics of each of the test items, such as their difficulty, and the likelihood that they could be guessed correctly by low-ability individuals. IRT scores are less likely than simple number-right or formula scores

to be distorted by correct guesses on difficult items if a student's response vector also contains incorrect answers to easier questions. Another attribute of IRT that makes it useful for NELS:88 is the calibration of item parameters for all items administered to all students. This makes it possible to obtain scores on the same scale for students who took harder or easier forms of the test. IRT also permits vertical scaling of the three grade levels (grade 8 in 1988, grade 10 in 1990, grade 12 in 1992).

Item nonresponse: The amount of missing information when a valid response to an item or variable was expected. (See entry for "Unit-nonresponse.")

LEP: Limited English Proficient. A concept developed to assist in identifying those language-minority students (individuals from non-English language backgrounds) who need language assistance services, in their own language or in English, in the schools. (See entries for "NEP" and "LM.") The Bilingual Education Act, reauthorized in 1988 (PL 100-297), describes a limited English proficient student as one who:
   1) meets one or more of the following conditions:
      a) the student was born outside of the United States or the student's native language is not English;
      b) the student comes from an environment where a language other than English is dominant; or
      c) the student is American Indian or Alaskan Native and comes from an environment where a language other than English has had a significant impact on his/her level of English language proficiency; and
   2) has sufficient difficulty speaking, reading, writing, or understanding the English language to deny him or her the opportunity to learn successfully in English-only classrooms.

LM: Language Minority. A fully English proficient student in whose home a non-English language is typically spoken. This groups includes students whose English is fluent enough to benefit from instruction in academic subjects offered in English.

Longitudinal or panel survey: In a longitudinal design, similar measurements--of the same *sample* of individuals, institutions, households or of some other defined unit--are taken at multiple time points. NELS:88 employs a longitudinal design that follows the same individuals over time, and permits the analysis of individual-level change. (See entry for "Cross-sectional survey.")

Machine editing: Also called forced data cleaning or logical editing. Uses computerized instructions in the data cleaning program that ensure common sense consistency within and across the responses from a data provider.

Microdata (microrecords): Observations of individual *sample* members, such as those contained on the NELS:88 data *files*.

MSA: Metropolitan statistical area. A large population nucleus and the nearby communities which have a high degree of economic and social integration with that nucleus. Each MSA consists of one or more entire counties (or county equivalents) that meet specified standards pertaining to population, commuting ties, and metropolitan character. (However, in New England, towns and cities, rather than counties, are the basic units.) MSAs are designated by the Office of Management and Budget (*OMB*). An MSA includes a city and, generally, its entire urban area and the remainder of the county or counties in which the urban area is located. A MSA also includes such additional outlying counties which meet specified criteria relating to metropolitan character and level of community of workers into the central city or counties.

Multidimensional raking: An adjustment procedure in weighting whereby the sum of the weights for each marginal category of respondents in the follow-up rounds of NELS:88 was made equal to the corresponding sum of the final prior round weights for that group.

NAEP: The National Assessment of Educational Progress.

NAIS: The National Association of Independent Schools. This organization endorsed NELS:88. NAIS schools form a base year school sampling stratum in NELS:88, and NAIS constitutes a category within the restricted use *file* school control type variable.

NCEA: The National Catholic Educational Association. This organization endorsed NELS:88.

NCES: The National Center for Education Statistics, Office of Educational Research and Improvement, of the U.S. Department of Education. This governmental agency is the primary sponsor of NELS:88, and is also the sponsoring agency for (among other studies) *NAEP*, *HS&B*, and *NLS-72*.

NELS:88: The National Education Longitudinal Study of 1988. Third in the series of *longitudinal* education studies sponsored by NCES. The study began in 1988 with the eighth-grade class of that year. The study has collected data in 1988, 1990, and 1992 on student's school experiences, as well as background information from *school administrators, teachers* and *parents* (in the base year and second follow-up only). The study seeks to learn about students' educational experiences and outcomes from eighth grade through high school and beyond.

NEP: No English Proficiency. A student who does not speak

English. (See entry for "LEP.")

NLS-72: The National Longitudinal Study of the High School Class of 1972. This project was the first in the series of *longitudinal* education studies sponsored by NCES.
Noncertainty schools: Schools in which fewer than four (three, two or one) NELS:88 students attended. These schools were not subsampled for participation in the *School Administrator, Teacher*, and Transcript components. Additionally, the survey instruments were not administered in group sessions in the schools, as was done in the *certainty schools*.

Nonresponse: (See entry for "Item nonresponse" and "Unit nonresponse.")

Nonsampling error: An error in *sample* estimates that cannot be attributed to sampling fluctuations. Such errors may arise from many sources including imperfect implementation of sampling procedures, differential unit or *item nonresponse* across subgroups, *bias* in estimation, or errors in observation and recording.

NORC: The National Opinion Research Center at The University of Chicago. NORC conducts NELS:88 for the National Center for Education Statistics.

NSF: The National Science Foundation, which is one of the sponsors of NELS:88. The National Science Foundation awards grants and contracts to individuals and organizations to conduct research. NSF sponsored two components of the second follow-up: 1) additions to the *student questionnaire* to learn about students' experiences and their exposure to mathematics and science curricula, and 2) a *teacher survey* of mathematics and science teachers to obtain evaluations of their NELS:88 student(s) and to learn about their classroom practices and background preparation for teaching.

OBEMLA: The Office of Bilingual Education and Minority Languages Affairs, U.S. Department of Education. OBEMLA funded a NELS:88 supplement that inquired into the education experiences of students whose native language is other than English.

OMB: The Office of Management and Budget, U.S. Executive Branch. OMB is a federal agency with the responsibility for reviewing all studies funded by executive branch agencies. OMB reviewed, commented on, and approved the NELS:88 questionnaires, as indicated by their approval number and its expiration date in the top right corner of the questionnaire covers.

Open-ended: A type of question in which the data provider's responses are not limited to given alternatives.

Optical disk: A disk that is read optically (e.g., by laser

technology), rather than magnetically. (See entry for "CD-ROM.")

Optical scanning: A system of recording responses that transfers responses into machine-readable data through optical mark reading. This method of data capture was used for the NELS:88 *student questionnaires* and *cognitive tests*, as well as for the *parent* and *teacher questionnaires*. (In contrast, responses to certain other questionnaires, such as the *school administrator questionnaire*, were keyed by using conventional data entry methods.)

Out-of-sequence: This term means that a student is not in the grade that he/she would be in if progressing with the majority of the *cohort* through school. For example, most NELS:88 *sample* members were in the tenth grade in the 1989-90 school year; one would be described as out-of-sequence if found to be in the eleventh grade in the 1989-90 school year.

Parent, NELS-targeted parent/guardian: The NELS:88 Parent Component sought to collect information from parents of eligible student/*dropout* respondents. It was asked that the parent or guardian who knew most about his or her child's educational experience complete the questionnaire.

PIN: Personal Identification Number. A unique number assigned to each district and school.

Population: All individuals in the group to which conclusions from a data collection activity are to be applied. Weighted results of NELS:88 data provide estimates for populations and subgroups.

Population variance: A measure of dispersion defined as the average of the squared deviations between the observed values of the elements of a population or *sample* and the population mean of those values.

Postsecondary education: The provision of formal instructional programs with a curriculum designed primarily for students who have completed the requirements for a high school diploma or equivalent. This includes programs of an academic, vocational, and continuing professional education purpose, and excludes avocational and adult basic education programs.

Poststratification adjustment: A weight adjustment that forces survey estimates to match independent *population* totals within selected poststrata (adjustment cells).

Precision: The difference between a *sample*-based estimate and its expected value. Precision is measured by the *sampling error* (or *standard error*) of an estimate.

Probability sample: A sample selected by a method such that each unit has a fixed and determined probability of selection.

QED: Quality Education Data. QED is a commercial firm that publishes national directories of all public and private schools and districts. Its list of schools in the U.S. constituted the sampling frame for the base year, and provided important information on school location, principal's name, minority enrollment, and other characteristics.

Range check: A determination of whether responses fall within a predetermined set of acceptable values.

Record format: The layout of the information contained in a data *record* (includes the name, type, and size of each field in the record).

Records: A logical grouping of *data elements* within a *file* upon which a computer program acts.

Reliability: The consistency in results of a test or measurement including the tendency of the test or measurement to produce the same results when applied twice to some entity or attribute believed not to have changed in the interval between measurements.

Sample: Subgroup selected from the entire *population*.

Sampling error: The part of the difference between a value for an entire *population* and an estimate of that value derived from a *probability sample* that results from observing only a sample of values.

Sampling variance: A measure of dispersion of values of a statistic that would occur if the survey were repeated a large number of times using the same *sample* design, instrument and data collection methodology. The square root of the sampling variance is the *standard error*.

School administrator questionnaire: This questionnaire was to be completed by the principal and/or someone designated by the principal. The questionnaire sought basic information about school policies, number of students in each class, curriculum offered, programs for disadvantaged and disabled students, and other school characteristics.

School climate: The social system and culture of the school, including the organizational structure of the school and values and expectations within it.

School Coordinator: A person designated in each school to act as a contact person between the school and *NORC*. This person assisted with establishing a *survey day* in the school, and in

some cases where the school *cluster size* was very small, the School Coordinator administered the student instruments.

School Effectiveness Study: A component of NELS:88 added to the first follow-up to permit the study of school effects. The supplement substantially increased *cluster sizes* and provided in-school representative student *samples* at approximately 250 urban and suburban schools in the thirty largest *MSAs* in order to permit researchers to assess the impact of various school characteristics (such as structural and management characteristics and *school climate*) on student outcomes (such as student achievement and educational experience). This component was continued in the second follow-up, and included *student*, *school administrator, teacher,* and *parent questionnaires*, transcript surveys, as well as a *course offerings* component.

Standard deviation: The most widely used measure of dispersion of a frequency distribution. It is equal to the positive square root of the *population variance*.

Standard error: The positive square root of the *sampling variance*. It is a measure of the dispersion of the sampling distribution of a statistic. Standard errors are used to establish *confidence intervals* for the statistics being analyzed.

State augmentation students: In the base year, certain states funded a *sample* of additional schools in the state to produce a representative sample of schools in the state. In this sense, the state's sample was "augmented" to maximize the utility of the NELS:88 data for those states. The students from those base year schools were designated as "augmentation" students, and were followed and surveyed in the first follow-up, though the students had dispersed to many tenth-grade schools. In the second follow-up these students were surveyed again.

Stopout: A student who had one or more occurrences of school non-attendance for 20 or more days (not including any excused absences) who subsequently returned to school. In NELS:88, this term was used for temporary dropouts *within a round* (e.g., out of school in fall 1989 but back spring 1990, as contrasted to 1990 dropouts who were back in school in spring term of 1992).

Student questionnaire: One of the two parts of the student survey (the other part is the *cognitive test battery*). This instrument contained a locator section for *tracing sample* members for future waves of NELS:88 and a series of questions about courses taken, hours spent on homework, and perceptions of the school and the home environment.

Survey day: A day chosen by the school during the data collection period when an *NORC* interviewer and a clerical assistant (or the *School Coordinator* in schools with only a small

group of *sample* members) administered the survey to the school's sample of students. The survey day session lasted about three hours for the actual data collection, with about thirty minutes each for preparation and clean-up/preparation of completed materials for mailing.

Teacher questionnaire: Math and science teachers of selected students were asked to complete a teacher questionnaire, which collected data on school and teacher characteristics (including teacher qualifications and experience), evaluations of student performance, and classroom teaching practices.

Teacher, NELS-targeted teacher sample: In the base year and first follow-up, two teacher reports were sought for each student, reflecting a combination of two subjects from four subject areas (English, social studies, science, mathematics). In the second follow-up, one teacher report per pupil was sought for those students who were enrolled mathematics, science, or both, in one of the schools designated for school *contextual data* collection.

Tracing: The locating (and ascertaining of school enrollment status) of NELS:88 *sample* members. Sample members were traced at six points in time subsequent to eighth grade: autumn term 1988, autumn term 1989, spring term 1990, autumn term 1990, autumn term 1991, and spring term 1992.

Transfer student: A NELS:88 *sample* member who moved from one school to another after the subsampling of schools between Phase 1 (the *tracing* of sample members to their school of enrollment) and Phase 2 (the re-verification of *sample* members' school of enrollment).

Unit nonresponse: Failure of a survey unit (for example, at the institutional level, a school, or at the individual level, a respondent, such as a student or a teacher) to cooperate or complete survey instrument. Unit nonresponse may be contrasted to *item nonresponse*, which is the failure of a participating *sample* member to give a valid response to a particular question on a survey instrument.

Validity: The capacity of an item or measuring instrument to measure what it was designed to measure; stated most often in terms of the correlation between scores in the instrument and measures of performance on some external criterion. *Reliability*, on the other hand, refers to consistency of measurement over time. (See entry for "Reliability.")

Variance: See entry for "Population variance" and "Sampling variance."

Weighted estimates: Estimates from a *sample* survey in which the sample data are statistically weighted (multiplied) by factors

reflecting the sample design. The weights (referred to as
sampling weights) are typically equal to the reciprocals of the
overall selection probabilities, multiplied by a *nonresponse* or
poststratification adjustment. Thus, for example, the 1,035
completed *school administrator questionnaires* in the NELS:88 base
year represent a *population* of 38,774 schools. Individual
completed cases (that is, base year school administrator
questionnaires) may "represent" anywhere from a minimum of 1.5
schools to a maximum of 387.3 schools. To take another example,
12,111 base year questionnaire respondents reported themselves to
be male, and a slightly greater number (12,244) reported
themselves to be female. When these cases are multiplied by the
nonresponse-adjusted student weights to yield a weighted percent
that reflects the national population of eighth graders, the
estimate for males is 50.1 percent of the 1988 eighth-grade
cohort while females are estimated to comprise 49.9 percent of
the nation's 1988 eighth graders.

Appendix P

Selected Measures of NELS:88 Base Year Data Quality

Base Year Data **Quality** Indicators

Six tables appear below. The first two tables compare student and parent reports on like items. Table 1 presents base year validity coefficients for selected family background characteristics variables. Table 2 summarizes percentage of cases matched on the selected family background variables, overall and by gender, race, and high and low socioeconomic status. Tables 1 and 2 are adapted from Kaufman, Rasinski, Lee & West (1991).

Tables 3 through 6 explore item nonresponse in the base year student questionnaire as well as cognitive test nonresponse. Table 3 indicates the nine base year student questionnaire items with the highest nonresponse rates; Table 4 depicts the proportion nonresponding to these nine items by selected student characteristics (overall and by gender, race, SES, and composite test quartile); Table 5 shows the average number of items not attempted on the four cognitive tests, overall and by gender, race and SES; the final table (Table 6) displays speededness indices for the base year cognitive tests (that is, the percentage of sample who reached the last item) by race and gender group. Tables 3 through 6 are excerpted from Spencer, Frankel, Ingels, Rasinski & Tourangeau (1990).

Table 1 shows that there was generally a high level of consistency between student and parent responses on factual items that were common to the student and parent questionnaires, although there clearly is information that is far better known to parents than to their eighth graders. The correlation on number of older siblings, for example, was 0.85. The percentage of cases matching on the race/ethnicity item was 92 percent (although a match on the race of the parent respondent and the race of the student is not a logical entailment, given the possibility of mixed race marriages). On the other hand, parents are assumed to be the better reporters of parent educational data; eighth graders apparently overestimated paternal education and underestimated maternal education. Table 2 presents weighted and unweighted data on the percentage of matched cases and correlation coefficients for selected variables.

Tables 3 through 6 address nonresponse issues. The nine base year student questionnaire items with the highest nonresponse rates were analyzed to determine the relationship between nonresponse and student characteristics. These items and their nonresponse rates are listed in Table 3. Table 4 shows the proportion nonresponding to the nine items with the highest nonresponse rates by selected student characteristics. A composite nonresponse variable was created by counting (for each student) the number of items for which a nonresponse was given across these items. The composite was used as a dependent variable in an analysis of variance, with the student's sex, racial/ethnic background, socioeconomic status, and composite (reading and math) test quartile as independent variables. The analysis of variance examined nonresponse as a function of main effects only, ignoring interactions among the independent variables.

Results of this analysis suggest that boys were significantly more likely to be nonrespondents on these items than were girls ($F[1,23459] = 143.17$, $p < .01$). The analysis also indicates that there are significantly different nonresponse rates across the five racial/ethnic groups ($F[4,23459] = 50.68$, $p < 0.0001$). Post hoc Neuman-Keuls tests indicate that blacks were most likely to be item nonrespondents, with an average nonresponse to 1.509 items across the six item scale. Hispanics were next most likely, averaging 1.127 nonresponding items. Asians and American Indians were third, averaging .9481 and .9454 items respectively, but not differing between them. Finally, whites had the least tendency toward nonresponse, averaging .7439 items. A single degree-of-freedom linear contrast of nonresponse across the four test quartiles was significant, indicating that students with lower test scores

were more likely to be **nonrespondents** than those with higher test scores $(F[1,23459] = 476.76, p < 0.0001)$. A similar test for **SES** failed to show a significant difference $(F[1,23459] = 0.00, n.s.)$.[1]

Table 5 examines **nonresponse** on the base year cognitive test **battery**. **Nonresponse** patterns for test scores were analyzed by examining the number of items not attempted for each of the four base year cognitive **tests**. Each measure was included in an analysis of **variance**, with **sex, race/ethnicity**, and **SES** as independent **variables**; only main effects were **tested**. A single **degree-of-freedom** contrast indicated a significant linear effect by **SES** for **reading, math**, social **studies**, and **science**.[2] For all test **subjects**, lower **SES** was related to higher **nonresponse**.

Another method for assessing test **nonresponse** is to examine the percentage of students who gave an answer to the final item in each **test**. Table 6 shows that test **"speededness"** was not a problem for these broad categories of **students**, and that an appropriate **amount** of time was given for completion of each of the four cognitive tests.

For more detailed analysis of data quality issues in the base **year**, see **Kaufman, Rasinski**, West and Lee (1991).

For a more detailed examination of data quality issues in the base year cognitive test **battery**, see Rock and **Pollack** (1990); for an examination of first follow-up psychometric **issues**, see **Ingels, Scott, Rock, Pollack** and **Rasinski** (1994); and for the second **follow-up**, the forthcoming *NELS:88* Second *Follow-Up* Psychometric *Report*.

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[1]   **Though the design effect correction was not used in these analyses, it should be noted that the F statistics were large enough that correcting by the average base year design effect of 2.54 would not have eliminated significant effects.**

[2]   Reading: $(F[1,23411] = 134.09, p < 01)$, math $(F[1,23395] = 51.53, p < .01$, social studies $(F[1,23411] = 28.84, p < .01)$, and science $(F[1,23395] = 12.13, p < .01)$.

**Table 1: Validity coefficients and percentage of cases with matched values
on selected family background characteristics**

VARIABLE	VALIDITY COEFFICIENT	% CASES MATCHED	RELATIVE BIAS
Race-Ethnicity[3]	0.77[4]	91.6	
N of siblings	0.83	82.2	0.011
N of older sibs	0.85	86.4	0.049
Father's education	0.82	61.0	0.066
Mother's education	0.76	62.5	-0.082
Father's occupation	0.53	51.8	--
Mother's occupation	0.42	47.8	
Father's expectations for student's education	0.41	47.5	0.062
Mother's expectations for student's education	0.43	43.1	0.078
Home language	0.62	72.3	--

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[3]   Parent item inquires about parent race; student item inquires about student race.

[4]   Cramer's V statistic is used for race, father's occupation, mother's occupation, and language usually spoken at home.

Table 2: Weighted and unweighted percentage matched and correlation coefficient on family background characteristics items, by sex, race, and high versus low socioeconomic status

	PERCENT MATCHED		CORRELATION COEFFICIENT	
	Wted.	Unwted.	Wted.	Unwted.
TOTAL				
Race	91.0	91.6	0.75	0.77
N of sibs	82.3	82.2	0.83	0.83
N of older sibs	85.1	86.4	0.85	0.85
Father's ed	60.8	60.1	0.81	0.82
Mother's ed	62.9	62.5	0.74	0.76
SEX: MALE				
Race	90.5	91.1	0.74	0.76
N of sibs	80.7	80.8	0.81	0.82
N of older sibs	84.2	85.7	0.84	0.84
Father's ed	59.7	59.6	0.80	0.82
Mother's ed	60.1	60.1	0.72	0.75
SEX: FEMALE				
Race	91.6	92.0	0.76	0.78
N of sibs	83.8	83.5	0.84	0.85
N of older sibs	86.0	87.0	0.85	0.86
Father's ed	61.9	62.5	0.81	0.83
Mother's ed	65.6	64.9	0.76	0.78
RACE: ASIAN				
Race	68.9	78.1		
N of sibs	85.0	85.2	0.82	0.84
N of older sibs	86.6	88.4	0.86	0.89
Father's ed	53.4	56.4	0.80	0.81
Mother's ed	55.8	56.6	0.74	0.77
ETHNICITY: HISPANIC				
Ethnicity	80.2	82.7	--	--
N of sibs	79.3	78.4	0.81	0.82
N of older sibs	82.7	83.0	0.85	0.85
Father's ed	59.8	60.4	0.72	0.75
Mother's ed	61.1	61.3	0.64	0.65

Table 2: (continued) Weighted and unweighted percentage matched and correlation coefficient on family background characteristics items, by sex, race, and high versus low socioeconomic status

| | PERCENT MATCHED | | CORRELATION COEFFICIENT | |
	Wted.	Unwted.	Wted.	Unwted.
RACE: BLACK				
Race	95.5	95.1	--	--
N of sibs	66.8	66.3	0.73	0.73
N of older sibs	73.7	74.9	0.80	0.79
Father's ed	53.7	53.1	0.63	0.67
Mother's ed	54.1	53.6	0.59	0.62
RACE: WHITE				
Race	94.2	94.2		
N of sibs	85.5	85.7	0.85	0.86
N of older sibs	87.5	88.9	0.86	0.87
Father's ed	62.2	62.6	0.82	0.84
Mother's ed	65.1	64.9	0.77	0.79
SES: HIGH				
Race	93.5	93.4	0.72	0.73
N of sibs	89.4	89.5	0.89	0.88
N of older sibs	90.7	92.3	0.88	0.90
Father's ed	61.2	62.7	0.74	0.74
Mother's ed	59.7	60.9	0.68	0.69
SES: LOW				
Race	89.3	90.3	0.76	0.78
N of sibs	74.4	73.2	0.78	0.78
N of older sibs	77.4	78.2	0.82	0.86
Father's ed	70.2	70.1	--	0.48
Mother's ed	70.8	69.8	--	0.46

Table 3: Nine items with highest nonresponse rates

		Proportion Eligible	
		Nonres-ponding	Respond-ents
BYS16	[IN REFERENCE TO A SECOND NOMINATED HIGH SCHOOL][5] Is this a public school, a private religious school, or a private nonreligious school?	0.137	6,687
BYS24	What language, other than English, do you currently use most often?	0.146	5,655
BYS29	Were you ever enrolled in an English language/language assistance program, that is, a program for students whose native language is not English?	0.120	5,655
BYS67A	Which of the following math classes do you attend at least once a week this school year? --Remedial math	0.168	24,599
BYS67C	Which of the following math classes do you attend at least once a week this school year? --Algebra (or other advanced math)	0.135	24,599
BYS67AA	Which of the following science classes do you attend at least once a week this school year? --A science course in which you have a laboratory	0.137	24,599
BYS67AC	Which of the following science classes do you attend at least once a week this school year? --Biology (life science)	0.144	24,599
BYS67AD	Which of the following science classes do you attend at least once a week this school year? --Earth Science	0.114	24,599
BYS83J	Have you or will you have participated in any of the following outside-school activities this year, either as a member, or as an officer (for example, vice-president, coordinator, team captain) ?--OTHER	0.117	24,599

Note: Proportions were calculated using weighted data.

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[5]   (expect to be at, 1990)

Table 4: Proportion nonresponding to nine items with highest nonresponse rates by selected student characteristics

	Q16	Q24	Q29	Q67A	Q67C	Q67AA	Q67AC	Q67AD	Q83J	Average
Overall	.137	.146	.120	.168	.135	.137	.144	.114	.117	.135
sex										
Male	.151	.174	.122	.201	.161	.160	.168	.134	.136	.156
Female	.124	.119	.117	.135	.109	.113	.120	.094	.097	.114
Race/ethnicity										
Asian	.147	.144	.059	.183	.138	.144	.154	.129	.129	.136
Black	.116	.301	.221	.272	.246	.241	.244	.196	.216	.228
White	.141	.183	.160	.142	.107	.110	.118	.093	.090	.127
Hispanic	.147	.091	.087	.204	.174	.170	.181	.140	.155	.150
American Indian	.105	.219	.168	.149	.133	.142	.152	.094	.159	.147
Socioeconomic Status										
Lowest Quartile	.147	.140	.112	.207	.195	.181	.182	.149	.166	.164
Second Quartile	.135	.135	.106	.160	.141	.134	.145	.117	.123	.133
Third Quartile	.140	.159	.136	.147	.114	.118	.125	.096	.102	.126
Highest Quartile	.122	.157	.132	.157	.091	.113	.124	.094	.076	.118
Cognitive Test Composite										
Lowest Quartile	.172	.194	.149	.237	.238	.213	.221	.184	.198	.201
Second Quartile	.100	.138	.120	.176	.155	.149	.154	.124	.122	.138
Third Quartile	.106	.122	.101	.134	.094	.102	.107	.080	.084	.103
Highest Quartile	.099	.108	.073	.116	.042	.076	.085	.058	.055	.079

Note: Proportions were calculated using weighted data.

Table 5: Average number of items not attempted on four cognitive tests by selected student characteristics

	Reading	Math	History/ Science	Citizenship	Average
Overall	0.391	0.922	0.437	0.285	0.509
Sex					
Male	0.454	0.978	0.451	0.286	0.542
Female	0.327	0.866	0.422	0.282	0.474
Race/ethnicity					
Asian	0.350	0.812	0.473	0.347	0.496
Black	0.840	1.687	0.751	0.485	0.941
White	0.268	0.718	0.347	0.216	0.387
Hispanic	0.611	1.278	0.577	0.432	0.725
American Indian	0.578	1.226	0.748	0.461	0.753
Socioeconomic Status					
Lowest Quartile	0.624	1.228	0.541	0.387	0.695
Second Quartile	0.420	0.984	0.466	0.320	0.548
Third Quartile	0.323	0.833	0.390	0.232	0.445
Highest Quartile	0.201	0.647	0.349	0.198	0.349

Note: Statistics were calculated using weighted data.

Table 6: Speededness indices for test by racial/ethnic and sex groups (percent of sample who reached last item)

Test	Asian	Hispanic	Black	White	Male	Female
Reading	96.1	92.7	87.9	97.3	94.9	95.9
Math	96.1	93.2	89.7	96.2	95.0	94.9
Science	96.2	95.3	92.6	98.0	96.7	97.0
History/Citizenship	96.2	95.5	94.6	97.9	97.0	97.3