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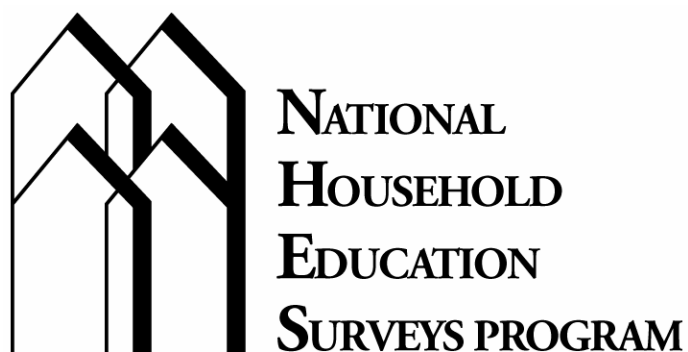
User's Manual

April 2003

National Household Education Surveys of 2001

Data File User's Manual

Volume I

NATIONAL HOUSEHOLD EDUCATION SURVEYS PROGRAM

NATIONAL CENTER FOR EDUCATION STATISTICS

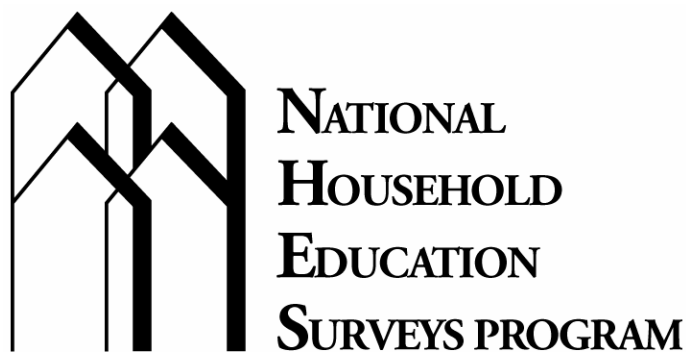**User's Manual**   **April 2003**

National Household Education Surveys of 2001

Data File User's Manual

Volume I

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1. INTRODUCTION

The National Household Education Surveys Program (NHES) was developed by the National Center for Education Statistics (NCES) and incorporates random digit dial (RDD) telephone surveys of households in the United States. The 2001 administration (NHES:2001) was conducted by Westat from January 2 through April 14, 2001. In the NHES:2001 Screener, household members were enumerated and demographic and educational information that determined eligibility for the three distinct surveys was collected. The NHES:2001 surveys are as follows:

- Early Childhood Program Participation survey (ECPP-NHES:2001), which gathered information on the nonparental care arrangements and educational programs of preschool children, comprising care by relatives, care by persons to whom they were not related, and participation in day care centers and preschool programs including Head Start;

- Before- and After-School Programs and Activities survey (ASPA-NHES:2001), which addressed relative and nonrelative care during the out-of-school hours of school-age children, as well as participation in before- and/or after-school programs, activities, and self-care; and

- Adult Education and Lifelong Learning survey (AELL-NHES:2001), in which data such as type of program, employer support, and credential sought were collected for participation in the following types of adult educational activities: English as a second language, adult basic education, credential programs, apprenticeships, work-related courses, and personal interest courses. Some information on work-related informal learning activities was gathered as well.

Three populations of interest corresponded to the three surveys that composed the NHES:2001:

- Children from birth through age 6 who were not yet enrolled in kindergarten or above, whose parents completed either the infant path (ages 0 through 2) or the preschool path (ages 3 through 6) of the ECPP-NHES:2001 survey;

- School-age children in kindergarten through 8th grade, whose parents completed the ASPA-NHES:2001 survey; and

- Adults (persons age 16 or older), who were not enrolled in grade 12 or below and also not on active duty in the military, who responded to the AELL-NHES:2001 survey.

The *NHES:2001 Data File User's Manual* provides documentation and guidance for users of the following three public-use data files of the NHES:2001: the ECPP data file, the ASPA data file, and the AELL data file. The manual is composed of four volumes. Information about the purpose of the study, the data collection instruments, the sample design, and data collection and data processing procedures is included in Volume I. The data collection instruments and a chart summarizing weighting and sample variance estimation variables for all NHES surveys are contained in appendixes to Volume I. Volumes II, III, and IV of the manual each address one data file, the ECPP, ASPA, and AELL files, respectively. They each contain a guide to the data file, a discussion of data considerations and anomalies and, in appendixes, the file layout, derived variable specifications, the codebook for the file, and directions and sample code for linking the NHES:2001 files.

The data files contain the following:

- The ECPP-NHES:2001 file includes data from interviews completed with parents of 6,749 children, 3,599 of whom were infants or toddlers and 3,150 of whom were preschoolers.

- The ASPA-NHES:2001 file contains data from interviews completed with parents of 9,583 children in kindergarten through 8th grade, including 9,388 students enrolled in regular public or private schools and 195 homeschooled children.

- The AELL-NHES:2001 file contains data from interviews with 10,873 adult respondents, of whom 6,094 were participants in educational activities (including full time credential programs only) and 4,779 were not.

1.1   Background of Study

The National Household Education Surveys Program was developed by NCES to complement its institutional surveys. The NHES is the principal mechanism for addressing topics that cannot be addressed in institutional data collections. By collecting data directly from households, the NHES allows NCES to gather data on a wide range of issues, such as early childhood care and education, children's readiness for school, parent perceptions of school safety and discipline, before- and after-school activities of school-age children, participation in adult and continuing education, parent involvement in education, and civic involvement.   The NHES uses random-digit-dial (RDD), computer-assisted telephone interviews (CATI) and has been conducted by Westat in the spring of 1991, 1993, 1995, 1996, 1999, and 2001. As shown in exhibit 1-1, each administration has included more than one survey.

Exhibit 1-1.—Surveys conducted under the National Household Education Surveys Program and years administered

Surveys	NHES:1991	NHES:1993	NHES:1995	NHES:1996	NHES:1999[1]	NHES:2001
Early Childhood Education/ Program Participation	√		√		√	√
Adult Education/Lifelong Learning	√		√		√	√
School Readiness		√			√	
School Safety and Discipline		√				
Parent and Family Involvement in Education/Civic Involvement				√	√	
Adult Civic Involvement				√		
Youth Civic Involvement				√	√	
Before- and After-School Programs and Activities			√[2]		√	√
Household and Library Use				√	√	

[1]The NHES:1999 was a special end-of-decade administration that measured key indicators from the surveys fielded during the 1990s. See text below for further explanation.

[2]These items were only asked about children in grades 1 through 3.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Household Education Surveys Program (NHES), 1991, 1993, 1995, 1996, 1999, 2001.

The first test of the NHES was a large field test conducted in the fall of 1989. This effort, which included the screening of about 15,000 households, included surveys on the following two topics: school dropouts (interviews were conducted with adult household respondents and 14- to 21-year-old youths) and early childhood education (interviews were conducted with parents/guardians[1] of 3- to 5-year-olds). The

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[1] Respondents need not have been parents or legal guardians. The household member most knowledgeable about the child's care and education was identified by the Screener respondent and selected t o respond to the survey. The respondent was usually, but not always, a parent.

design of the field test and the results of the field test data collection activities are described in an *Overview of the NHES Field Test* (Brick, Celebuski, et al. 1992).

The first full-scale implementation of the NHES was conducted in the spring of 1991, when the Early Childhood Education survey (ECE-NHES:1991) for 3- to 8-year-olds (and 9-year-olds enrolled in second grade or below) and the Adult Education survey (AE-NHES:1991) were conducted. For the NHES:1991 surveys, more than 60,000 households were screened, nearly 14,000 Early Childhood Education interviews were conducted with the parents/guardians of eligible children, and about 12,500 interviews were conducted with noninstitutionalized adults not on active duty in the military regarding participation in adult education activities. More information about these data can be found in the *National Household Education Survey of 1991: Adult and Course Data Files User's Manual* (Brick et al. 1992a) and the *National Household Education Survey of 1991: Preprimary and Primary Data Files User's Manual* (Brick et al. 1992b).

The NHES was conducted again in 1993, addressing the topics of readiness for school and safety and discipline in school. The School Readiness survey (SR-NHES:1993) focused on readiness for school in a broad sense and examined several relevant issues, such as experience in early childhood programs, the child's accomplishments and difficulties in several developmental domains, home activities, delayed kindergarten entry, and early school experience. Parents of 10,888 children ages 3 through 7 and in 2nd grade or below were interviewed. The other survey in the NHES:1993, the School Safety and Discipline survey (SS&D-NHES:1993), focused on the following four areas: school environment, school safety, school discipline policy, and alcohol/other drug use and education. Parents of 12,680 children in 3rd through 12th grades were interviewed, as were 6,504 students in 6th through 12th grades whose parents had completed an interview. More information about these data can be found in the *National Household Education Survey of 1993: School Readiness Data File User's Manual* (Brick et al. 1994a) and the *National Household Education Survey of 1993: School Safety and Discipline Data File User's Manual* (Brick et al. 1994b).

In 1995, the topics from the NHES:1991 were repeated. The Early Childhood Program Participation survey (ECPP-NHES:1995) focused on children's early experiences in various types of nonparental child care arrangements and early childhood programs. For the ECPP-NHES:1995, interviews were completed with parents of 14,064 children from birth through 3rd grade up to age 10. The Adult Education survey (AE-NHES:1995) focused on the participation of adults in a wide range of educational activities during the 12 months prior to the interview. The population for this survey was defined as noninstitutionalized persons age 16 and older who were not enrolled in elementary or secondary school and not on active duty in the U.S. Armed Forces. Adults in communal living arrangements such as retirement homes were excluded from the survey population. In all, 19,722 adult interviews were completed for the AE-NHES:1995: 11,713 with adult education participants and 8,009 with nonparticipants. More information about these data can be found in the *National Household Education Survey of 1995: Adult Education Data File User's Manual* (Collins et al. 1996a) and the *National Household Education Survey of 1995: Early Childhood Program Participation Data File User's Manual* (Collins et al. 1996b).

In 1996, the NHES surveys were conducted on the topics of Parent and Family Involvement in Education/Civic Involvement (PFI/CI-NHES:1996) and the Civic Involvement of youth in grades 6 through 12 (YCI-NHES:1996) and a random sample of adults (ACI-NHES:1996). The PFI/CI-NHES:1996 focused on family involvement in children's education in four areas as follows: children's schools, communication with teachers or other school personnel, children's homework and behavior, and learning activities with children outside of school. Interviews were completed for 20,792 children ages 3 through 20 and in 12th grade or below. The YCI-NHES:1996 and ACI-NHES:1996 addressed sources of information about government and national issues, civic participation, and knowledge and attitudes about government. Items were administered to youth in grades 6 through 12 and their parents, as well as to a representative sample of civilian, noninstitutionalized U.S. adults. The YCI-NHES:1996 also addressed opportunities that youth have to develop the personal responsibility and skills that would facilitate their taking an active role in civic

life. Interviews were completed with 9,393 parents of students in grades 6 through 12, 8,043 youth in grades 6 through 12, and 2,250 adults. More information about these data can be found in the *National Household Education Survey of 1996: Data File User's Manual, Volumes I through V* (Collins et al. 1997*)*.

The NHES:1999 surveys addressed a wide variety of educational topics that had been covered in previous NHES surveys and also included new items on postsecondary education plans. The surveys were designed to provide the Department of Education with end-of-decade measures of important education indicators. Topics were selected by identifying associated items most widely used in published estimates by the Department or other education researchers, evaluating the data needs for measuring the Department's Strategic Plan indicators,[2] consulting with NHES data users and education researchers about issues they considered important to measure at the end of the decade, and evaluating the content of other studies that could potentially overlap the content of the NHES:1999 surveys.

The Parent survey (Parent-NHES:1999) included items on early childhood program participation, aspects of school readiness, school practices to involve and support families, family involvement in learning outside of school, and parent reports about the child's postsecondary education plans. Interviews were completed for 24,600 children from birth through 20 years of age and in 12th grade or below. A Youth survey (Youth-NHES:1999) was administered to youth in grades 6 through 12 whose parents had completed a parent interview and granted permission for their children to be interviewed. The Youth-NHES:1999 focused on school, family environment, civic involvement and community service, and plans for postsecondary education. Interviews were completed with 7,913 youth in grades 6 through 12. The Adult Education survey (AE-NHES:1999) focused on the participation of civilian adults ages 16 years and older and not enrolled in 12th grade or below in a wide range of educational activities. Items on adult literacy and community involvement were also included. Interviews were completed with 6,697 adults, 3,999 with adult education participants and 2,698 with nonparticipants. More information about these data can be found in the *National Household Education Survey of 1999: Data File User's Manual, Volumes I through IV* (Nolin et al. 2000).

1.2 NHES:2001 Surveys

The three surveys that composed the NHES:2001 included two on topics that had been surveyed in previous years and one on a topic for which only a limited amount of data had been collected in previous surveys. The Early Childhood Program Participation survey (ECPP-NHES:2001) and the Adult Education and Lifelong Learning survey (AELL-NHES:2001) encompass topics surveyed in 1991 and 1995. Items related to these topics were also included in the NHES:1999. The Before- and After-School Programs and Activities survey (ASPA-NHES:2001) represented the first full-scale survey on the out-of-school arrangements of school-age children, expanding the data collected on this topic in 1999 and 1995.

Early Childhood Program Participation Survey

The ECPP-NHES:2001 addressed the nonparental care and program participation of 6,749 preschool children, that is, children from birth through age 6 and not yet in kindergarten or higher grades. The survey collected information on all of the child's current, regular care arrangements, such as care by a relative or by someone not related to the child in a private home and participation in a day care arrangement or preschool, including Head Start. Information was collected about the number of hours per week or per month of nonparental care, as well as the extent to which characteristics of current

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[2] More information on the U.S. Department of Education Strategic Plan, 1998–2002, can be obtained at the Web site http://ed.gov./pubs/StratPln/.

arrangements match those characteristics parents perceive as important for child care. The survey addressed continuity of care arrangements, parent perceptions of the quality of arrangements and programs, and factors associated with choosing nonparental care.

Other information collected in this survey pertained to educational activities at home, emerging literacy and numeracy, the child's personal and demographic characteristics, including health and disability status, and parent and household characteristics. Interviews were completed with 6,749 parents of preschool children.

Before- and After-School Programs and Activities Survey

The ASPA-NHES:2001 focused on children enrolled in kindergarten through 8th grade who were 15 years old or younger. Interviews were conducted with the parents of 9,583 students. Parents reported on the before- and/or after-school arrangements in which their children participated, including care by relatives or nonrelatives in a private home, before- or after-school programs, activities that might provide adult supervision in the out-of-school hours, and children's self-care. Items also addressed continuity of care arrangements, parental perceptions of quality, reasons for choosing parental care, and obstacles to participation in nonparental arrangements. The child's health and disability status and characteristics of the parents and the household were also collected.

Adult Education and Lifelong Learning Survey

The AELL-NHES:2001 measured participation in the following types of educational activities: English as a second language, basic skills and GED preparation courses, college or university degree programs, vocational or technical credential programs, apprenticeship programs, courses or training for work-related reasons, personal interest classes or courses, and informal learning. Items also gathered information on employer support for educational activities. Detailed information about educational attainment, employment, and household characteristics was also collected from both participants and nonparticipants. Adults age 16 and older who were not enrolled in 12th grade or below and not serving on active military duty were eligible for this survey, and interviews were completed with 10,873 people, 6,094 of whom had participated in educational activities in the past year and 4,779 of whom had not.

1.3   Overview of Design

The ECPP, ASPA, and AELL surveys were developed to provide reliable national estimates. Three surveys were conducted simultaneously because of the high costs associated with screening large numbers of households in order to meet the sample size requirements for precise estimates. By addressing more than one topic in the NHES:2001, the cost of screening households to find those eligible could be partitioned over the three surveys. This strategy is key to the NHES design.

Another feature of the NHES, within-household sampling, was developed in response to concerns about the burden placed upon households in which the same household member would be eligible to respond to multiple surveys and/or more than one household member could be sampled. A Screener was used to collect information on household composition and interview eligibility, and to reduce burden, no more than three persons were sampled in a single household. Because of numbers needed to meet precision requirements and their relative scarcity in the population, a preschooler (age 3 through 6 and not enrolled in kindergarten or higher grades) and a middle school student (grades 6 through 8) were sampled in any household that contained them. In contrast, more adults, infants (age 0 through 2), and elementary school students (kindergarten through grade 5) would be found during screening than were needed for precision

requirements, so a maximum of two persons among adults, infants, and elementary school students could be sampled in any household. Also, adults were sampled at a lower rate in households that contained eligible children, further reducing respondent burden. (See chapter 3 for a detailed discussion of precision requirements and sampling procedures for the NHES:2001.)

Even though sampling methods reduced the number of interviews per household, the length of the interview was considered to be a critical factor in obtaining good response rates and reliable estimates. Therefore, the number of items included in the NHES:2001 surveys was limited in order to help improve response rates and reduce the demands made on survey respondents. The overall average administration time for the Screener was 3.4 minutes. The average administration time was 3.1 minutes for Screeners with no extended interviews, between 3.2 and 4.0 minutes for Screeners with one extended interview, about 4.5 minutes for Screeners that generated two extended interviews, and about 5.9 minutes for Screeners associated with three extended interviews. The average administration time for the ECPP interview was 20.0 minutes; for the ASPA interview it was 23.0 minutes. The AELL interview took an average of 17.4 minutes overall. The administration time was 22.5 minutes for adult education participants and 10.8 minutes for nonparticipants.

Because of the requirement to reduce respondent burden, the complex sampling techniques employed, and the need for quick and accurate administration, the NHES:2001 was conducted using computer-assisted telephone interviewing (CATI) technology. Some of the advantages of CATI include improved project administration, online sampling and eligibility checks, scheduling of interviews according to a priority scheme to improve response rates, managing data quality by controlling skip patterns and checking responses online for range and consistency, and an online "help" function to assist interviewers in answering respondents' questions. Items within each of the NHES:2001 instruments were programmed so that the appropriate items appeared on the interviewer's computer screen according to the respondent's answers to previous questions.

Table 1-1 summarizes the number of completed interviews and gives weighted completion and response rates for the Screener and the ECPP, ASPA, and AELL surveys. Table 1-2 gives unweighted completion and response rates for the Screener and the ECPP, ASPA, and AELL surveys. More details on the computation of these rates, including a discussion of the uses of weighted and unweighted response rates, are given in chapter 4.

Table 1-1.—Summary of completed interviews and weighted completion and response rates

Interview type	Number of completed interviews	Completion rate[1]	Response rate[2]
Screener...	48,385	69.2	69.2
ECPP survey	6,749	86.6	59.9
ASPA survey	9,583	86.4	59.7
AELL survey	10,873	77.2	53.4

[1]The completion rate is the percentage of completed interviews for a specific stage of the survey (i.e., the Screener, ECPP, ASPA, or AELL interview). It is a ratio of the number of completed interviews to the number of units (e.g., households, household members) sampled for the interviews. For many telephone numbers sampled for the Screener interview, no contact was ever made. Based on results of the survival method calculations, 27.9 percent of these numbers were assumed to be residential and were added to the denominator for the calculation of the Screener completion and response rates.

[2]The response rate indicates the percentage of possible interviews that have been completed, taking all sampling stages into account. The response rate and completion rate are identical for the first stage of sampling and interviewing (i.e., the Screener). For the ECPP, ASPA, or AELL surveys, the response rate is the product of the Screener completion rate and the interview completion rate (e.g., for the ECPP survey, the calculation for the response rate is 69.2 x 86.6 = 59.9).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation survey of the National Household Education Surveys Program (NHES), 2001; Before- and After-School Programs and Activities survey of the NHES, 2001; and Adult Education and Lifelong Learning survey of the NHES, 2001.

Table 1-2.—Summary of completed interviews and unweighted completion and response rates

Interview type	Number of completed interviews	Completion rate[1]	Response rate[2]
Screener...	48,385	67.6	67.6
ECPP survey	6,749	86.1	58.1
ASPA survey	9,583	86.3	58.4
AELL survey	10,873	78.6	53.1

[1]The completion rate is the percentage of completed interviews for a specific stage of the survey (i.e., the Screener, ECPP, ASPA, or AELL interview). It is a ratio of the number of completed interviews to the number of units (e.g., households, household members) sampled for the interviews. For many telephone numbers sampled for the Screener interview, no contact was ever made. Based on results of the survival method calculations, 27.9 percent of these numbers were assumed to be residential and were added to the denominator for the calculation of the Screener completion and response rates.

[2]The response rate indicates the percentage of possible interviews that have been completed, taking all sampling stages into account. The response rate and completion rate are identical for the first stage of sampling and interviewing (i.e., the Screener). For the ECPP, ASPA, or AELL surveys, the response rate is the product of the Screener completion rate and the interview completion rate (e.g., for the ECPP survey, the calculation for the response rate is 67.6 x 86.1 = 58.1).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation survey of the National Household Education Surveys Program (NHES), 2001; Before- and After-School Programs and Activities survey of the NHES, 2001; and Adult Education and Lifelong Learning survey of the NHES, 2001.

1.4 Flow of the Interviews

Figure 1-1 shows the flow of the NHES:2001 interviews. Each household contact began with a Screener to obtain information used to sample adults and children for extended interviews.

If the household contained any children from birth through 8th grade, up to two interviews were conducted with the parent or guardian most knowledgeable about each child's care and education. Up to one adult was sampled in each household for an AELL interview. (See chapter 3 for additional details about the sample.)

Whenever possible, all interviews with household members were conducted during the same telephone call as the Screener. Followup calls were made to complete interviews that were not completed during the initial contact.

1.5 Contents of Manual

The chapters that follow in Volume I provide additional information about the survey instruments (chapter 2), the sample design and estimation procedures (chapter 3), data collection and response rates (chapter 4), and data preparation (chapter 5). Appendix A provides a copy of the Screener and the ECPP, ASPA, and AELL questionnaires. Appendix B contains a summary of weighting and sample variance estimation variables. Volumes II through IV of the NHES:2001 Data File User's Manual provide information on the ECPP, ASPA, and AELL data files, respectively. Each contains a guide to the relevant data file and codebook, a discussion of data considerations and anomalies, and, in appendixes, the file layout, derived variable specifications, the codebook for the relevant data file from the NHES:2001, and directions and sample code for linking the NHES:2001 data files.

Figure 1-1.—Flow of the NHES:2001 interviews
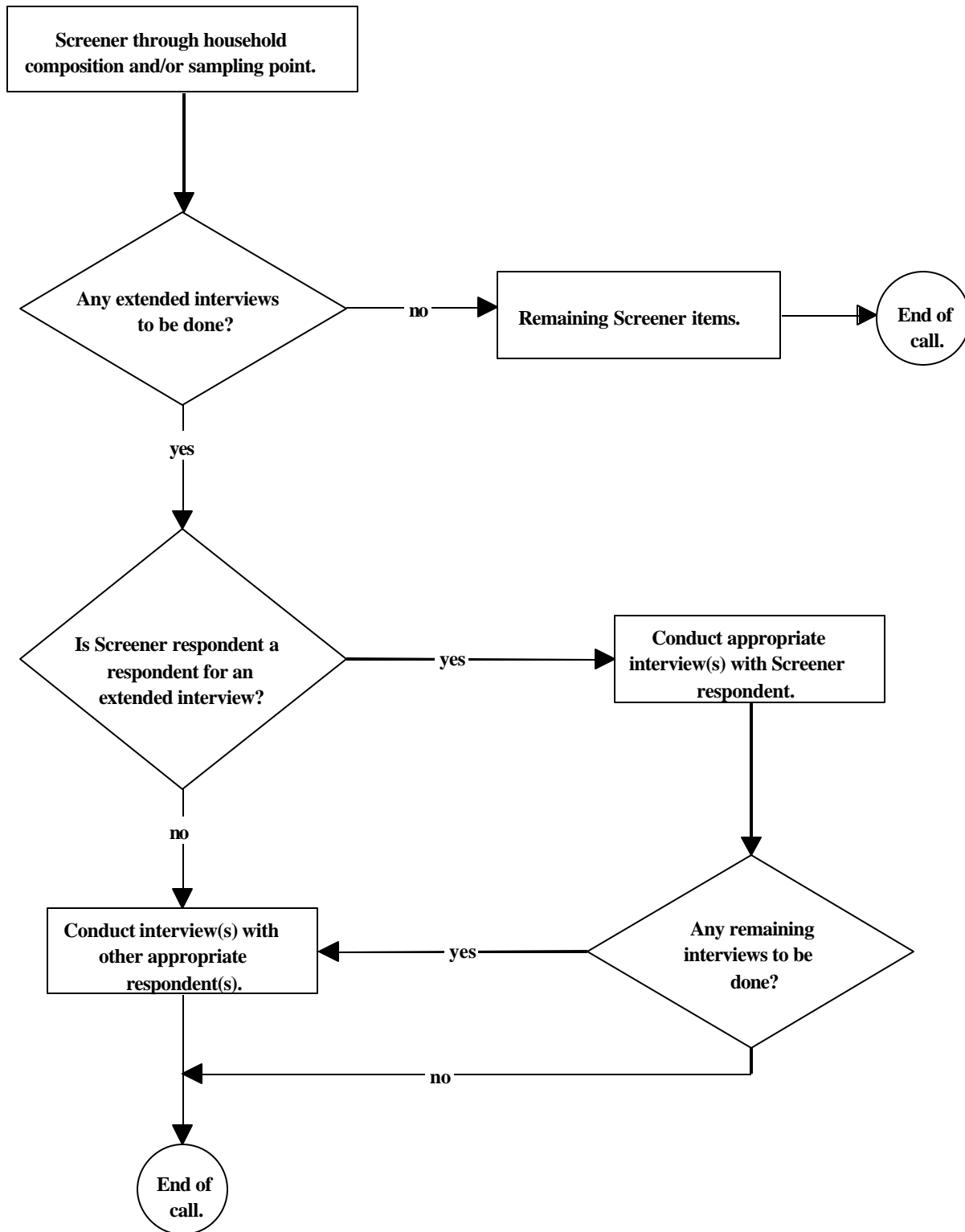
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2. DESCRIPTION OF DATA COLLECTION INSTRUMENTS

The sections that follow describe the instruments used to collect data contained in the ECPP, ASPA, and AELL data files in the NHES:2001. In addition to the Screener, through which eligibility was determined, ECPP, ASPA, and AELL questionnaires were used. Appendix A contains a copy of each instrument.

2.1   The NHES:2001 Screener

The screening interview in the NHES:2001 was used to determine whether sampled telephone numbers belonged to households, gather the information needed to sample household members to be interview subjects, select the appropriate parent/guardian respondent for ECPP and ASPA interviews, and administer some household items in households in which no one was sampled for an extended interview. The Screener was designed to accomplish these tasks efficiently, placing minimum burden on the respondent.

The first series of questions in the Screener determined whether the telephone number was residential and whether the person on the telephone was eligible to answer the questions. If it was determined that the telephone number was used for business only, the call was terminated. The survey continued for numbers that were for household use or for both household and business use.

If the person who answered the telephone was not a household member or was a household member under 18 years of age, an appropriate Screener respondent was requested.   If no member of the household was 18 years old or older, a person designated as the male or female head of household was eligible to be the Screener respondent.

The order of subsequent Screener questions varied depending upon whether the household contained any members age 15 or younger and whether the household had been designated for an AELL interview. In households not designated for an AELL interview and in which there were children age 15 or younger, only those members age 15 and younger were enumerated (that is, the name, age, and sex of each person was collected). Screener questions directly following the enumeration determined whether they could be sampled for the study. The questions asked whether household members age 3 through 15 were attending school or being homeschooled, and the grade or year of school in which they were enrolled. If a child was sampled for an ECPP or ASPA interview, the parent/guardian most knowledgeable about the child's education and care was selected as the respondent.

In households designated for an AELL interview, all household members were enumerated in the Screener. Participation in any educational activities during the past 12 months was determined for all household members age 16 or older and not currently enrolled in grade 12 or below. Following selection of an adult for the extended interview, eligibility was determined by asking whether the sampled adult was currently serving on active duty in the military. Active duty military personnel were not eligible for an AELL interview. When appropriate, contact information was gathered for adults living in school-sponsored housing.

If no child was sampled for an ECPP or ASPA interview and no adult was sampled for an AELL interview, the Screener respondent was asked whether the home was owned or rented and whether there were other telephone numbers in the household for home use. This information was used for weighting and nonresponse adjustment. Then the interview was terminated.

2.2   The Early Childhood Program Participation (ECPP) Survey

In the ECPP-NHES:2001 survey, data were collected about children from birth through age 6 as of December 31, 2000 who were not enrolled in kindergarten or a higher grade in school.

The respondent for the ECPP interview was the adult living in the household who was the most knowledgeable about the child's care and education. Typically, this was the mother of the child; however, the respondent could be a father, stepparent, adoptive parent, foster parent, grandparent, another relative, or nonrelative designated as the most knowledgeable household member. For simplicity, when referring to the most knowledgeable respondent in the manual, this person will be called the parent/guardian.

In the ECPP interview, subjects were routed to one of two questionnaire paths, infant or preschool. Irrespective of the questionnaire path for the child, parents were asked basic demographic questions about the child, questions about the child's health and disability status, questions about parent/guardian characteristics, and questions about household characteristics. To avoid redundancy and greater response burden, household information was collected only during the first interview conducted in each household. Similarly, parent/guardian information was collected only once per household, unless sampled children in the same household had different parents. Table 2-1 shows the structure of the ECPP and ASPA interviews, which contained many parallel items, and the distribution of topics among the paths for each interview.

The **infant path (I)** of the ECPP interview was for those children newborn through 2 years of age. Information was collected on early childhood care and programs, care and education by nonparental adults, program continuity, parental perceptions of the quality of arrangements, factors in parental choice of arrangement, training and support for parents of preschoolers, literacy-related skills and activities, and training and support for families of preschoolers.

The **preschool path (N)** was for those children who were age 3 or older and not yet attending kindergarten or primary school. These children were typically 3 to 5 years old, but could have been 6 years old. As shown in Table 2-1, information was collected about participation in early childhood care and programs (relative care, nonrelative care, and center-based programs, including Head Start), program continuity, parental perceptions of the quality of arrangements, and factors in parental choice of arrangement, literacy-related skills and activities, and training and support for families of preschoolers. Parents of children who were not enrolled in a center-based program were not asked items about the characteristics of their programs or school or their perceptions of quality of care and programs, as were the parents of children who were enrolled in a center-based program.

2.3   The Before - and After-School Programs and Activities (ASPA) Survey

In the ASPA-NHES:2001 survey, data were collected about children who were in kindergarten through 8th grade provided they were age 15 or younger. Students who were homeschooled with a grade equivalent of kindergarten through 8 were also eligible; a subset of questions was asked about this population (table 2-1).

The respondent for the ASPA interview was the adult living in the household who was the most knowledgeable about the child's care and education. Usually, this was the mother of the child; however, the respondent could be a father, stepparent, adoptive parent, foster parent, grandparent, another relative, or a nonrelative. There were two paths through the interview items, the school path and the homeschool path. All parents were asked basic demographic questions about the child, questions about the child's health and disability status, questions about parent/guardian characteristics, and questions about household characteristics in both paths of the interview.

The **school path (S)** was administered to parents/guardians of children currently attending a regular school in kindergarten, including transitional kindergarten and prefirst grade, through 8th grade. (As defined in the NHES, transitional kindergarten is a program before regular kindergarten for children who are old enough for kindergarten but not yet ready to start. Prefirst grade is an extra year between kindergarten and first grade.) The ages of the children typically ranged from 5 to 13.

In the school path, data were collected about enrollment in school, school characteristics, student academics and behavior at school, before- and after-school care arrangements and programs, before- and after-school activities, self-care, parental care during the out-of-school hours, program continuity, parental perceptions of the quality of arrangements, and factors in parental choice of arrangement.

The **homeschool path (H)** was administered to those parents/guardians of children who were being instructed at home for some or all of their classes instead of attending regular school and who had a grade equivalent of kindergarten through 8th grade. Parents of homeschoolers were asked questions about the student's grade equivalent, reasons for schooling their child at home, and receipt of support for homeschooling from their public school or school district. For those students who were reported to be homeschooled but also attended a school 9 or more hours per week, parents/guardians were administered the sections on school characteristics and student performance at school.

2.4 Adult Education and Lifelong Learning (AELL) Survey

The AELL-NHES:2001 was designed to provide national estimates of participation in adult educational activities. Adults age 16 and older who were not enrolled in grade 12 or below, not institutionalized, and not on active duty in the military were eligible for this survey.

Respondents were asked about their participation in the following types of educational activities: English as a second language, basic skills/GED preparation, credential courses in colleges or universities, vocational or technical credential courses, apprenticeships, career- or job-related training or courses, personal interest/development classes, and informal learning activities. Information about employer support for educational activities was obtained. Other items gathered demographic, household, and detailed employment information.

Table 2-1.— Content of the ECPP-NHES:2001 and ASPA-NHES:2001, by path

Characteristic	ECPP survey			ASPA survey	
		Preschoolers (N)			
	Infants/ toddlers (I)	Not enrolled in center-based programs	Enrolled in center-based programs[1]	Enrolled in regular school (S)	Home-schooled (H)
Demographics	√	√	√	√	√
Current school/program status		√	√	√	√[2]
Characteristics of program/school			√		
Homeschooling					√
School characteristics				√	√[2]
Student academic performance and behavior				√	√[2]
Nonparental care/education	√	√	√		
Before-/after-school care arrangements/programs				√	
Parental care during out-of-school hours				√	
Program continuity	√	√	√	√	
Perceptions of quality of care and programs	√		√	√	
Factors in parental choice	√	√	√	√	
Support for families of preschoolers	√	√	√		
Home activities	√	√	√		
Emerging literacy and numeracy	√	√	√		
Health and disability	√	√	√	√	√
Parent/guardian characteristics	√	√	√	√	√
Household characteristics	√	√	√	√	√

[1] Center-based programs include day care centers, nursery schools, preschools, and prekindergartens.

[2] Asked of homeschooled students who also attended regular school for 9 hours per week or more.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation survey of the National Household Education Surveys Program (NHES); 2001, and Before- and After-School Programs and Activities survey of the NHES, 2001.

3. SAMPLE DESIGN AND IMPLEMENTATION

This chapter describes the sample design for the NHES:2001, including a number of special features of the design. Also presented are the procedures for weighting, variance estimation, and imputation for items that had missing values. (For a more detailed discussion of these topics, see the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming))

3.1   Precision Requirements for the NHES:2001

The number of telephone numbers required for the NHES:2001 was determined by the precision requirements for the estimates from the ECPP, ASPA, and AELL surveys. The general precision requirement for all three surveys was the ability to detect a 10 to 15 percent relative change for an estimate of between 30 and 60 percent.

In the NHES:2001, the overall screening sample was largely determined by the need to produce precise estimates of indicators for children, particularly preschoolers (age 3 through 6 and not yet in kindergarten) and middle schoolers (6th through 8th graders). For the ECPP and ASPA surveys, key sample size determinants were the requirements to detect changes in estimates of type of care arrangement by age/grade groupings and by race/ethnicity. The age/grade groupings considered were infants (0–2 years), preschoolers (3 through 6 and not yet in kindergarten), elementary schoolers (kindergarten through 5th graders), and middle schoolers (6th through 8th graders). The race/ethnicity categories considered were White, non-Hispanic; Black, non-Hispanic; and Hispanic. As a result, target sample sizes (in terms of numbers of sampled children) of about 5,700 for infants, 4,800 for preschoolers, 7,000 for elementary schoolers, and 6,300 for middle schoolers were established.

For adults, key sample size determinants were the requirements to detect changes in estimates of participation in adult education activities overall and participation by type of adult education. In addition, the requirements to estimate participation by race/ethnicity and by educational attainment (less than high school or high school and higher) were also considered. Based on these requirements, a target sample size of about 19,500 sampled adults was established. Adult education participants were sampled at a higher rate than nonparticipants in order to improve the precision of estimates of characteristics of participants. Adults with less than a high school diploma were sampled at a higher rate for the same reason.

Taking into account all stages of sampling and expected response, a goal of screening about 63,000 households was established. However, a lower than expected residency rate (i.e., the proportion of telephone numbers that are assigned to households) and a lower than expected response rate[3] caused a revision of the targets for screened households and numbers of completed extended interviews. The effect on the precision of the estimates was examined and found to be minimal. For instance, for AELL, the original expectation was to detect a change of 2.0 percent in overall participation rate, a relative change of 4.4 percent. The revised targets were expected to allow detection of a change of 2.1 percent in participation rate, a relative change of 4.5 percent. The revised sample targets established goals of 48,000 completed Screeners, 6,866 completed ECPP interviews (3,742 infants and 3,124 preschoolers), 9,852 completed ASPA interviews (5,192 elementary schoolers and 4,660 middle schoolers), and 11,134 completed AELL interviews.

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[3] The final residency and Screener response rates for the NHES:2001 were 42.8 percent and 69.2 percent, respectively. These are lower than the expected rates of 46.5 percent and 75.7 percent, respectively.

3.2 Sampling Households

Different methods have been developed over the years for selecting random samples of telephone households. The Mitofsky-Waksberg method of random digit dialing as described in Waksberg (1978) is probably the best known of the methods. For the NHES:1991 and the NHES:1993, a modified Mitofsky-Waksberg method described by Brick and Waksberg (1991) was used.

Since the NHES:1995, a different approach to RDD sampling, called a list-assisted method, described by Casady and Lepkowski (1993), has been used for the NHES surveys. This method reduces the number of unproductive calls to nonworking or nonresidential numbers (compared with simple random sampling of all numbers), produces a self-weighting sample, is a single stage and unclustered sample, and eliminates the sequential difficulties[4] associated with the Mitofsky-Waksberg method. With the list-assisted method, an equal probability random sample of telephone numbers is selected from all telephone numbers that are in 100-banks (numbers in a 100-bank have the same first 8 digits of the 10-digit telephone number) in which there is at least one residential telephone number listed in the white pages directory (the listed stratum). Both listed and unlisted telephone numbers are included in the listed stratum. Telephone numbers in 100-banks with no listed telephone numbers (the zero-listed stratum) were not sampled.

The sampling frame for the NHES:2001 was all telephone numbers in 100-banks with one or more listed telephone numbers as of September 2000. A stratified list-assisted sample was used in order to support design goals for national-level and subdomain statistics for the ECPP, ASPA, and AELL surveys of the NHES:2001.

Because the NHES is a telephone survey, undercoverage bias resulting from differences between telephone and nontelephone households is a concern. Undercoverage bias is the average difference between the survey estimate and the population parameter being estimated that results from some members of the inference population being excluded from the sampling frame. For example, while the NHES is conducted using a sample of telephone households, the inference population includes both telephone and nontelephone households, so undercoverage bias could result form the exclusion of persons in nontelephone households. Various studies have been undertaken to examine the undercoverage bias for key subgroups in the NHES. Brick, Burke, and West (1992) looked at undercoverage bias for 3- to 5-year-olds and 14- to 21-year-olds. Brick (1996) examined undercoverage bias for 0- to 2-year-olds and adults. Undercoverage bias for 3- to 7-year-olds was examined by Brick et al. (1997). Undercoverage bias for estimates of characteristics of households and for adults was investigated by Montaquila, Brick, and Brock (1997). Results from these studies suggest that undercoverage bias in the NHES is not a significant problem. However, the undercoverage bias for smaller subgroups could be more problematic and require additional research. The undercoverage bias for most subgroups is not likely to be a major problem after the raking adjustment.[5] However, when dealing with a small subgroup that is likely to be differentially undercovered, data users should consider the possible impact of different sources of error. Both sampling errors and nonsampling errors from undercoverage bias are likely to be relatively large for small subgroups.

Another potential source of undercoverage bias in telephone surveys that use the list-assisted method is the fact that not all telephone households are included in the sampling frame. Households in the zero-listed stratum have no chance of being included in the sample. Empirical findings were presented by

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[4] With the Mitofsky-Waksberg method, primary sampling units (PSUs) comprising sets of telephone numbers having the same first 8 digits (i.e., 100-banks) are created and sampled. Within each sampled PSU, a single telephone number (called the prime number) is selected. The telephone number is dialed, and if it is found to be residential, the PSU is retained in the sample and an additional *k* telephone numbers are selected from the PSU; otherwise, the PSU is discarded and no telephone numbers are sampled from the PSU. In order to obtain a fixed number of telephone numbers in the sample, PSUs cannot be selected in one step but must be selected sequentially as the telephone numbers are dialed, since the number of PSUs in which the prime number is residential is unknown at the time of PSU selection.

[5] See section 3.4.2 for further details about the raking adjustment that was applied in creating the survey weights.

Brick et al. (1995) to address the question of undercoverage bias due to the exclusion of telephone numbers in the zero-listed stratum. These results show that the percentage of telephone numbers in the zero-listed stratum that are residential is very small (about 1.4 percent), and that about 3 to 4 percent of all telephone households are in the zero-listed stratum. The findings also show that the bias resulting from excluding the zero-listed stratum is generally small.

In the NHES:2001, a two-phase stratification was used to select telephone numbers in order to produce more reliable national estimates from the extended interviews for subdomains defined by race and ethnicity. In the first phase, a sample of 206,182 telephone numbers was drawn, with telephone numbers in areas with high percentages of Black and Hispanic residents sampled at higher rates than those in areas with low percentages of Black and Hispanic residents. The sampling frame used in the study contained the 1990 census counts of persons in the area by race and ethnicity. A 100-bank was classified in the high minority concentration stratum if its population was either at least 20 percent Black or at least 20 percent Hispanic. The banks that did not meet this requirement were classified in the low minority concentration stratum. The sampling rate in the high minority concentration stratum was nearly twice that of the low minority stratum.

In the second phase, within each minority stratum, the sampled telephone numbers were stratified as listed or unlisted according to whether they matched listings in the white pages telephone directory. Within each of the four strata defined by the combinations of minority concentration and listed status, telephone numbers were subsampled at different rates. Because higher proportions of minority households are in the unlisted strata[6] (based on estimates from the NHES:1999), within each of the minority strata, telephone numbers in the unlisted substratum were sampled at rates about 30 percent higher than numbers in the listed substratum.

In this manner, a sample of 179,211 telephone numbers was selected for the NHES:2001. (The remaining 26,971 telephone numbers from the first phase sample of 206,182 were held in reserve. The reserve sample was not used.) Assuming that 47 percent of the telephone numbers would belong to households and assuming a Screener response rate of 76 percent, it was expected that about 63,000 screening interviews would be completed. However, the actual residency rate was 43 percent, and the Screener response rate was 69 percent. The number of households with completed screening interviews was 48,385.

3.3   Sampling Within Households

To limit burden on respondents, a within-household sampling scheme was developed to control the number of persons sampled for extended interviews in each household. In all households with children ages 15 or younger, children were enumerated. To determine whether adults would be enumerated, the sample of telephone numbers was randomly divided into three groups. The first group (89,597 telephone numbers or approximately 50 percent of the sample) was designated for adult enumeration. The second group (44,985 telephone numbers or about 25 percent of the sample) was designated for adult enumeration only if there were no eligible children in the household. The third group (44,629 telephone numbers or about 25 percent of the sample) was designated for no adult enumeration.

Once the enumeration of the appropriate household members was completed in the Screener, the sampling of household members for the extended interviews was done by computer. The ECPP and ASPA interviews were conducted with parents/guardians of sampled children from birth through age 15 who were in 8th grade or below. In households with one or more preschoolers (children age 3 through 6 and not yet in kindergarten), one child in this age/grade range was sampled. In households with middle school students

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[6] Here, the terms "listed strata" and "unlisted strata" are used to describe strata created based on the actual white pages-listed status of the individual telephone number. In the earlier discussion of the list-assisted method, the term "zero-listed stratum" was used to refer to 100-banks in which no telephone number in the 100-bank is listed in the white pages.

(6th through 8th grade), one child in this age/grade range was also sampled. The sampling of infants (newborn through age 2), elementary school children (kindergarten through grade 5), and adults was conducted using an algorithm designed to attain the sampling rates required to meet the target sample sizes while minimizing the number of interviews per household. The within-household sample size was limited to three eligible children if no adults were to be selected or two eligible children and one eligible adult. No more than one child from any given domain (i.e., infants, preschoolers, elementary students, middle school students) was sampled in any given household. This sampling algorithm was designed to limit the amount of time required to conduct interviews with parents in households with a large number of eligible children. Table 3-1 gives the expected and actual response rates and numbers of completed interviews for each of the NHES:2001 surveys.

Estimates from the October 1997 Current Population Survey (CPS) indicated that 31 percent of all households have at least one child age 15 or below and enrolled in 8th grade or below. Using the within-household sampling algorithm developed for the NHES:2001, the 63,000 screened households should have yielded sample sizes of 5,708 infants, 4,766 preschoolers, and 13,237 students in kindergarten through 8th grade. Assuming an ECPP interview completion rate of 90 percent, the expected number of completed ECPP interviews was 9,426 (5,138 infant interviews and 4,289 preschooler interviews). The expected number of ASPA interviews, again based on a 90 percent interview completion rate, was 11,914. Because of the lower than expected residency and response rates, the expected numbers of completed interviews were revised to 6,866 for ECPP and 9,852 for ASPA. The actual number of completed ECPP interviews was 6,749, and the actual number for ASPA was 9,583. The difference between the expected and actual numbers of completed interviews was mainly due to the completion of fewer Screeners than expected.[7]

Table 3-1.—Expected and actual numbers of completed interviews and weighted response rates for the NHES:2001 Screener and extended interviews

Interview	Expected			Actual	
	Original number of completed interviews	Revised number of completed interviews	Original response rate (percent)	Number of completed interviews	Response rate (percent)
Screener...........................	63,000	48,000	75.0	48,385	69.2
ECPP survey	9,426	6,866	67.5	6,749	59.9
ASPA survey..................	11,914	9,852	67.5	9,583	59.7
AELL survey..................	15,573	11,134	60.0	10,873	53.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation survey of the National Household Education Surveys Program (NHES), 2001; Before- and After-School Programs and Activities survey of the NHES, 2001; and Adult Education and Lifelong Learning survey of the NHES, 2001.

The AELL interview may be used to generate estimates for all civilian, noninstitutionalized persons age 16 or older and not enrolled in grade 12 or below. Based on the sampling algorithm, the 63,000 screened households were expected to yield 19,466 sampled adults. Assuming an Adult Education interview completion rate of 80 percent, the expected number of completed AELL interviews was 15,573, which was revised to 11,134 to reflect the lower than expected residency and response rates found during data collection. The actual number of completed AELL interviews was 10,873. The

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[7] The actual completion rates for the ECPP and ASPA surveys were 87 and 86 percent, respectively, compared to the expected completion rate of 90 percent for both surveys. Expected completion rates were based on experiences in previous NHES collections.

difference between the expected and observed numbers of interviews was due primarily to the lower than expected number of completed Screeners.[8]

Although the sample yield for children and adults was lower than expected, the lower yield did not affect the ability to detect differences between 1999 and 2001 in key statistics beyond the thresholds that were used to design the sample. (The key statistics for ECPP and ASPA were type of care arrangement by age/grade grouping for infants, preschoolers, elementary school students, and middle school students and by the race/ethnicity categories of White, non-Hispanic; Black, non-Hispanic; and Hispanic. For adults, the key statistics were overall participation in adult education and participation by type of adult education activity, as well as overall participation by race/ethnicity and level of educational attainment.) However, the reduction in sample size may affect the ability to detect differences in other statistics that were not used to design the sample.

3.4   Weighting Procedures

The objective of the NHES:2001 is to make inferences about the entire civilian, noninstitutionalized population for the domains of interest. Although only telephone households were sampled, the estimates were adjusted to totals of persons living in both telephone and nontelephone households derived from the October 1999 and March 2000 Current Population Surveys (CPS) to achieve this goal. Beginning in 1994, the CPS weights were adjusted to population totals that were adjusted to account for the undercoverage from the 1990 decennial census. Any additional undercoverage in the census of special populations, such as the homeless, remains in the totals obtained from the CPS. The weighting procedures are described briefly below. More complete details are presented in the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming).

3.4.1   Household-Level Weights

The primary purpose of the Screener in the NHES:2001 was to provide information required to assess the eligibility of household members for an extended interview. Household-level information that is of analytic interest was also collected during the extended interview. Since no data intended for analyses were collected at the household level only, household-level weights were calculated solely for use as a basis for computing person-level weights for the analysis of the extended interview data. In computing household weights, a household base weight was developed to account for the RDD sampling of telephone numbers, including the sampling rate differences by minority concentration stratum and listed stratum and a factor to reflect the subsampling for follow-up of no-answer telephone numbers. (See the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming)). This weight was adjusted for Screener nonresponse and then adjusted for households that had more than one telephone number, hence more than one chance of being included in the sample. A CHAID analysis was run to identify characteristics most associated with Screener nonresponse.[9] These characteristics, which were primarily geographic characteristics associated with the telephone exchange, were used to form the cells for nonresponse adjustment of the household weights. The final adjustment was a poststratification adjustment to the household weights. The primary purpose of the poststratification adjustment was to account for undercoverage resulting from the sampling of telephone households only. Poststratification ensures that survey weights sum to known population totals. The characteristics used in poststratification were Census region (Northeast/South/Midwest/West) and presence of children less than 18 years of age. Table 3-2

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[8] The actual completion rate for the AELL survey was 77 percent instead of the expected rate of 80 percent.

[9] Chi-Square Automatic Interaction Detection (CHAID) is a categorical search algorithm that identifies characteristics associated with response propensity. For more details about CHAID, see Nolin et al. (forthcoming).

presents the control totals used for poststratifying the household-level weights. The variables used in poststratification were chosen to address differences in coverage rates with respect to region in which the household is located and presence of children in the household.

Table 3-2.—Control totals for poststratifying the NHES:2001 household-level weights

Census region*	Children under 18 in household	Control total
Northeast	Yes	13,123,145
Northeast	No	6,969,672
South	Yes	23,970,552
South	No	13,343,144
Midwest	Yes	15,639,333
Midwest	No	8,900,832
West	Yes	14,013,486
West	No	8,821,783
TOTAL		104,781,947

*The following states and the District of Columbia are in each Census region: Northeast: CT, MA, ME, NH, NJ, NY, PA, RI, VT; South: AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV; Midwest: IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI; West: AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey (CPS), March 2000.

3.4.2   Person-Level Weights

The next weighting procedures resulted in person-level weights, i.e., weights used to estimate the number of persons and to produce estimates of characteristics of persons. The household-level weight was used as the base weight, and the weighting procedures included the adjustment of the estimates to independent totals from the CPS.

Person Weights for the ECPP and ASPA Interviews

As described in section 3.3, a sampling algorithm was used to limit the number of persons sampled in each household while maintaining the sampling rates required to attain the target sample sizes. The sampling was based on information collected in the Screener interview from the adult household member who responded to the Screener, and the eligibility of the sampled children was later verified or updated when the parent/guardian most knowledgeable about the child responded to the ECPP or ASPA interviews. Because sampling eligibility was defined in terms of the data collected in the Screener, the weighting procedures were developed with possible misclassification of children according to grade— resulting in a change in interview path—taken into account so that the estimates would not incur bias due to misclassification.

The same methodology was used for creating person-level weights for the ECPP interview and for the ASPA interview. Additionally, the same variables were used to create cells for nonresponse adjustment and for raking (a statistical procedure described on the next page). With the exception of the final raking adjustment, the weighting adjustments were performed simultaneously but independently for the two surveys.[10] The first step in developing the person weights for the ECPP and ASPA surveys was to account for the probability of sampling the child's domain in the given household. For example, if there was one preschooler, one elementary school child (enrolled in kindergarten through 5th grade), and one

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[10] The final raking adjustment was performed simultaneously on the ECPP and ASPA weights, but was not independent between the two surveys.

middle school child (enrolled in 6th through 8th grade), then the preschooler and the middle school child were sampled with certainty, and the elementary school child was sampled with probability 0.5; the domain sampling adjustment factors for the preschooler and the middle school child were 1, and the factor for the elementary school child (if sampled) was 2. The second adjustment accounted for the probability of sampling the child from among all eligible children in the given domain. For example, if there were three preschoolers in the household, then one was sampled, and the adjustment was 3, which is the reciprocal of the probability of selecting the child from among all children in that domain. The application of these two adjustments to the household weight created a person-level base weight for the ECPP and the ASPA interviews.

The next step involved adjusting the person-level base weight for nonresponse to the ECPP or ASPA interviews. Nonresponse adjustment cells were created using age/grade combinations: children age 0, children age 1, children age 2, unenrolled children ages 3 through 6, preschoolers, kindergartners, and children enrolled in each single grade for grade 1 through grade 8; enrolled children with no grade equivalent were included in the cell containing the modal grade for their age; that is, they were assigned to the grade in which most children their age are enrolled. For each cell, the ratio of the weighted number of eligible sampled children to the weighted number of responding children was then computed. This ratio was multiplied by the person-level base weight to create the nonresponse-adjusted person-level ECPP and ASPA interview weight.

The final stage of weighting for the ECPP and ASPA interviews was a raking adjustment. Raking was proposed by Deming and Stephan (1940) as a way to ensure consistency between complete counts and sample data from the 1940 U.S. census. The raking procedure typically improves the reliability of survey estimates, and also corrects for the bias due to households or persons not covered by the survey, e.g., households without telephones and households with unlisted telephone numbers belonging to zero-listed telephone banks. The raking procedure is carried out in a sequence of adjustments: first, the weights are adjusted to sum to the totals on one marginal distribution (or dimension) and then the adjusted weights are further adjusted to sum to the totals on the second marginal distribution, and so on. One sequence of adjustments to the marginal distributions is known as a cycle or iteration. The procedure is repeated until convergence of weighted totals is achieved.

The raking procedure for the ECPP and ASPA weights involved raking the nonresponse-adjusted person-level weights to national totals obtained using the percentage distributions from the October 1999 CPS and the total number of children from the March 2000 CPS. The October 1999 CPS contains variables not available on the March 2000 CPS, but the totals in the latter are more current. In the procedure used in the NHES:2001, the control total for a raking cell is the proportion in that cell from the October 1999 CPS multiplied by the estimate of the total number of children from the March 2000 CPS. The three raking dimensions used for the ECPP and ASPA interview weights were a cross between race/ethnicity of the child (Black, non-Hispanic/Hispanic/other) and household income categories ($10,000 or less/$10,001–$25,000/$25,001 or more), a cross of Census region (Northeast/South/Midwest/West) and urbanicity (urban/rural), and a cross of home tenure (rent/own or other) and age or grade of child (with those enrolled in school but having no grade equivalent assigned to the modal grade for their age). These raking dimensions were used because they include important analysis variables (e.g., grade) and characteristics that have been shown to be associated with telephone coverage (e.g., race/ethnicity). Table 3-3 and 3-4 show the control totals used for raking the ECPP and ASPA interview weights.

Once the procedures described above were completed, estimates were produced for the surveys. As a standard practice in the NHES, estimates are compared to other sources to assess the credibility of the NHES weights. When this comparison was done, a discrepancy was found in estimates of the number of 5-year-olds. The estimate of 3,525,163 from the NHES was considerably lower than the estimate of 4,037,191 from the CPS. Concerns about the discrepancy between the NHES:2001 and CPS estimates of the total number of 5-year-olds resulted in a detailed investigation into the reasons for this

and an evaluation of alternative sets of raking dimensions. The first step in this investigation was to review the implementation of the weighting methodology. Although checks had been conducted at each stage of weighting, the procedures were reviewed again to ensure that they had been correctly computed and applied. No problems were found in the computation or application of the weighting adjustments.

The raking procedure was determined to be the probable step that led to the discrepancy since the previous weights, the nonresponse-adjusted person-level weights, did not exhibit the problem. Thus, an evaluation was undertaken in which three alternative sets of raking dimensions were considered (see exhibit 3-1). In each case, the first two dimensions (race/ethnicity by household income, and Census region by urbanicity) remained the same. In Alternative 1, the home tenure by age/grade dimension was replaced with two dimensions: single year of age (alone), and home tenure by grade. In Alternative 2, the home tenure by age/grade dimension was replaced with a single dimension: home tenure by single year of age.

In Alternative 3, the home tenure by age/grade dimension was replaced by the single dimension of home tenure crossed with grade by age category. For each grade, two age categories were created: (1) at or below modal age for the grade and (2) above modal age for the grade. Prior to classifying children into raking cells for this dimension, the age of the child was recalculated as of September 30, to match the reference age used in computing the control totals from the CPS.

Four separate but potentially related concerns addressed in this evaluation were:

- Differences in estimates of the number of kindergartners;
- Large number of iterations required for convergence of the raking algorithm;
- Inconsistent ages (CPS age is as of September 30, while the NHES age is as of December 31); and
- The effect of the interaction between age and grade in the raking procedure.

The study of the weighting procedures for the ECPP and ASPA surveys from the NHES:2001 was wide ranging and had several important findings. The weighting procedures in the NHES:2001 were executed correctly. The original weights converged to the specified control totals with a small number of iterations, and the variability of the weights was reasonable. The original weighting procedure resulted in estimates of the number of 5-year-olds that differed from the CPS estimate by about 15 percent (500,000 children). The distributions of age by grade for children as measured in the CPS and the NHES differ, and this is mainly due to the difference in the time that data are collected.

The Alternative 1 weights produced estimates that matched the CPS estimates by age and by grade, but exhibited greater variability than desired. In particular, the mean raked weight for children within a grade decreased as age increased. Another issue noted was the large number of iterations required for the raking procedure to converge. With Alternative 2, the raked NHES estimate of kindergarten enrollment was about 500,000 higher than the CPS estimate. In general, with the exception of estimates of enrollment by grade, the Alternative 3 weights produced estimates that differed more from the CPS estimates than those produced using the original weights. The additional research found that the CPS estimate of the number of kindergarten children is at the lower end of the range computed using several sources. No study of CPS procedures was undertaken, but the method of classifying a child as being enrolled in kindergarten may differ between the CPS and some of the other sources.

Exhibit 3-1.—Raking schemes used in the evaluation of NHES:2001 child-level weights

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Original
    Three raking dimensions:
- Race/ethnicity of the child by household income
- Census region by urbanicity
- Home tenure by age or grade of child (age 0; age 1; age 2; ages 3-6, not enrolled; nursery/preschool; kindergarten; single grade, for grades 1 through 8)

Alternative 1[11]
    Four raking dimensions:
- Race/ethnicity of the child by household income
- Census region by urbanicity
- Single year of age
- Home tenure by grade/enrollment of child (not enrolled; nursery/preschool; kindergarten; single grade, for grades 1 through 8)

Alternative 2
    Three raking dimensions:
- Race/ethnicity of the child by household income
- Census region by urbanicity
- Home tenure by age of child (single year of age, for ages 0 through 15)

Alternative 3
    Three raking dimensions:
- Race/ethnicity of the child by household income
- Census region by urbanicity
- Home tenure by grade/age classification of child. For each grade, two subclassifications were created: At or below modal age for the grade, and above modal age for the grade). Age was recalculated to age as of September 30, 2000, for comparability to the CPS.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Household Education Surveys Program, 2001.

As a result of the findings of this study, it was decided that the original weights should be used for analysis of the ECPP-NHES:2001 and ASPA-NHES:2001 data. Each of the alternatives considered had shortcomings, and no alternative was clearly preferable to the original weights. Thus, only the weights computed using the original methodology appear on the data files.

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[11] In addition, a "deaged" version of Alternative 1 was considered, in which age was recalculated to age as of September 30, 2000, for comparability to the CPS. Results from this version were similar to those from Alternative 1.

Table 3-3.—Control totals for raking the ECPP-NHES:2001 person-level weights

Race/ethnicity of child	Household income	Control total
Black, non-Hispanic	$10,000 or less	903,941
Black, non-Hispanic	$10,001-$25,000	786,749
Black, non-Hispanic	$25,001 or more	1,299,255
Hispanic	$10,000 or less	585,259
Hispanic	$10,001-$25,000	1,361,729
Hispanic	$25,001 or more	1,747,611
Other	$10,000 or less	789,577
Other	$10,001-$25,000	1,999,918
Other	$25,001 or more	10,807,186
Census region*	**Urbanicity**	**Control total**
Northeast	Urban	2,932,856
Northeast	Rural	783,761
South	Urban	4,674,758
South	Rural	2,135,003
Midwest	Urban	3,488,476
Midwest	Rural	1,378,273
West	Urban	4,216,150
West	Rural	671,948
Home tenure	**Age/grade of child**	**Control total**
Rent	Age 0	1,515,009
Rent	Age 1	1,484,801
Rent	Age 2	1,582,170
Rent	Age 3–6, not enrolled	1,692,269
Rent	Nursery/Preschool/Head Start	1,417,237
Own or other	Age 0	2,352,826
Own or other	Age 1	2,417,177
Own or other	Age 2	2,348,363
Own or other	Age 3–6, not enrolled	2,302,434
Own or other	Nursery/Preschool/Head Start	3,168,939
TOTAL		20,281,225

*The following states and the District of Columbia are in each Census region: Northeast: CT, MA, ME, NH, NJ, NY, PA, RI, VT; South: AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV; Midwest: IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI; West: AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey (CPS), March 2000; October 1999.

Table 3-4.—Control totals for raking the ASPA-NHES:2001 person-level weights

Race/ethnicity of child	Household income	Control total
Black, non-Hispanic	$10,000 or less	1,254,638
Black, non-Hispanic	$10,001-$25,000	1,922,579
Black, non-Hispanic	$25,001 or more	2,685,666
Hispanic	$10,000 or less	791,211
Hispanic	$10,001-$25,000	2,094,365
Hispanic	$25,001 or more	2,857,845
Other	$10,000 or less	1,189,588
Other	$10,001-$25,000	3,518,165
Other	$25,001 or more	20,364,944
Census region*	**Urbanicity**	**Control total**
Northeast	Urban	5,304,128
Northeast	Rural	1,417,447
South	Urban	8,454,393
South	Rural	3,861,196
Midwest	Urban	6,308,980
Midwest	Rural	2,492,634
West	Urban	7,624,991
West	Rural	1,215,232
Home tenure	**Age/grade of child**	**Control total**
Rent	Transitional kindergarten/ Kindergarten/Pre-1st grade	1,390,202
Rent	1st grade	1,431,051
Rent	2nd grade	1,327,395
Rent	3rd grade	1,344,591
Rent	4th grade	1,314,613
Rent	5th grade	1,306,471
Rent	6th grade	1,217,448
Rent	7th grade	1,117,932
Rent	8th grade	1,102,602
Own or other	Transitional kindergarten/ Kindergarten/Pre-1st grade	2,440,869
Own or other	1st grade	2,902,274
Own or other	2nd grade	2,606,563
Own or other	3rd grade	2,998,054
Own or other	4th grade	2,899,098
Own or other	5th grade	2,848,472
Own or other	6th grade	2,804,840
Own or other	7th grade	2,767,142
Own or other	8th grade	2,859,384
TOTAL		36,679,001

*The following states and the District of Columbia are in each Census region: Northeast: CT, MA, ME, NH, NJ, NY, PA, RI, VT; South: AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV; Midwest: IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI; West: AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey (CPS), March 2000; October 1999.

Person Weights for the AELL Interview

Four adjustments were made to the household-level weight to compute the person-level weight for the AELL interview. The first adjustment accounted for the probability of sampling adults in the household. As described in section 3.3, a sampling algorithm was used to limit the number of persons sampled in each household while maintaining the sampling rates required to attain the target sample sizes. For example, if there were no eligible children in the household and there were three eligible adults—one adult education participant and two adult education nonparticipants, all with less than a high school diploma—then with probability 0.75, up to two adults were sampled at the first stage.[12] At the second stage, in which adults were subsampled based on adult education participation status, the adult education participant domain was sampled with probability 1, and the nonparticipant with probability 0.2876. In such an example, if one adult education participant and one nonparticipant were sampled, then the domain sampling adjustment factor for the participant was 1.3333 [=1/(0.75·1)], and the domain sampling adjustment factor for the nonparticipant was 4.6360 [=1/(0.75·0.2876)]. The second adjustment was used to account for the probability of selecting the adult from among all adults in the household in the sampled educational attainment by participation domain (e.g., adult education participants with less than a high school diploma). This adjustment depended upon the number of eligible adults in the domain and the number to be selected. In the above example, the factor for sampling an adult education participant was 1 and the factor for sampling one of the two adult education nonparticipants was 2 [=1/0.5]. The application of these two adjustments to the household weight created a person-level base weight for the AELL interview.

The third adjustment for the AELL interview person-level weights was the nonresponse adjustment. Four variables were used to create the nonresponse adjustment cells. The first was the sex of the adult, the second was the adult education participation status of the adult (as reported by the Screener respondent), the third was an indicator of whether the sampled adult was the Screener respondent, and the fourth was the Census region. These variables were used because they are available for all sampled adults (both respondents and nonrespondents) and were associated with AELL interview response propensity. Within each cell, the ratio of the weighted number of sampled adults to the weighted number of responding adults was computed and used to create the nonresponse-adjusted person-level weight.

The nonresponse-adjusted weight was adjusted in the final step to national totals using a raking procedure. (Refer to the subsection "Person Weights for the ECPP and ASPA Interviews" above for a general description of the raking methodology.) The control totals for raking the AELL weights were obtained from the March 2000 CPS. The four dimensions for the raking cells were a cross of the adult's race/ethnicity (Black, non-Hispanic/Hispanic/other) and household income ($10,000 or less/$10,001-$25,000/$25,001 or more), a cross of age (16–29 years/30–49 years/50 years or more) and sex, a cross of Census region (Northeast/South/Midwest/West) and urbanicity (urban/rural), and a cross of home tenure (rent/own or other) and highest educational attainment (less than high school diploma/high school diploma or equivalent/some college). These raking dimensions were used because they include important analysis variables (e.g., educational attainment) and characteristics that have been shown to be associated with telephone coverage (e.g., race/ethnicity). The control totals used for raking the AELL interview person-level weights are given in table 3-5.

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[12] The sampling of adults was done in two stages. At the first stage, adults were sampled based on educational attainment. At the second stage, adults were subsampled based on educational attainment and adult education participation status (as reported by the Screener respondent). In households without children, it was possible for two adults to be sampled.

Table 3-5.—Control totals for raking the AELL-NHES:2001 person-level interview weights

Race/ethnicity	Household income	Control total
Black, non-Hispanic	$10,000 or less	3,613,624
Black, non-Hispanic	$10,001-$25,000	5,979,160
Black, non-Hispanic	$25,001 or more	12,593,627
Hispanic	$10,000 or less	2,577,983
Hispanic	$10,001-$25,000	6,595,603
Hispanic	$25,001 or more	12,363,290
Other	$10,000 or less	9,241,027
Other	$10,001-$25,000	26,763,611
Other	$25,001 or more	119,074,918
Age	**Sex**	**Control total**
16–29 years	Male	20,715,422
16–29 years	Female	21,600,780
30–49 years	Male	41,005,133
30–49 years	Female	42,618,407
50 years or more	Male	33,234,159
50 years or more	Female	39,628,942
Census region*	**Urbanicity**	**Control total**
Northeast	Urban	30,223,175
Northeast	Rural	8,076,682
South	Urban	48,406,360
South	Rural	22,107,612
Midwest	Urban	32,690,941
Midwest	Rural	12,915,964
West	Urban	38,281,068
West	Rural	6,101,041
Home tenure	**Highest educational attainment**	**Control total**
Rent	Less than high school diploma	12,578,690
Rent	High school diploma or equivalent	28,686,587
Rent	Some college	13,401,253
Own or other	Less than high school diploma	19,431,575
Own or other	High school diploma or equivalent	76,837,457
Own or other	Some college	47,867,281
TOTAL		198,802,843

*The following states and the District of Columbia are in each Census region: Northeast: CT, MA, ME, NH, NJ, NY, PA, RI, VT; South: AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV; Midwest: IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI; West: AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey (CPS), March 2000.

3.5   Computing Sampling Errors

        In surveys with complex sample designs, such as the NHES:2001, direct estimates of the sampling errors assuming a simple random sample will typically underestimate the variability in the estimates. The NHES:2001 sample design and estimation included procedures that deviate from the assumption of simple random sampling, such as oversampling in areas with higher concentrations of minorities, sampling persons within households with differential probabilities, and raking to control totals.

        One method for computing sampling errors to reflect these aspects of the sample design and estimation is the replication method. Replication involves splitting the entire sample into a set of groups or replicates based on the actual sample design of the survey. The survey estimates can then be computed for each of the replicates by creating replicate weights that mimic the actual sample design and estimation procedures used in the full sample. The variation in the estimates computed from the replicate weights can then be used to estimate the sampling errors of the estimates from the full sample. Appendix B contains a summary of weighting and sample variance estimation variables for the NHES:1991–2001.

        A total of 80 replicates were defined for the NHES:2001 based on the sampling of telephone numbers. This number was chosen to provide reliable estimates of sampling errors with reasonable data processing costs. The specific replication procedure used for the NHES:2001 was a jackknife replication method (Wolter 1985). It involved dividing the sample into 80 random subsamples (replicates) for the computation of the replicate weights. Replicate weights were created for each of the 80 replicates using the same estimation procedures that were used for the full sample. These replicate weights are included in the ECPP file as FEWT1 through FEWT80. In the ASPA interview file, they are FSWT1 through FSWT80, and in the AELL interview file, they are FAWT1 through FAWT80. The computation of the sampling errors using these replicate weights can be done easily using the Windows-based software package WesVar Complex Samples Software; with either of these packages, the replication method should be specified as JK1. The current version of WesVar Complex Samples (version 4) is available from Westat. Information can be obtained at http://www.westat.com/wesvar. A previous version of WesVarPC (version 2.12) is available free of charge at that Web site or by sending an e-mail message to wesvar@westat.com. Please note that version 2.12 of WesVarPC is no longer being updated or revised.

        Another approach to the valid estimation of sampling errors for complex sample designs is to use a Taylor series approximation to compute sampling errors. To produce standard errors using a Taylor series program, such as SUDAAN (Shah et al. 1995), two variables are required to identify the stratum and the primary sampling unit (PSU). The stratum-level variable is the indicator of the variance estimation stratum from which the unit (telephone number or sampled person) was selected. The PSU is an arbitrary numeric identification number for the unit within the stratum. The PSU and stratum variables appear on each of the extended interview files. On the ECPP interview file, the PSU and stratum variables are called EPSU and ESTRATUM; on the ASPA interview file, they are SPSU and SSTRATUM; and on the AELL interview file, they are APSU and ASTRATUM. These variables can be used in SUDAAN to produce standard errors by specifying that the design is a "with replacement" sample (DESIGN = WR) and that the sampling levels are given by the appropriate stratum and PSU variables. For example, for estimates from the ASPA interview file, use SSTRATUM SPSU in the NEST statement. (Information on obtaining SUDAAN can be found at http://www.rti.org/sudaan.)

        STATA, another software package that uses Taylor series methods, also uses the PSU and stratum variables to define the units needed for computation. (Information on obtaining STATA is available at http://www.stata.com.) To specify the stratum, PSU and weight variables in STATA use the svyset strata, svyset psu, and svyset pweight commands. For example, for estimates from the ASPA interview file, use the following commands to specify these design parameters:

svyset strata sstratum
svyset psu spsu
svyset pweight fswt

The full sample weight to be used for analysis of the ECPP interview file is FEWT. For the ASPA interview file, the full sample weight is FSWT. For the AELL interview file, the full sample weight is FAWT.

Data users should be aware that the use of different approaches or software packages in the calculation of standard errors may result in slightly different standard errors. Estimates of standard errors computed using the replication method and the Taylor serie s method are nearly always very similar, but not identical. For a discussion of this issue see Broene and Rust (2000).

3.6 Approximate Sampling Errors

Although calculating the sampling errors using the methods described above is recommended for many applications, simple approximations of the sampling errors may be valuable for some purposes. One such approximation is discussed below.

Most statistical software packages compute standard errors of the estimates based upon simple random sampling assumptions. The standard error from this type of statistical software can be adjusted for the complexity of the sample design to approximate the standard error of the estimate under the actual sample design used in the survey. For example, the variance of an estimated proportion in a simple random sample is the estimated proportion (p) times its complement (l-p) divided by the sample size (n). The standard error is the square root of this quantity. This estimate can be adjusted to more closely approximate the standard error for the estimates from the NHES:2001.

A simple approximation of the impact of the sample design on the standard errors of the estimates that has proved useful in previous NHES surveys and in many other surveys is to adjust the simple random sample standard error estimate by the root design effect (DEFT). The DEFT is the ratio of the standard error of the estimate computed using the replication method discussed above to the standard error of the estimate under the assumptions of simple random sampling. An average DEFT is computed by estimating the DEFT for a number of estimates and then averaging. A standard error for an estimate can then be approximated by multiplying the simple random sample standard error estimate by the mean DEFT.

In complex sample designs, like the NHES:2001, the DEFT is typically greater than 1 due to the clustering of the sample and the differential weights attached to the observations. In the NHES:2001, both of these factors contributed to making the average DEFT greater than 1. A fuller description of these factors for the NHES:2001 is given the *National Household Education Surveys of 2001:Methodology Report* (Nolin et al. forthcoming). (See also appendix B for the DEFT for each data file of the NHES:1991–2001.)

The average DEFT computed for estimates in the three interviews in the NHES:2001 ranged from 1.2 to 1.4. For the ECPP file estimates, the average DEFT was 1.2 overall. For estimates by path of child (infant or preschooler), the average DEFT was also 1.2. For estimates by race/ethnicity, the average DEFT was 1.2 for Hispanics and for White, non-Hispanics and was 1.3 for Black, non-Hispanics**.** Therefore, a DEFT of **1.2** is recommended to approximate the standard error of overall estimates in the ECPP interview file. For estimates by race/ethnicity, a DEFT of **1.2** is also recommended, with the exception of estimates of characteristics of Black, non-Hispanic children; for this subgroup, a DEFT of **1.3** is recommended.

The average DEFT for estimates from the ASPA file was 1.3. For estimates by path of student (grades kindergarten through 8 or homeschoolers), the average DEFT was also 1.3. For estimates by race/ethnicity, the average DEFT was 1.3 for Hispanics and for White, non-Hispanics and was 1.4 for Black, non-Hispanics. Therefore, a DEFT of **1.3** is recommended to approximate the standard error of overall estimates in the ASPA interview file. For estimates by race/ethnicity, a DEFT of **1.3** is also recommended, with the exception of estimates of characteristics of Black, non-Hispanic children; for this subgroup, a DEFT of **1.4** is recommended.

For estimates from the AELL file, the average DEFT is 1.3, and this did not vary for estimates by race/ethnicity, adult education participation status, or educational attainment. Therefore, a DEFT of **1.3** is recommended to approximate the standard error of estimates from the AELL interview file.

As stated above, the average DEFT can be used to approximate the standard error for an estimate. An example of how to do this on a **percent** estimate derived using a statistical package like SAS or SPSS is as follows. If a weighted estimate of 46 percent is obtained for some characteristic in the AELL file (suppose that 46 percent of adults participated in adult education activities, excluding full-time credential programs), then an approximate standard error can be developed in a few steps. First, obtain the simple random sample standard error for the estimate using the weighted estimate in the numerator and the unweighted sample size in the denominator: the standard error for this 46 percent statistic would be 0.48 percent (the square root of (46*54)/10,873, where the weighted estimate (p) is 46 percent, 54 is 100 minus the estimated percent (1-p), and the unweighted sample size (n) is 10,873). The approximate standard error of the estimate from the NHES:2001 is this quantity (the simple random sample standard error) multiplied by the DEFT for the AELL file estimates of 1.3. In this example, the estimated standard error would be 0.62 percent (1.3 x 0.48 percent).

The approximate standard error for a **mean** can be developed using a related procedure. The three steps required to do so are demonstrated using an example from the ASPA file. First, the mean is estimated using the full sample weight and a standard statistical package like SAS or SPSS. Second, the simple random sample standard error is obtained through a similar, but unweighted, analysis. Third, the standard error from the unweighted analysis is multiplied by the mean DEFT for the ASPA file estimates of 1.3 to approximate the standard error of the estimate under the NHES:2001 design. For example, suppose the average total number of hours per week students in grades kindergarten through 8 spend in nonparental care arrangements or programs is 4.2 hours and the simple random sampling standard error (unweighted) is 0.08 hours. Then, the approximate standard error for the estimate would be 0.10 hours (0.08 hours x 1.3).

Users who wish to adjust the standard errors for estimates of **parameters in regression models** should follow a procedure similar to that discussed for means, above. Specifically, the estimates of the parameter in the model can be estimated using a weighted analysis in a standard statistical software package such as SAS or SPSS. A similar, but unweighted, analysis will provide the simple random sample standard errors for these parameter estimates. The standard errors can then be multiplied by the DEFT to arrive at the adjusted standard error for the NHES:2001 design. For example, if a given parameter in a model involving items from the ECPP file has a weighted estimate of 2.33 and an unweighted simple random sample standard error of 0.45, then the adjusted standard error would be 1.2 x 0.45 = 0.54.

Alternatively, the final weight can be adjusted to reflect the DEFT before the parameter estimates are calculated in a standard statistical software package such as SAS or SPSS. To do this, first sum the values of the final weights for the sample of interest. For instance, for an analysis of all infants and preschoolers, sum the final weights for all 6,749 cases on the ECPP file. Next, divide this sum by the number of cases to generate an average final weight. (In the above example, the number of cases is 6,749). Multiply the average final weight by the square of the DEFT for the population of interest. (In the above example, the average final weight would be multiplied by the square of 1.2, or 1.44.) Divide the final weight by the adjusted average weight and save the quotient as a new final weight. (In the above example,

the new final weight is equal to the final weight divided by the product of 1.44 and the average final weight.) Weight the analysis by this new final weight. The standard errors generated in the analysis will approximate the standard errors correctly adjusted for design effects.

It should be noted that direct computation of the standard errors is always recommended when the statistical significance of statements would be affected by small differences in the estimated standard errors.

3.7   Imputation

In the NHES:2001, as in most surveys, the responses to some data items are not obtained for all interviews. There are numerous reasons for item nonresponse. Some respondents do not know the answer for the item or do not wish to respond for other reasons. Some item nonresponse arises when an interview is interrupted and not continued later, leaving items at the end of the interview blank. Item nonresponse may also be encountered because responses provided by the respondent are not internally consistent, and this inconsistency is not discovered until after the interview is completed. In these cases, the items that were not internally consistent were set to missing.

For most of the data items collected in the NHES:2001, the item response rate was very high. The median item response rate for items from the ECPP interview was 99.29 percent; for the ASPA interview data, 98.35 percent; and for the AELL interview, 99.34 percent. (Item response rates are discussed in more detail in chapter 4.) Despite the high item response rate, data items with missing data on the file were imputed. The imputations were done for two reasons. First, complete responses were needed for the variables used in developing the sampling weights. Second, users will be computing estimates employing a variety of methods and complete responses should aid their analysis.

A hot-deck procedure was used to impute missing responses (Kalton and Kasprzyk 1986). In this approach, the entire file was sorted into cells defined by characteristics of households or respondents that are likely to be associated with differences in response propensities. The variables used in the sorting also included any variables involved in the skip pattern for the item. Many of these sort order variables are not on the data files.

The standard set of sort order variables for the household-level items collected in the ECPP, ASPA, and AELL surveys consisted of:

- CENREG -- the Census region in which the household was located;

- HINCOME or HINCMRNG -- household income category (broad or specific, respectively);

- KIDINHH -- a variable derived specifically for imputation from the age (AGE) of household members indicating whether or not children under age 18 resided in the household; and

- HOWNHOME -- whether the home was rented versus owned or other arrangement.

The standard sort order variables for the person-level items on the ECPP and ASPA interview files were:

- MAINRSLT -- the final completion code for the interview;

- ALLGRADR -- a variable derived specifically for imputation that indicates the grade/grade equivalent of the sampled child;

- SEX -- sex of the sampled child;

- PARGRADS -- a variable derived specifically for imputation that indicates the highest education level attained by either parent in the household as less than high school diploma, high school diploma but no bachelor's degree, or college graduate. This variable was derived from MOMGRADE, MOMDIPL, DADGRADE, and DADDIPL; and

- HHPARNS -- a variable derived specifically for imputation from HHMOM and HHDAD indicating whether there were two parents in the household or not.

The standard sort order variables for the person-level items from the Adult Education Interview file were:

- PARTIC -- a variable derived for specifically for imputation that indicates whether the adult participated in any adult education activities (including full-time credential) in the last year;

- EDUC -- a variable derived specifically for imputation that indicates whether or not the adult has at least a high school diploma or the equivalent;

- AGECAT -- a variable derived specifically for imputation from AGE for the respondent with the categories 18 through 29 years, 30 through 49 years, and 50 or older;

- ARACETH -- a variable derived specifically for imputation that classifies the respondent as Black, non-Hispanic; Hispanic; or other; and

- HINCMRNG -- the household income range.

All of the observations were sorted into cells defined by the responses to the sort variables, and then divided into two classes within the cell depending on whether or not the item was missing. For an observation with a missing value, a value from a randomly selected donor (observation in the same cell but with the item completed) was used to replace the missing value. After the imputation was completed, edit programs were run to ensure the imputed responses did not violate skip patterns or edit rules. If any violations occurred, the program was adjusted and imputation was rerun, or if only a few cases were affected, they were manually imputed.

For items in repeating segments (i.e., child care arrangement-level items such as NCCOST1-NCCOST3 on the ECPP and ASPA data files and course-level items such as WRCURR1-WRCURR4 on the AELL data file), the items were imputed without regard to the segment number. That is, all segments were combined prior to imputation. In the absence of a compelling reason to distinguish among segments, this approach allowed for a larger donor pool to be used.

For some items, the missing values were imputed manually rather than using the hot-deck procedure. In the NHES:2001, hand imputation was done (1) to impute certain person-level demographic characteristics; (2) to impute whether a child is homeschooled, attends regular school for some classes, and the number of hours attending regular school; (3) to impute variables that involved complex relationships that would have required extensive programming to impute using a hot-deck procedure; (4) to correct for a small number of inconsistent imputed values; and (5) to impute for a few cases when no donors with matching sort variable values could be found.

For hand imputation of the person-level demographic items and of the homeschooling items, the following three sort variables were used to ensure that all household members were grouped together: state, the three-digit ZIP Code, and the person identification number.

After values had been imputed for all observations with missing values, the distribution of the item prior to imputation, (i.e., the respondents' distribution) was compared to the post-imputation distributions of the imputed values alone and of the imputed values together with the observed values.

There were 36 items in the ECPP file with response rates of less than 90 percent, 87 items in the ASPA file, and 61 items in the AELL file. The comparisons revealed similar item distributions pre- and post-imputation. This comparison is an important step in assessing the potential impact of item nonresponse bias and ensuring that the imputation procedure reduces this bias, particularly for items with relatively low response rates (less than 90 percent).

For each data item for which any values were imputed, an imputation flag variable was created. If the response for the item was not imputed, the imputation flag was set equal to 0. If the response was imputed, the flag was set to either 1, 2, 3, or 4. The value of the imputation flag indicates the specific procedure used to impute the missing value. The imputation flag was typically set to 1 if the missing value was imputed using the standard hot-deck approach.

The procedure for hot-deck imputation only recognizes missing value codes as those that need to be replaced by imputed values. For the NHES:2001, these missing codes were -7 = refused, -8 = don't know, and -9 = not ascertained. Therefore, in some cases, variables that originally equaled -1 (inapplicable) had to be recoded to a missing value code (i.e., -9 = not ascertained) prior to being imputed using the standard hot-deck approach. This was done so that data were consistent with the skip patterns of the questionnaire. For these cases the imputation flag was set to 2. For example, in the ASPA file, if the value of SCHOICE (SD2) equaled -8 for a child, then SDISRCT (SD3) was never asked and thus equaled -1 (inapplicable). During the imputation process for this child, if SCHOICE was imputed to equal 2 (chosen), the SDISRCT had to first be recoded from -1 (inapplicable) to -9 (not ascertained) before the imputation procedure would recognize SDISRCT as a variable that should be imputed to equal either 1 (school is in assigned school district) or 2 (school is not in assigned school district). In this case, the imputation flag for SDISRCT would be set to 2. If an item was imputed manually, the flag was set to 3. The imputation flag was set to 4 if the reported value was "don't know" prior to imputation using the standard hot-deck approach.

The imputation flags were created to enable users to identify imputed values. Users can employ the imputation flag to delete the imputed values, use alternative imputation procedures, or account for the imputation in computation of the reliability of the estimates produced from the data set. For example, some users might wish to analyze the data with the missing values rather than the imputed values. If there is no imputation flag corresponding to the variable, no values for that variable were imputed. If the imputation flag corresponding to the variable is equal to 1, 2, 3, or 4, the user can replace the imputed response with a missing value to accomplish this goal. This method could also be used to replace the imputed value with a value imputed by some user-defined imputation approach. Finally, if the user wishes to account for the fact that some of the data were imputed when computing sampling errors for the estimates, the missing values could be imputed using multiple imputation methods (Rubin 1987) or imputed so that the Rao and Shao (1992) variance procedures could be used.

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4. DATA COLLECTION METHODS AND RESPONSE RATES

4.1   Data Collection Procedures

The following sections discuss the procedures used in the data collection phase of the NHES:2001, including the use of computer-assisted telephone interviewing (CATI), staff training, interviewer assignments and contact procedures, and quality control. More detailed descriptions of these topics can be found in the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming).

4.1.1   Special Precollection Procedures

Before the beginning of data collection, special procedures were implemented to remove business and nonworking telephone numbers from the sample, and specific subsampling was done that reduced the number of telephone numbers from the full sample of 206,182 telephone numbers originally drawn to the final sample of 179,211 telephone numbers that was fielded. In addition, an advance mailing was conducted.

Identification of business and nonworking numbers. The 206,182 telephone numbers in the full NHES:2001 sample were drawn by Genesys, a commercial firm that draws samples to specific requirements. The Genesys ID-PLUS utility was used prior to the start of data collection to identify business and nonworking telephone numbers. With the ID-PLUS utility, a telephone number is dialed and is allowed to ring up to two times. Through this process, nonworking numbers are identified. In all, 44,051 numbers were identified as nonworking through the ID-PLUS process; 41,665 of the telephone numbers in the final sample of 179,211 were assigned a final disposition code of nonworking as a result of the ID-PLUS process. The ID-PLUS process also includes matches to white and yellow pages listings. If a sampled telephone number is listed in the yellow pages but not in the white pages, it is classified as a business number. A total of 8,879 of the 206,182 telephone numbers in the initial sample and 8,400 telephone numbers in the final sample of 179,211 were assigned a status of nonresidential as a result of the matches to yellow pages and white pages listings.

Subsampling of telephone numbers. Two-phase stratification was used to select telephone numbers for the final NHES:2001 sample in order to produce more reliable national estimates. In the first phase, a sample of 206,182 telephone numbers was drawn, with telephone numbers in areas with high percentages of Black and Hispanic residents sampled at nearly twice the rates of those in areas with low percentages[13] of Black and Hispanic residents. In the second phase, within each minority stratum, the sampled telephone numbers were stratified as listed or unlisted according to whether they matched listings in the white pages telephone directory. Within each of the four strata defined by the combinations of minority concentration and listed status, telephone numbers were subsampled at different rates. Within each of the minority strata, telephone numbers in the unlisted substratum were sampled at rates about 30 percent higher than numbers in the listed substratum. This process resulted in a sample of 179,211 telephone numbers for the NHES:2001.

Advance mailing. The field test of the NHES:1996 showed that households receiving an advance letter were more likely to respond to the survey (Brick, Collins, and Chandler 1997). So, in an effort to increase Screener-level response, a mailing was planned for the households for which an address

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[13] High minority areas were defined as having a population that was 20 percent Black or 20 percent Hispanic.

was obtained from either of two commercial firms, Telematch and Acxiom. In all, 98,892 telephone numbers were matched with listed addresses; 79,130 telephone numbers with matched addresses were in the final NHES:2001 sample. To coordinate the arrival of the letter with the initial call into the household, the mailing was to have been conducted in two waves. A brief letter was mailed to approximately half of the households in the final sample for which addresses had been obtained, 47,460 households. This letter explained the purpose of the NHES:2001 and encouraged participation in the study. However, 5,599 letters were returned by the postmaster, the vast majority containing no forwarding address. The second wave mailing, consisting of 31,670 addresses, was prepared but not actually mailed due to unforeseen and unavoidable circumstances. The unweighted completion rate[14] differed for households to which letters were mailed in advance of calling, households with mailable addresses but not actually mailed to, and households for which addresses were sought but could not be obtained (69 and 64 percent compared to 35 percent).

4.1.2   CATI System Applications

The use of a CATI system for the NHES:2001 included a number of applications that facilitated the implementation of the survey. Briefly, the most salient features of the CATI system for the NHES:2001 were as follows:

- **Sampling:** The use of online sampling through CATI eliminated the need for separate screening and interviewing calls, reducing the cost and the burden on respondents.

- **Scheduling:** The CATI system was used to feed telephone numbers to the interviewers, maintain a schedule of callback appointments, and reschedule unsuccessful contact attempts to the appropriate day and time.

- **Skip patterns:** The CATI system was programmed to automatically guide interviewers through the complex skip patterns in the questionnaire, reducing the potential for interviewer error and shortening the questionnaire administration time.

- **Copying responses:** The CATI system was used to copy responses from one interview to another to prevent unnecessary repetition of questions. For example, when two children with the same parents were sampled in a household, the parent characteristics series and household information items were asked only once. This helped to reduce response burden.

- **Monitoring survey progress:** The CATI system was programmed to provide automatic status reports throughout data collection. This allowed ongoing monitoring of the survey's progress.

- **Online help:** The CATI system was programmed to provide an online help screen for each item in the Screener and extended interviews. These screens, which could be accessed with a keystroke by the interviewer, clarified terminology, explained the intent of questions, and helped the interviewer obtain correct information.

4.1.3   Interviewer Training

Interviewers were trained in groups of about 30. Groups were scheduled for training beginning in early December 2000 and continuing into the beginning of February 2001. Experienced interviewers only were trained in December and received 14 hours of training.[15] Inexperienced interviewers were

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[14] The unweighted completion rate is considered here as a measure of the success of the advance mailing process.

[15] Experienced interviewers were those that had worked on Westat CATI studies previously.

trained in January or early February and received 18 hours of training. Prior to the NHES:2001 project training, all interviewers had participated in a basic training in general interviewing techniques and the use of the CATI system that typically lasted 6 hours. Each training group had an assigned time for the first interviewing shift so that their work could be closely monitored. In total, 396 interviewers were trained for the study.

Interviewer training was conducted using the CATI system. The trainees entered information in the CATI system during training presentations, providing them with hands-on experience prior to beginning data collection. The topics covered in the training session included an introduction to the study, interactive lectures based on each of the survey questionnaires, details about survey procedures, and techniques for gaining respondent cooperation. Prior to live interviewing, trainees practiced interviews in pairs using several role-play scripts. The majority of training time (about 12 hours) was spent on interactive lectures and practice interviews using role-play scripts. Most of the remaining time was spent on procedures for contacting households and respondents and techniques for gaining cooperation.

The survey staff included 24 interviewers bilingual in English and Spanish. These interviewers received the same training in English as did all other interviewers. They were then trained to conduct the interviews in Spanish. All of the CATI screens were translated into Spanish, and these screens were available to bilingual interviewers at a keystroke, so they could interview in either English or Spanish when placing an initial call into a household.

4.1.4   Interviewing Procedures

The CATI system scheduled cases automatically, based on an algorithm that was customized for the NHES:2001 survey. The system assigned cases to interviewers in the following order of priority:

- Cases that had specific appointments;

- Cases that had resulted in busy signals 15 minutes earlier;

- Cases that had resulted in noncontact at a scheduled appointment time;

- Initial cases, until they had received one day and one evening call attempt;

- Cases that had unspecified appointment/general callback times for the time period; and

- Cases that had not been contacted on previous attempts and had not been attempted during the time period.

At least eight attempts were made by NHES interviewers to screen households in order to determine the presence of household members eligible for extended interviews, that is, an eligible child or adult. These calls were staggered on different days of the week and at different times of the day over a period of at least 2 weeks. This included at least three daytime calls, three evening calls, and two weekend calls. In addition, nearly all cases for which this eight-call limit was reached were released at several points during data collection to receive additional calling attempts. Cases received up to 15 calls in this effort to complete screening interviews. Cases that were coded as problems were referred to a telephone supervisor to discuss appropriate methods of completing an interview (e.g., holding a case for some time and releasing it for additional attempts later in the data collection period). Below is an overview of the specific calling strategies used during the NHES:2001 data collection and their results. Because most nonresponse in a random-digit-dial (RDD) survey occurs at the screening level, these procedures emphasized increasing the Screener response rate. Please see the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming) for a more detailed account of these procedures and their results.

Procedures for non-English speakers. The NHES:2001 was conducted primarily in English, but provisions were made to interview persons who spoke only Spanish. As was noted above, the questionnaires were translated into Spanish, the Spanish versions of the CATI instruments were programmed, and bilingual interviewers were trained to complete the interview in either English or Spanish.

When the person answering the telephone was not able to speak English, and the interviewer was not bilingual and was not able to identify an English-speaking household member, the interviewer coded the case as a "language problem" and further specified the case as either "hearing/speech problem," "Spanish," or "language other than English or Spanish." There were 32 Screeners that were classified by at least one interviewer as a hearing or speech problem. None of these cases was completed.

Bilingual interviewers were the only ones who could access cases coded Spanish or another language for follow up. If a bilingual interviewer encountered a Spanish-speaking respondent on an initial call into a household, the interviewer could immediately begin to conduct the interview in Spanish without ever coding the case as a language problem. A total of 3,089 Screeners were classified by the first interviewer who made contact as Spanish-speaking. About 68 percent of all these cases were finalized as completes, and about 93 percent of these completed cases, or 64 percent of the total, were completed in Spanish. About 10 percent of the Screener cases identified as Spanish language were finalized as refusals, 4 percent as language problem cases, and about 18 percent were given other nonresponse status codes, such as maximum call or no answer.

About 28 percent of the 997 Screeners with respondents identified by the initial interviewer as speaking some language other than English or Spanish were completed. Most were completed in English; only about 20 percent of the completed cases were completed in Spanish. About half of the cases in households identified as non-English/non-Spanish (54 percent) were finalized as language problems and the rest were refusals (6 percent) or other nonresponse (9 percent).

Answering machines. Interviewers made at least eight attempts to reach households in which call attempts resulted in contact with an answering machine in order to complete the screening and determine whether any household members were sampled for interviews. The first time an answering machine was reached, the interviewer left a brief message explaining the nature of the call, providing the 800 telephone number for the prospective respondent, and explaining that an interviewer would call again at a later time. A different message was left upon reaching an answering machine only if the case changed strategy, for instance, became a refusal or language problem case. At the end of the data collection period, additional messages may have been left in an attempt to gain the cooperation of the household. In 15,532 households with a completed Screener (32 percent), one message was left. In 6,683 households (14 percent), two or three messages were left. Forty-four households received four messages, one household received five, and one received six.

4.1.5   Special Data Collection Procedures

Refusal conversion.   Additional efforts to gain cooperation from households or individual respondents who had initially refused to complete an interview were also part of the data collection effort for the NHES:2001. Unless an interviewer indicated that the initial refusal was "hostile" (e.g., profane or abusive), one refusal conversion attempt was made for each Screener or extended interview refusal. Cases classified as "hostile" were reviewed by a supervisor to determine whether another attempt should be made. For most of the field period, a 13-day hold was placed on initial refusals before a conversion attempt was made. This period was decreased near the end of data collection to facilitate survey close-out while maximizing response rates.

A strategy used in the NHES:2001 to increase the likelihood of successful refusal conversion attempts at the Screener level was to send a letter to households for which an address had been obtained from Telematch or Acxiom, companies that match telephone numbers with published addresses. The letters were sent by Federal Express at a special corporate rate in order to draw the attention of potential respondents to their importance. (Letters to rural route or Post Office box addresses were sent via Priority Mail.) A total of 22,180 letters were mailed, and 11,643 of these cases or 55 percent were completed, versus 38 percent of the 8,599 cases to which a letter was not mailed. Taken together, 24 percent of the completed Screeners were completed in those households that received refusal conversion letters.

An additional refusal conversion attempt was made in a subset of cases which had twice refused to participate in the Screener interview. The cases included in this effort were those for which neither the first nor second refusal received a code of "hostile." This effort resulted in the completion of 3,187 Screeners (or 7 percent of the total completed). All Screener refusals were considered to be final if a third contact with the household resulted in a code of refusal.

Refusal conversion efforts were successful at the extended interview level as well; 419 ECPP interviews, 553 ASPA interviews, and 1,095 AELL interviews were completed as a result. In the NHES:2001, an additional refusal conversion attempt was also made on selected extended interview cases for which two refusals had been received. Before calling, those cases with mailable addresses were sent a letter of explanation, provided the household had not been sent a refusal conversion letter previously. The letters were sent by Federal Express (at a special corporate rate) or, for cases with addresses not accepted by Federal Express, by Priority Mail. These efforts also yielded completed interviews; a higher percentage of cases sent letters completed interviews as compared with cases with no mailable addresses. In sum, 120 ECPP interviews were completed out of 484 refusals cases refielded for a second time, 156 ASPA interviews were completed out of 681 cases refielded, and 330 AELL interviews out of 1,586 refielded were completed.

In summary, the refusal conversion activities for the NHES:2001 were productive. Fifty-five percent of the Screener refusal cases that were mailed a Federal Express letter and 38 percent of the cases called after an initial refusal but not mailed a Federal Express letter were completed after calling back into the household, including 22 percent of the cases released for another call attempt after two refusals. Of the extended interviews released for a first refusal conversion attempt, from 38 to 34 percent were completed. From 21 to 25 percent of extended cases refielded for a second refusal conversion attempt were completed. The completion rate was higher for cases that had been mailed a Federal Express letter. For instance, 36 percent of the ECPP second refusal cases that had been mailed a letter were completed versus 20 percent that had not been mailed a letter. (For more details, see the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming).

"Maximum call" cases. Other efforts to increase the Screener response rate focused on "maximum call" cases, in which a person had answered the telephone on at least one of the seven initial call attempts. If a good mailing address had been obtained for the household, cases were randomly subsampled to receive either a Federal Express (or Priority Mail) letter or a first class letter in an 8 1/2 x 11-inch envelope. The letter described the survey and the importance of cooperating. Approximately 60 percent of the mailable cases were sent Federal Express or Priority Mail letters, and the rest, first class letters. The cases were held for a period of time, mailed to if possible, and released for additional attempts periodically during the data collection period. This effort resulted in the completion of 1,362 additional Screeners, 27 percent of eligible cases refielded and 5 percent of all completed Screeners. The completion rates for mailed cases and those not mailed to ranged from 30 percent for cases mailed Federal Express or Priority Mail letters to 26 percent for those mailed first class letters and 25 percent for those not mailed to.

Extended interview "maximum call" cases were also released for additional call attempts, and mailable cases were sent letters in an effort to gain respondent cooperation. ECPP and ASPA cases with

mailable addresses in households that had not previously been mailed a refusal conversion or maximum call letter were sent first class letters. Because of the greater difficulty in gaining respondent cooperation for the AELL survey, those "maximum call" cases were sent Federal Express or Priority Mail letters. These efforts resulted in the completion of 500 ECPP interviews, 679 ASPA interviews, and 863 AELL interviews. Again, the results of the mailing were fruitful. For example, 52 percent of the AELL maximum call cases that were mailed letters were completed in contrast to 36 percent that were not mailed letters. (For more details, see the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming).

"No answer" calls. Numbers that had been answered only by answering machines and never by a person ("no answer, answering machine" cases) and numbers at which no answer was ever received during the seven attempts, ("no answer" cases) also received special treatment during the NHES:2001 data collection. All "no answer, answering machine" Screener cases for which a good address had been obtained were mailed a letter. Nearly two-thirds of the mailable cases were mailed a Federal Express or Priority Mail letter and the rest were mailed a first class letter in an 8 1/2 by 11-inch envelope prior to being refielded for additional call attempts. Of the 5,772 Screener "no answer, answering machine" cases, 1,049 were completed after re-releasing. There was little difference in completion rate between the 1,912 cases that were mailed a Federal Express or Priority Mail letter (28 percent completed) and the 1,089 cases mailed a First Class letter (27 percent completed). However, of the 2,762 cases not mailed to, only 15 percent were completed.

"No answer" cases were re-released for additional call attempts as well. Because previous experience has shown that "no answer" cases are the least productive cases, cases were subsampled before re-releasing them, so that data collection efforts could be efficiently allocated according to the types of cases and their likelihood of yielding completes. Approximately one-third of the "no answer" cases were randomly sampled and released for additional attempts. To reflect this subsampling, the cases that were re-released were weighted up to represent all the "no answer" cases.[16] Eighty-one of the 5,103 subsampled "no answer" cases were completed, a completion rate of 2 percent. (The refielded "no answer" cases accounted for 0.2 percent of all completed Screeners.) However, 532 telephone numbers were identified as nonworking or nonresidential. At the close of data collection, the cases at which a person was never reached were allocated to residential or nonresidential status in order to calculate the final response rate for the study. The allocation was based upon the statistical survival method which took into consideration the number of call attempts for each case as well as other characteristics of the telephone number (Brick et al. 2002).

4.1.6   Data Collection Quality Control

Data collection quality control efforts began during the CATI development period. As the CATI system was programmed, extensive testing of the system was conducted. This testing included review by project research staff, telephone interviewing staff, data preparation staff, statistical staff, and the programmers themselves. The testing by staff members representing different aspects of the project was designed to ensure that the system was working properly from all of these perspectives. Two live field tests were conducted in households prior to data collection to ensure that the CATI system was working properly and the timing and flow of the instruments was as expected. In phase one, 427 households were screened, and extended interviews for all three surveys were administered: 320 ECPP interviews, 254 ASPA interviews, and 135 AELL interviews were conducted from June 1 through June 9, 2000. Phase two focused on the ECPP and ASPA surveys because changes to the AELL instrument following phase one did

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[16] In computing response rates, each "no answer" case that was selected for re-release was given a weighting factor of three (the reciprocal of the subselection probability). Each "no answer" case that was eligible but not selected for re-release was given a weighting factor of 0.

not warrant conducting additional interviews. Between September 28 and October 2, 311 screened households yielded 74 completed ECPP interviews and 60 completed ASPA interviews.

Quality control activities continued during training and data collection. During interviewer training, interviewers paired with one another conducted role-play interviews on telephones monitored by supervisors. When interviewers began actual data collection, they were monitored on an ongoing basis by telephone center supervisors. Project research staff also monitored the interviewers, especially during the beginning weeks of data collection. Data preparation staff reviewed the cases from the CATI system as they were completed and referred problems to the project staff for resolution. Interviewer memos were posted and distributed when any observations indicated that reminders to the interviewers were appropriate. Additional training was provided to interviewers as necessary.

Throughout data collection, supervisors and telephone monitors (experienced telephone interviewers who were trained for monitoring) listened for about 15 minutes at a time to the interviewers from either a monitoring room or from a carrel on the floor of the telephone center. The monitors completed a special monitoring form that covered five major areas of telephone interviewing:

- Voice quality and reading skills;

- Listening, probing, and clarifying skills;

- Technical skills;

- Gaining respondent cooperation; and

- Interview management.

The monitors recorded their impressions of the interviewer's skills and abilities along with suggestions for improvement. Interviewers were individually coached by supervisors, and any who had exhibited difficulty were intensively monitored to make sure the difficulties were resolved. If the problems continued, then the interviewers were released from the NHES:2001 interviewing pool. Over 15,000 monitoring sheets were completed for NHES:2001 interviewers. Only eight interviewers were released because of inadequate performance.

In addition, at least once a week, the CATI management system produced computer-generated reports that displayed response rates, refusal rates, and refusal conversion rates for each NHES:2001 interviewer. These reports assisted telephone center supervisors in identifying differences in interviewer performance. Supervisors relied on both monitoring sheets and standard reports to make staff assignments. For example, standard reports might have shown that some interviewers were more effective in refusal conversion and monitoring those interviewers could have revealed persons particularly skilled in gaining cooperation from the elderly who could be assigned to conduct refusal conversion on those cases.

4.2   Response Rates in the NHES:2001

A response rate is the ratio of the number of units with completed interviews (for example, the units could be telephone numbers, households, or persons) to the number of units sampled and eligible for the interview. In some cases, these rates are easily defined and computed, while in other cases the numerator or denominator of the ratio must be estimated.

For reporting the results from the NHES:2001, the response rate indicates the percentage of possible interviews completed taking all survey stages into account, while the completion rate measures the percentage of interviews completed for a specific stage of the survey. For example, household members

were identified for interviews in a two-stage process. Screener interviews were conducted to enumerate and sample household members, and then questionnaires were administered for the sampled members. If the first-stage Screener was not completed, no members could be sampled for other interviews. Under this design, the completion rate for the second stage (ECPP, ASPA, or AELL interviews) is the percentage of sampled persons who completed these interviews. The response rate is the product of the first- and second-stage completion rates.

Response and completion rates can be either unweighted or weighted. The unweighted rate, computed using the raw number of cases, provides a useful description of the success of the operational aspects of the survey. The weighted rate, computed by summing the weights (usually the reciprocals of the probability of selecting the units) for both the numerator and denominator, gives a better description of the success of the survey with respect to the population sampled, since the weights allow for inference of the sample data (including response status) to the population level. Both rates are usually similar unless the probabilities of selection and the response rates in the categories with different selection probabilities vary considerably. All of the response rates discussed below are weighted unless noted specifically in the text.

Response rates and completion rates are identical for the first stage of sampling and interviewing (i.e., the Screener). The next section discusses the response rate for the Screener and provides a profile of the characteristics of the respondents. The discussion of response and completion rates for ECPP, ASPA, and AELL interviews are given in the sections that follow. Additional information on the NHES:2001 response rates, including the findings of additional nonresponse bias analyses, is included in the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming).

4.2.1 Screener Response Rate

The first panel of table 4-1 shows the disposition of the 179,211 telephone numbers that were sampled for the NHES:2001. The three major categories of residential status are those identified as numbers for residential households, those identified as nonresidential numbers (primarily nonworking and business telephone numbers), and those numbers that, despite numerous attempts, could not be classified as either residential or nonresidential. Calculation of response rates is complex because of the possible ways residential status can be assigned to these numbers.

As shown in the lower part of the table, the first weighted response rate of 69.2 percent for the Screener was calculated using the survival analysis method (Brick et al. 2002). The survival analysis method uses information about cases for which no answer was obtained in the estimation of their residency rate. Specifically, the listed status, interviewers' coding of answering machine call attempts, and the total number of call attempts are used in the estimation of the residency rate based on survival analysis methods. Estimates based on the survival method suggest that 27.9 percent of telephone numbers with undetermined residency status in the NHES:2001 are residential. Therefore, the denominator of the survival method response rate is the weighted total number of residential telephone numbers plus the 27.9 percent of the weighted total of numbers with unknown residential status that are estimated to be residential. The numerator is the weighted number of telephone numbers in households that participated in the survey. Both the numerator and the denominator have been weighted by the probabilities of selecting the telephone numbers and weighted for the subsampling for extensive follow up of no-answer telephone numbers that were not refielded.

Other estimates of the response rates were computed by allocating different proportions of the numbers with unknown residency status into the residential category. The footnote to table 4-1 explains five different schemes for estimating the response rate. It is reasonable to say that the Screener response rate is between 61 and 73 percent. The variability in the estimates arises because it is not possible to identify precisely the residential status for each telephone number. The response rate calculated by the business

office method has traditionally been reported as the NHES response rate. However, some research suggests that the business office approach may be inaccurate due to reporting practices of phone companies (Shapiro et al. 1995). The survival method response rate is believed to be more accurate because it uses data about the sampled telephone numbers in the estimation of the residency rate. Using this approach, the best estimate for the NHES:2001 response rate is 69 percent.

The lower right part of table 4-1 also shows unweighted Screener response rates calculated using each of the approaches described above. If the raw count of telephone numbers had not been weighted, the Screener response rate using the survival analysis method would have been 67.6 percent.

Table 4-1.—Number of telephone numbers dialed, by residential status and weighted and unweighted Screener response rates

Screener response category	Number	Percentage of all numbers	Percentage of residential numbers
Total	179,211	100.0	
Identified as residential			100.0
Responded	48,385	27.0	72.5
Did not respond	18,309	10.2	27.5
Identified as nonresidential	95,147	53.1	
Unknown residential status	17,370	9.7	

Estimated Screener response rates*	Weighted rate (percent)*	Unweighted rate (percent)*
Survival analysis response rate	69.2	67.6
Business office method response rate	67.5	65.6
CASRO response rate	67.0	65.5
Conservative response rate	60.5	57.6
Liberal response rate	73.2	72.6

*All of the response rates use the weighted number of responding households (for weighted rates) or the unweighted number of responding households (for unweighted rates) as the numerator. The denominators vary but are all estimated totals. For the survival analysis method response rate, the proportion of unknown residential status numbers included in the denominator was estimated using survival analysis methods that incorporate information about the cases (including listed status, interviewers' coding of answering machine call results, and the number of call attempts the telephone number received). For the estimated response rate using the business office method, the proportion of unknown residential status numbers included in the denominator was based upon the proportion identified in checks with telephone business offices. For the CASRO (Council of American Survey Research Organizations) response rate, the proportion of unknown residential status numbers included in the denominator was based upon the residency rate for the numbers with known residential status. For the conservative response rate, all of the unknown residential status numbers were included. For the liberal response rate, none of the unknown residential status numbers were included.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Household Education Surveys Program (NHES), 2001.

Table 4-2 presents the Screener response rate by selected geographic area characteristics and characteristics of telephone numbers. These characteristics were considered because they are available for all telephone numbers and are sometimes associated with response propensity. The response rate for listed residential telephone numbers was higher than for telephone numbers that were not listed. The response rate was also higher for telephone numbers with mailable addresses, regardless of whether letters were mailed, than for those without mailable addresses. The Screener response rate also varied somewhat by region of the country. Response rates for the Northeast and West were lower than for the Midwest and South. Areas with lower proportions of renters had higher response rates than those with higher proportions. Areas with higher proportions of Whites had higher response rates than those with lower proportions. Response rates declined as median home value increased.

Table 4-2.—Number of telephone numbers dialed in the Screener, by response status, weighted response rate, and characteristic of the geographic area based on the telephone exchange

Characteristic	Total	Residential, responded	Residential, did not respond	Non-residential	Unknown residential status	Estimated response rate (percent)*
Total..	179,211	48,385	18,309	95,147	17,370	69.2
Census region						
Northeast	31,846	8,815	4,019	15,265	3,747	65.2
South......................................	68,256	18,515	6,861	36,591	6,289	69.4
Midwest	37,554	9,905	3,127	21,392	3,130	73.1
West	41,555	11,150	4,302	21,899	4,204	68.4
Listed status						
Not listed................................	119,858	21,133	9,260	75,204	14,261	61.9
Listed residential.....................	50,952	27,252	9,049	11,542	3,109	73.9
Listed business........................	8,401	0	0	8,401	0	†
Mailable status						
Mailable address, mailed to........	41,848	23,609	7,594	7,494	3,151	74.7
Mailable address, not mailed to...	31,575	16,083	6,270	6,497	2,725	70.4
No mailable address..................	105,788	8,693	4,445	81,156	11,494	54.6
Answering machine message indicator						
Message left............................	42,122	22,271	10,985	6,360	2,506	66.6
No message left	137,089	26,114	7,324	88,787	14,864	71.5
Percent White						
Less than 20 percent..................	10,553	2,641	1,366	5,621	925	62.3
20 to 49 percent.......................	28,067	6,794	3,165	15,171	2,937	63.4
50 to 79 percent.......................	60,603	15,993	6,266	32,192	6,152	67.4
80 to 89 percent.......................	23,100	6,458	2,308	11,944	2,390	68.9
90 percent or more....................	56,888	16,499	5,204	30,219	4,966	72.3
Median home value						
1st decile	18,003	4,321	1,291	11,261	1,130	74.8
2nd decile................................	17,890	4,951	1,506	10,192	1,241	74.2
3rd decile................................	17,761	5,112	1,633	9,548	1,468	73.0
4th decile................................	17,760	5,096	1,764	9,426	1,474	71.9
5th decile................................	17,741	5,201	1,806	9,124	1,610	71.2
6th decile................................	17,807	5,189	1,844	8,953	1,821	70.1
7th decile................................	17,915	4,937	1,913	9,141	1,924	68.5
8th decile................................	18,009	4,831	2,144	9,032	2,002	65.4
9th decile................................	18,103	4,723	2,356	8,855	2,169	62.7
10th decile	18,222	4,024	2,052	9,615	2,531	60.4
Percent renters						
Less than 50 percent..................	128,965	37,208	13,086	66,927	11,744	70.7
50 to 59 percent.......................	21,641	5,308	2,208	11,873	2,252	66.2
60 to 69 percent.......................	11,523	2,491	1,135	6,705	1,192	63.8
70 to 89 percent.......................	14,602	2,926	1,611	8,267	1,798	58.0
90 percent or more....................	2,480	452	269	1,375	384	54.7
Percent owners						
Less than 50 percent..................	28,452	5,832	2,998	16,265	3,357	60.1
50 to 69 percent.......................	60,145	16,221	6,322	31,606	5,996	68.0
70 to 79 percent.......................	49,131	14,414	5,015	25,198	4,504	71.1
80 percent or more....................	41,483	11,918	3,974	22,078	3,513	71.5
Percent age 65 and older						
Less than 20 percent..................	123,720	33,841	12,789	65,105	11,985	69.3
20 percent or more....................	55,491	14,544	5,520	30,042	5,385	68.8

*The estimated response rate is the survival method response rate, i.e., the number of completed interviews divided by the sum of the number of completed interviews, nonresponses, and 27.9 percent of telephone numbers with an unknown residency status, weighted by the probability of selection.

†Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Household Education Surveys Program (NHES), 2001.

4.2.2   Extended Interview Response Rates

The number of persons enumerated and sampled, and those with completed interviews for each survey of the NHES:2001, are given in table 4-3. Of the enumerated 9,184 children eligible for sampling for the ECPP interview, a sample of 7,973 children was selected. About 1.8 percent of the sampled children were not actually in the age and grade range eligible for the survey according to the reports of the ECPP interview respondent; 0.3 percent were eligible for the ASPA survey and had completed ASPA interviews, and 1.5 percent of the children were classified as ineligible. Completed ECPP interviews were obtained for 6,749 of the sampled children (19 of whom were initially sampled for ASPA interviews) for an estimated 87 percent completion rate and a response rate of 60 percent. The bulk of the unit nonresponse for the ECPP interview was due to refusal of the parent/guardian to respond (54.1 percent of nonresponse). Other reasons for ECPP interview nonresponse were inability to make contact with the parent/guardian (30.8 percent of nonresponse), language problems (2.7 percent of nonresponse), and other miscellaneous reasons such as the parent/guardian being unavailable for an interview during the field period (12.4 percent of nonresponse).

Table 4-3.—Number of enumerated children and adults, completed interviews, and weighted completion and response rates, by type of extended interview

Type of interview	Number	Estimated completion rate (percent)	Estimated response rate (percent)*
ECPP interview			
Enumerated	9,184		
Sampled for ECPP..	7,973		
Sampled for ECPP and eligible for ECPP.............	7,828		
Did not respond...	1,098		
Sampled as ECPP, completed as ECPP................	6,730		
Sampled as ASPA, completed as ECPP................	19		
Sampled as ECPP, completed as ASPA................	25	86.6	59.9
ASPA interview			
Enumerated	18,477		
Sampled for ASPA..	11,135		
Sampled for ASPA and eligible for ASPA	11,075		
Did not respond...	1,517		
Sampled as ASPA, completed as ASPA...............	9,558		
Sampled as ECPP, completed as ASPA................	25		
Sampled as ASPA, completed as ECPP................	19	86.4	59.7
AELL interview			
Enumerated	59,393		
Sampled...	13,858		
Eligible	13,833		
Did not respond...	2,960		
Complete..	10,873	77.2	53.4

*The estimated response rate is computed by multiplying the Screener response rate of 69.2 percent by the appropriate completion rate. Due to rounding, the product of the reported Screener response rate and the reported extended interview completion rate may not match the estimated response rate given.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation survey of the National Household Education Surveys Program (NHES), 2001, Before- and After-School Programs and Activities survey of the NHES, 2001, and Adult Education and Lifelong Learning survey of the NHES, 2001.

The number of children enumerated, sampled, and the final status of each sampled child for the ASPA interview are also given in table 43. About 60 percent of the 18,477 enumerated children in kindergarten through grade 8 were sampled for the ASPA interview. About 0.5 percent of the sampled students were classified as ineligible for the ASPA survey because the parent respondent reported that they were not actually enrolled in grades K through 8; 0.2 percent were determined to be eligible for the ECPP survey and had completed ECPP interviews, and 0.4 percent were ineligible for both the ECPP and ASPA surveys. In all, 9,583 ASPA interviews were completed with parents or guardians of sampled children, including 25 who were initially sampled for an ECPP interview. The estimated completion rate for the ASPA interview is 86 percent, and the response rate is 60 percent. The main reason for ASPA interview nonresponse was the refusal of the parent/guardian to complete the interview (56.3 percent of ASPA interview nonresponse). Other reasons for nonresponse to the ASPA interview were inability to make contact with the parent/guardian respondent (28.9 percent of ASPA interview nonresponse), language problems (3.0 percent of ASPA interview nonresponse), and other miscellaneous reasons for nonresponse such as the parent/guardian being unavailable for an interview during the field period (11.8 percent of nonresponse).

The bottom section of table 4-3 gives the numbers of adults enumerated and sampled, and the final status of the AELL interview for sampled adults. Adults were enumerated in only a subsample of households. Of the 59,393 enumerated adults, 13,858 were sampled for AELL interviews. A total of 10,873 adults completed the AELL interview. The estimated completion rate for the AELL interview is 77 percent and the response rate is 53 percent. Almost all of those sampled were eligible for the interview; those classified as ineligible were either in the military or currently enrolled in high school. For the AELL interview, the bulk of the nonresponse was due to refusal of the sampled adult to respond (60.1 percent of nonresponse). Other reasons for AELL interview nonresponse were inability to make contact with the sampled adult (21.0 percent of nonresponse), language problems with the sampled adult (4.4 percent of nonresponse), and other miscellaneous reasons such as the sampled adult being unable to respond due to illness (14.6 percent of nonresponse).

The completion rates for the ECPP, ASPA, and AELL interviews can only be examined by variables available for both respondents and nonrespondents. For persons sampled for extended interviews in the NHES:2001 surveys, such variables are those available on the sampling frame and those available from the Screener. The variables shown for the ECPP interview are Census region (based on the telephone number) and nursery/preschool enrollment status of the sampled child. Age and grade were collected during the Screener. Table 4-4 shows the number of sampled children by response status and completion rate for each of these variables. The completion rates vary slightly by Census region, with the highest completion rate in the Midwest (89 percent) and the lowest in the Northeast (85 percent). There are no differences in completion rates according to whether the child is enrolled in nursery school/preschool.

For the ASPA interview, Census region, obtained based on the telephone number; grade, collected in the Screener; and type of schooling (regular or home school, also collected in the Screener), were also used to examine completion rates. The distribution of cases for these variables and the completion rates are shown in table 4-5. There are slight differences in completion rates by Census region, with the highest completion rate in the Midwest (89 percent) and the lowest in the West (84 percent). There is little variation in the completion rates by grade for students whose grade is known.

For the AELL interview, four variables were considered in examining the response profile: Census region (based on the telephone number), sex (from the Screener), adult education participation status as reported by the Screener respondent, and an indicator of whether the sampled adult was the Screener respondent (table 4-6). The completion rates vary somewhat by region, with the highest completion rate in the Midwest (81 percent) and the lowest in the Northeast (75 percent). The completion rate for females is higher than that for males, and the completion rate for adults reported by the Screener respondent to be adult education participants is slightly higher than the completion rate for those reported to be nonparticipants (80

percent vs. 76 percent). Sampled adults who were the Screener respondents completed the AELL interview at a higher rate (87 percent) than those who were not the Screener respondents (66 percent).

Table 4-4.—Number of sampled ECPP interviews, by response status and weighted completion rates

ECPP interviews	Total	Responded	Did not respond	Ineligible	Estimated completion rate (percent)
Total.................................	7,973	6,755	1,098	120	86.6
Census region					
Northeast.......................................	1,391	1,155	216	20	84.9
South...	2,929	2,487	399	43	86.1
Midwest...	1,636	1,430	183	23	89.1
West..	2,017	1,683	300	34	86.0
Enrollment status of child (Screener)					
Not enrolled..................................	5,750	4,845	787	118	86.6
Nursery/Preschool..........................	2,220	1,910	310	0	86.6
Unknown	3	0	1	2	0.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation survey of the National Household Education Surveys Program (NHES), 2001.

Table 4-5.—Number of sampled ASPA interviews, by response status and weighted completion rates

ASPA interviews	Total	Responded	Did not respond	Ineligible	Estimated completion rate
Total..................................	11,135	9,577	1,517	41	86.4
Census region					
Northeast..	2,062	1,764	293	5	86.2
South...	4,186	3,578	593	15	85.7
Midwest...	2,212	1,971	235	6	89.4
West...	2,675	2,264	396	15	84.3
Grade of child (Screener)					
Kindergarten....................................	894	762	131	1	84.9
1st grade..	936	810	126	0	86.9
2nd grade	872	768	102	2	88.2
3rd grade..	918	771	144	3	85.7
4th grade..	1,008	878	125	5	85.9
5th grade..	1,041	898	141	2	87.2
6th grade..	1,827	1,558	267	2	85.5
7th grade..	1,846	1,614	228	4	88.3
8th grade..	1,750	1,493	242	15	85.2
Other *...	5	4	1	0	75.9
Unknown	38	21	10	7	67.3
School (Screener)					
Regular school	10,866	9,348	1,480	38	86.3
Homeschool......................................	221	197	23	1	91.2
Unknown	48	32	14	2	67.3

*Other included ungraded and special education.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Before- and After-School Programs and Activities survey of the National Household Education Surveys Program (NHES), 2001.

Table 4-6.—Number of sampled AELL interviews, by response status and weighted completion rates

AELL interviews	Total	Responded	Did not respond	Ineligible	Estimated completion rate (percent)
Total	13,858	10,873	2,960	25	77.2
Census region					
Northeast...	2,476	1,900	570	6	74.5
South..	5,210	4,064	1,137	9	76.1
Midwest...	2,892	2,356	534	2	81.0
West...	3,280	2,553	719	8	77.2
Sex (Screener)					
Female	7,690	6,224	1,458	8	80.1
Male...	6,168	4,649	1,502	17	73.9
Adult education participation status (Screener)					
Participant..	6,615	5,348	1,251	16	79.6
Nonparticipant	7,243	5,525	1,709	9	75.7
Screener respondent					
Sampled adult	8,525	7,369	1,151	5	87.2
Person other than sampled adult..........	5,333	3,504	1,809	20	66.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning survey of the National Household Education Surveys Program (NHES), 2001.

4.3 Item Response Rates

For most of the data items collected in the NHES:2001, the item response rate was very high. The tables in this section show the item response rates for a representative group of items for each interview. The items included were selected to represent key items and to represent the range of item response rates. The number of cases for which each item was attempted and the percentage of cases for which a valid response was obtained are shown.

Table 4-7 shows the item response rates for a representative group of items from the ECPP interview. ASPA interview item response rates for selected items are represented in table 4-8; table 4-9 presents the selected AELL interview item response rates. For the ECPP, ASPA, and AELL surveys, the median item response rates were 99.29 percent, 98.35 percent, and 99.34 percent, respectively. For items that are rarely asked, e.g. the items pertaining to the third credential program in the AELL interview, a small number of missing values could result in a low item response rate. For most of the selected items across the three surveys, item response rates were very high. For more details, including a complete listing of all item response rates, see the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming).

For the ASPA survey, there is one set of variables worth noting. During the preparation of the data file, an unintended skip in the ASPA questionnaire was detected for a set of parental care items (PABHOME, PAAHOME, PAAHMIN, PAAHMOUT, PAARELA, PAAFRND, PAANEIG, PAAPUBL, PAACENT, PAAOUT, PAASCHL, PAAPLOTH, PAAEDUC, PAACOMP, PAAREAD, PAAART, PAACHOR, PAAOUTPL, PAAINPLA, PAAPHON, PAAEAT, PAATV, PAATALK, PAAACTIV, and PAAOTHER). Consequently, the item PABHOME was not asked about children with no before-school arrangements if they also had before- or after-school activities that were used to cover hours when parents needed adult supervision for them (ASCOVER = 1). This question should have been asked for all children who had no arrangements before school, regardless of the status of their before- or after-school arrangements. All remaining items in the list above were skipped if children had no after-school

arrangements and had before- or after-school activities that were used to cover hours when adult supervision was needed.

Again, these questions should have been asked for all children who had no after-school arrangements, regardless of their before- or after-school arrangements. It was determined that for these subgroups, these items should be imputed. For PABHOME, 576 cases were imputed, and for all remaining variables listed above, 274 cases were imputed as a result of the unintended skip.

For more details, including a complete listing of all item response rates, see the *National Household Education Surveys of 2001: Methodology Report* (Nolin et al. forthcoming).

Table 4-7.—Item response rates for selected items in the ECPP interview

Item	Number attempted	Percent response
Current school status		
Child enrolled/attending school	3,150	100.00
Child being schooled at home	349	100.00
Early childhood care/programs and perceptions of quality/factors in parental choice		
Child receives regular care from a relative	6,749	99.97
Child receives regular care from a nonrelative	6,749	100.00
Number of children cared for by nonrelative, program 1	1,103	97.82
Child attends center-based program	6,749	99.97
Program 1 located at parent workplace	2,427	98.76
Number of days per week child attends program 1	2,525	99.33
Any arrangement is Head Start	4,296	99.53
Parent would choose nonparental care	2,396	97.83
Home activities and emerging literacy and numeracy		
Number of times read to child in last week	6,749	99.94
Taught child letters/words/numbers in past week	3,150	99.87
Visited library with child in past month	3,150	99.94
Child recognizes letters	4,421	99.82
How high child can count	4,421	99.84
Health and disability		
Child is developmentally delayed	6,749	99.84
Last time child saw doctor	6,749	99.96
Child has learning disability	3,150	99.46
Disability affects ability to learn	406	97.29
Parent and household items		
Highest grade mother completed	6,633	99.05
Mother worked for pay last week	6,633	99.55
Highest grade father completed	5,444	97.80
Father worked for pay last week	5,444	99.38
Own home, rent, or other arrangement	6,749	99.47
Total household income range	6,749	87.98

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation survey of the National Household Education Surveys Program (NHES), 2001.

Table 4-8.—Item response rates for selected items in the ASPA interview

Item	Number attempted	Percent response
Current school status		
Child enrolled/attending school	9,583	100.00
Child homeschooled for religious reasons	195	100.00
School characteristics		
Child attends public/private school	9,398	99.84
Lowest grade taught at child's school	9,398	98.63
Number of students enrolled in child's school	9,398	91.47
Before/after school arrangements		
Child receives regular care from a relative	9,388	99.86
Child receives regular care from a nonrelative	9,388	99.88
Child attends a before- or after-school center-based program	9,388	99.93
Child regularly participates in activities before or after school	9,388	99.93
Child is regularly responsible for himself/herself before or after school	9,388	99.62
Perceptions of quality and factors in parental choice		
Parent is aware of before- or after-school programs in the community	4,525	98.59
Health and disability		
Child has deafness or another hearing impairment	9,583	99.86
Child receives services for disability from local school district	2,096	99.09
Parent and household items		
First language mother learned to speak	9,223	99.38
Father participates in program at work to cover child care costs	1,511	82.06
Family received benefits from Medicaid	9,583	98.94
Total household income range	9,583	89.29

SOURCE: U.S. Department of Education, National Center for Education Statistics, Before- and After-School Programs and Activities survey of the National Household Education Surveys Program (NHES), 2001.

Table 4-9.—Item response rates for selected items in the AELL interview

Item	Number attempted	Percent response
Background		
Highest grade completed	10,873	99.53
Work at job in past 12 months	10,873	99.97
Have home computer/laptop	10,873	98.87
Have access to computer at work	7,879	98.86
Use Lifetime Learning tax credit	1,210	91.90
Use Hope Scholarship tax credit	943	93.85
English as a second language		
Took ESL classes	1,636	99.94
Work while taking ESL classes	95	98.95
Employer required to take ESL	76	98.68
How well reads English	1,636	99.76
How well writes English	1,636	99.82
Basic skills and GED preparation classes		
Basis skills classes	2,058	99.85
GED preparation classes	2,058	99.76
Other high school equivalency program	2,058	99.90
ABE/GED was p art of family literacy program	197	91.88
Credential programs		
College or university degree program	10,873	99.99
Enrolled part time/full time/both, course 1	1,188	99.33
Work while taking course 1	974	99.79
Vocational or technical diploma program	10,873	99.96
Apprenticeship program	10,873	99.89
Employer provided apprenticeship program	135	100.00
Work related courses/informal learning activities		
Currently taking work related course 1	3,764	99.63
Maintain or improve skills knowledge, course 1	3,764	99.68
Self-paced study - computer software	10,873	99.82
Household characteristics		
Own, rent home, or other arrangement	10,873	98.11
Family received WIC in past 12 months	3,069	98.31
Total household income range	10,873	78.26

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education and Lifelong Learning survey of the National Household Education Surveys Program (NHES), 2001.

5. DATA PREPARATION

5.1　Disclosure Risk Analysis

Central to the mission of The National Center for Education Statistics is a commitment to protecting the identity of respondents to its various data collections. Surveys that make up the National Household Education Surveys program are designed to protect respondent identity. This design includes an extensive respondent disclosure risk analysis. As in past NHES collections, results from this analysis led to modifications to some data included on the data files. These confidentiality edits modify respondent data in order to prevent positive identification of individual respondents. Tests on the modified data were conducted to assure that the data remain accurate and useful. Wrongful disclosure of respondent identity by users of the data can result in penalties of up to 5 years in prison and up to $250,000 in fines (see section 9007, as amended, of Title 20 of the Unites States Code)."

5.2　Coding and Editing Specifications

Most of the NHES:2001 interview data were coded by the interviewers during the interview using the CATI system. As the interviewers entered the number of the response option given by the respondent, this number was written to the data file. Range and logic edits were developed for relevant items to maximize coding accuracy.

5.2.1　Range Specifications

The ranges of most of the items were determined by the codes available for responses (closed-ended responses). However, some items such as age did not have predefined response codes and required an entry by the interviewer (open-ended responses). To help assure that reasonable entries were made for open-ended responses, reasonable ranges were defined.

Range edits included both hard- and soft-range edits. A "soft range" is one that represents the reasonable expected range of values but does not include all possible values. Responses outside the soft range were confirmed with the respondent and had to be entered a second time. For example, the number of hours each week a child attended center-based care had a soft range of 1 to 50. A value outside this range could be entered and confirmed as correct by the interviewer as long as it was within the hard range of values (1 to 70). "Hard ranges" are those that have a finite set of parameters for the values that can be entered into the CATI system. Out-of-hard-range values for either open- or closed-ended questions were not accepted. If the respondent insisted that a response outside the hard range was correct, the interviewer could enter the information in a comments data file. These comments were reviewed by data preparation and project staff. Out-of-hard-range values were accepted if the comments supported the response. Otherwise, the values were left as missing and later imputed.

After data collection was completed, range edits were rerun against the entire database to ensure that no outliers were inadvertently introduced during the post-data-collection updating process or during imputation. Therefore, any outliers that exist in the data files were reviewed during the data preparation process and originated from information entered into the comments data file.

5.2.2 Consistency Checks (Logic Edits)

Consistency or logic checks examine the relationships between responses to ensure that they do not conflict with one another or that the response to one item does not make the response to another unlikely. Logic specifications for the NHES:2001 interviews were contained within the CATI system. For example, the CATI system was programmed to control skip patterns so that inappropriate items were not asked. Additional consistency (logic) checks for the NHES:2001 interviews also were included. For example, a parent/guardian may have reported that a child was attending a grade that was outside the normal range of grades for his age. If the logic check was violated, an error message appeared that explained that the response was out of the soft range and allowed the interviewer to enter a correction. If the interviewer passed through the error screen once and information was still outside the soft range, but within the hard range, the interviewer was asked to re-verify the information. After the second attempt, the inconsistent information was accepted. However, if an initial response was outside the hard range, the error message appeared and continued to reappear unless a response within the hard range was entered. If the respondent confirmed an answer outside of a hard range, the interviewer entered it as a comment. These verified responses were allowed in the data file. At several points during data collection, logic edits were also checked against the entire database. Cases violating the edits were examined by data preparation and project staff and either the information violating the edit was kept or it was coded to "not ascertained" and later replaced with imputed data. Data were kept in circumstances where the data were judged to be plausible even though they violated the edit (e.g., the length of time from home to the center-based program was more than 90 minutes). In such circumstances, there was supporting information available in the comments data file.

5.2.3 Structural Edits

Because of the surveys' complexity, the CATI database was a highly complex, hierarchical file. The relationships of database records were often dependent on values of variables contained in other database records; therefore, structural edit specifications were developed to check the structural integrity of the database. This ensured that all variables that should exist did exist and those that should not exist did not exist in the database. For example, if there was a completed ECPP interview for a child, the data record that contained the child items must have existed in the database. Structural edits were run against the entire database during the data preparation.

5.2.4 Frequency and Cross-Tabulation Review

The frequencies of responses to all data items (both individually and in conjunction with related data items) were reviewed to ensure that appropriate skip patterns were followed. Members of the data preparation team checked each item to make sure the correct number of responses was represented for all items. If a discrepancy was discovered, the problem case was identified and reviewed. If necessary, the audit trail for the interview, which provided a keystroke-by-keystroke record of an interview, was retrieved to determine the appropriate response. If the audit trail revealed no additional information, either a call back was made to the household to obtain the information or the item was coded as "not ascertained," and later imputed.

5.2.5 Review of "Other, specify" Items

The "other, specify" open-ended text responses were reviewed to determine if they should be coded into one of the existing code categories. When a respondent selected an "other" response, the interviewer entered text into a "specify" overlay that appeared on the screen. The "specify" responses were reviewed by

the data preparation staff and, where appropriate, coded into one of the existing response categories. Review of the open-ended text responses revealed that with few exceptions, no particular text item occurred frequently enough to warrant the creation of a new response category. However, some additions were made. A response category of "biweekly" was added to each of the cost of care questions in the ECPP and ASPA interviews (RCUNIT, NCUNIT, CPUNIT). The item "talking with friends/socializing" was added to the other open-ended descriptions of the child's activities in each type of before- and after-school arrangement (RCBFRIE1-RCBFRIE4, RCAFRIE1-RCAFRIE4, NCBFRIE1-NCBFRIE4, NCAFRIE1-NCAFRIE4, CPBFRIE1-CPBFRIE4, CPAFRIE1-CPAFRIE4, and SCAFRIE). Two open-ended items were added in the ECPP and ASPA files as reasons that a parent chooses to stay home to care for the child. These are "child's safety/security/parent doesn't trust others" (PPSAFETY) and "parent wants to be with child" (PPWANT). The response categories and open-ended items that were added appear in italics on the questionnaires. Verbatim strings of all "other, specify" items do not appear on the public-use data files. However, verbatim strings do appear on the restricted-use data file. See sections 6.3 of Volume II through Volume IV for a discussion of the restricted-use files.

5.2.6   Coding of Open-Ended Items

In the AELL interview, open-ended items that were coded related to the industry and occupation of jobs reported by respondents and the major field of study for participants in credential programs. Codes for industry and occupation are included in the public-use data file (FSIC for industry; FSOC for occupation). The coding manual for industry and occupation, an aggregation of Standard Industry and Standard Occupation Codes (SIC and SOC), is found in appendix G of Volume IV of this manual. Codes for major field of study are also included in the public-use data file (CIPF) and the major field of study coding manual is found in appendix H of Volume IV of this manual. Up to four work-related courses (WRCRS1-WRCRS4) and up to two personal interest courses (SACRS1-SACRS4) were also coded. Verbatim strings used in coding industry and occupation, major field of study, and courses are included in the restricted-use file of the AELL-NHES:2001.

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APPENDIX A

**NHES:2001 SCREENER AND ECPP, ASPA, AND
AELL QUESTIONNAIRES**

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APPENDIX B

**SUMMARY OF WEIGHTING AND
SAMPLE VARIANCE ESTIMATION VARIABLES**

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Summary of weighting and sample variance estimation variables

NHES Data File	Full Sample Weight	Computing Sampling Errors					Approximating Sampling Errors
		Replication Method (WesVarPC[1])			Taylor Series Method (SUDAAN and STATA[2])		DEFT (Average Root Design Effect)
		Respondent ID	Replicate Weights	Jackknife Method	Sample Design	Nesting Variables	
NHES:1991 *Early Childhood Education* ■ Primary file ■ Preprimary file	 EWGT EWGT	PERSID	 EWREPL1 – EWREPL50 EWREPL1 – EWREPL50	 JK1 JK1	 WR WR	 VSTRAT PSU VSTRAT PSU	 1.3 1.3
NHES:1991 *Adult Education* ■ Adult file ■ Course file[3]	 AEWT AEWT	 PERSID CLASID	 AEREPL1-AEREPL50 AEREPL1-AEREPL50	 JK1 JK1	 WR WR	 VSTRAT PSU VSTRAT PSU	4.5 Full Sample 2.3 Participants 2.8 Nonparticipants 3.8 Black (non-Hispanic) 3.2 Hispanic 2.8 White (non-Hispanic) 2.4 Other races
NHES:1993 *School Readiness*	FWGT0	ENUMID	FWGT1 - FWGT60	JK2	WR	STRATUM PSU	1.3
NHES:1993 *School Safety & Discipline* ■ Parent interviews only ■ Parent & Emancipated Youth (EY) interviews ■ Youth interviews (including Emancipated Youth)	 FWGT0 FWGT0 (for parents) & PFWGT0 (for EY) FWGT0	 BASMID BASMID ENUMID	 FWGT1-FWGT60 FWGT1-FWGT60, PFWGT1-PFWGT60 FWGT1-FWGT60	 JK2 JK2 JK2	 WR WR WR	 STRATUM PSU STRATUM PSU STRATUM PSU	 1.4 1.4 1.5
NHES:1995 *Early Childhood Program Participation*	EWEIGHT	ENUMID	ERPL1 - ERPL50	JK1	WR	STRATUM PSU	1.2
NHES:1995 *Adult Education*[4]	AEWEIGHT	BASMID	ARPL1 - ARPL50	JK1	WR	STRATUM PSU	1.3
NHES:1996 *Screener/Household & Library*	FHWT	BASEID	FHWTR1-FHWTR80	JK1	WR	HSTRATUM HPSU	1.1
NHES:1996 *Parent PFI/CI*	FPWT	BASMID	FPWTR1-FPWTR80	JK1	WR	PSTRATUM PPSU	1.3

Summary of weighting and sample variance estimation variables—Continued

NHES Data File	Full Sample Weight	Computing Sampling Errors					Approximating Sampling Errors
		Replication Method (WesVarPC[1])			Taylor Series Method (SUDAAN and STATA[2])		DEFT (Average Root Design Effect)
		Respondent ID	Replicate Weights	Jackknife Method	Sample Design	Nesting Variables	
NHES:1996 *Youth CI*	FYWT	BASMID	FYWTR1-FYWTR80	JK1	WR	YSTRATUM YPSU	1.4
NHES:1996 *Adult CI*	FAWT	BASMID	FAWTR1-FAWTR80	JK1	WR	ASTRATUM APSU	1.2
NHES:1999 *Parent Interview*	FPWT	BASMID	FPWT1-FPWT80	JK1	WR	PSTRATUM PPSU	1.3
NHES:1999 *Youth Interview*	FYWT	BASMID	FYWT1-FYWT80	JK1	WR	YSTRATUM YPSU	1.3
NHES:1999 *Adult Education Interview*	FAWT	BASMID	FAWT1-FAWT80	JK1	WR	ASTRATUM APSU	1.3 Full sample 1.4 Participants 1.5 Black, non-Hispanic
NHES:2001 *Early Childhood Program Participation*	FEWT	BASMID	FEWT1-FEWT80	JK1	WR	ESTRATUM EPSU	1.2 Full sample 1.3 Black, non-Hispanic
NHES:2001 *Before- and After-School Programs and Activities*	FSWT	BASMID	FSWT1-FSWT80	JK1	WR	SSTRATUM SP SU	1.3 Full sample 1.4 Black, non-Hispanic
NHES:2001 *Adult Education and Lifelong Learning*	FAWT	BASMID	FAWT1-FAWT80	JK1	WR	ASTRATUM APSU	1.3

[1]WesVar Complex Samples software, version 4, is available from Westat. Information is on their Web site, www.westat.com.

[2]Information on SUDAAN can be obtained at www.rti.org. Information on STATA can be obtained at www.stata.com.

[3]Unlike the NHES:1995 Adult Education data file, no course weights are provided in the NHES:1991 course file. The full sample weight and variables for computing sampling errors are provided in the course file for making adult-level estimates. Information as to the total number of courses that adults took is also available, and procedures similar to those described in the NHES:1995 *Adult Education Data File User's Manual* (Collins et al. 1996a) could be used to create weights for making course-related estimates. However, it is important to note that the course information collected in the NHES:1991 pertains to the four most recent courses taken, rather than a random sample of courses as was the case in the NHES:1995.

[4]This data file contains weights for making "person-course" estimates pertaining to work-related and other formal structured courses. A simple way of doing this is to create a new variable that is the product of the course weight and the variable of interest. The standard weight and variance estimation methods are then applied to the new variable. The weight variables are called WRWGT, for adjusting for the courses adults took in work-related classes, and SAWGT, for adjusting for personal development courses. Weights are required for these types of courses because course-related data were collected only for a random subsample of courses. See the NHES:1995 *Adult Education Data File User's Manual* (Collins et al. 1996a) for more details.