Chapter 2: Sample Design and Attrition

2.1 Sample Design

The original NLS of Mature Women sample was designed to represent the civilian noninstitutionalized population of the United States ages 30–44 as of March 31, 1967, at the time of the initial survey. The cohort is represented by a multi-stage probability sample drawn by the Census Bureau from 1,900 primary sampling units (PSUs) that had originally been selected from the nation's counties and cities for the experimental *Monthly Labor Survey* conducted between early 1964 and late 1966. A primary sampling unit consists of Standard Metropolitan Statistical Areas (SMSAs), counties (or parishes in some states), parts of counties, and independent cities. A total of 235 sample areas, comprising 485 counties and independent cities, were chosen to represent every state and the District of Columbia. From the sample areas, 235 strata were created of one or more PSUs that were relatively homogeneous according to socioeconomic characteristics. Within each stratum, a single PSU was selected to represent the stratum. Finally, within each PSU, a probability sample of housing units was selected to represent the civilian noninstitutionalized population. Because the addresses for the sample frame came from the 1960 Census, respondents are covered by Title 13 confidentiality restrictions. Therefore, variables linking respondents to PSUs are not available to public users, making it impossible to identify respondents by city or state.

2.2 Screening Process

As dictated by the above requirements, the initial sample of about 42,000 housing units for all four NLS Original Cohorts was selected and screening interviews took place in March and April of 1966. Of this number, about 7,500 units were found to be either vacant, occupied by persons whose usual residence was elsewhere, changed from residential use, or demolished. On the other hand, about 900 additional units were found created within existing living space or changed from what had been nonresidential space. A total of 35,360 housing units were available for interview, from which usable information was collected for 34,662 households, for a completion rate of 98.0 percent.

The original plan called for using the initial screening to select all four NLS Original Cohorts. However, after the sample members for the Older Men were chosen, the sample was rescreened in September 1966 before the initial interview of the Young Men. This decision was made because a seven-month delay between the screening and first interview seemed inordinate due to the mobility of Young Men in their late teens and early twenties. To increase efficiency, it was decided to stratify the sample for the rescreening by the presence or absence of a 14- to 24-year-old male in the household. The probability was high that a household that contained a 14- to 24-year-old in March would also have such a member in September. However, to insure that the sample also represented persons who had moved into sample households in the intervening period, a sample of addresses that previously had no 14- to 24-year-old males was also included in the rescreening operation. Since a telephone number had

been recorded for most households at the time of the initial screening interview, every attempt was made to complete the short screening interview by telephone. The sample of households from the initial screening, supplemented with information from the rescreening, was subsequently used to obtain the two samples of women ages 30–44 and 14–24 for the Mature Women and Young Women cohorts (Parnes et al. 1970; Shea et al. 1971).

User Notes: During the screening process a large number of multiple respondent households were designated for interview; more than half of respondents in the Mature Women, Young Women, and Young Men cohorts and one-third of respondents in the Older Men cohort originated from multiple respondent households (i.e., a household with at least one other NLS respondent). For more information on multiple respondent households and on the types of relationships that existed between respondent pairs (e.g., spouse, sibling, etc.), see the "Household Composition" section of this guide.

2.3 Sampling Process

Following the initial household interview and rescreening operation, 5,393 women ages 30-44 as of March 31, 1967, were designated to be interviewed for the Mature Women cohort. The sample was designed to provide approximately 5,000 respondents—about 1,500 nonwhites and 3,500 whites. The women were sampled differentially within four strata: whites in predominantly white enumeration districts (EDs), non-whites in predominantly non-white EDs, whites in predominantly non-white EDs, and non-whites in predominantly white EDs. An enumeration district is a geographical area considered to be an appropriate size for an interviewer to complete all necessary interviews within a prescribed time frame. To provide separate reliable statistics for black respondents, the sample design called for oversampling of blacks at twice the expected rate in the total population. The sampling rate of households in predominantly non-white EDs was between three and four times that for households in predominantly white EDs in order to meet this survey requirement. During the first survey in 1967, 5,083 (94.3 percent) of the designated women were interviewed.

2.4 Interview Schedule & Fielding Periods

In the initial survey plan, respondents from each of the four Original Cohorts were to be interviewed yearly over a five-year period. However, due to cost considerations, it was decided after the second survey of the Older Men to survey the two older groups (Older Men and Mature Women) biennially rather than annually. In order to permit a survey at the end of the five-year period, Mature Women respondents were interviewed in both 1971 and 1972. A decision was made at the end of the first five-year period to continue the interviews for another five years because of the usefulness of these data and the relatively small sample attrition. At this point, the interviewing pattern changed from a biennial

personal interview to a 2-2-1 schedule; each respondent was contacted by phone approximately every two years, then again in person one year after the second phone interview. The 2-2-1 schedule was continued through 1987 when the decision was made to conduct a personal interview every other year. However, the implementation of the biennial schedule was interrupted by the 1990 decennial Census. The scheduled 1990 Young Women survey was pushed back to 1991; the scheduled 1991 Mature Women survey was conducted in 1992. The scheduled 1994 Mature Women survey was then delayed until the 1995 CAPI administration. Table 2.4.1 depicts the years in which the cohort was surveyed, the fielding period, the percent of the cohort interviewed, and the type of interview utilized.

Table 2.4.1 Sample Sizes, Retention Rates, and Fielding Periods

Year	Type of interview	Fielding period	Total interviewed	Retention rate[1]	Retention rate among living respondents[2]
1967	Personal	May–July	5083	100.0%	100.0%
1968	Mail	May–July	4910	96.6	97.0
1969	Personal	May–July	4712	92.7	93.3
1971	Personal	April–June	4575	90.0	91.1
1972	Personal	April–June	4471	88.0	89.2
1974	Telephone	April–June	4322	85.0	86.8
1976	Telephone	April–June	4172	82.1	84.2
1977	Personal	April–June	3964	78.0	80.2
1979	Telephone	April–June	3812	75.0	77.7
1981	Telephone	April–June	3677	72.3	75.5
1982	Personal	July–September	3542	69.7	73.1
1984	Telephone	April–June	3422	67.3	71.3
1986	Telephone	July–September	3335	65.6	70.3
1987	Personal	July–September	3241	63.8	68.7
1989	Personal	June–August	3094	60.9	66.5
1992	Personal	October–December	2953	58.1	65.1
1995	Personal	June–September	2711	53.3	61.3
1997	Personal	July–September	2608	51.3	61.0
1999	Personal	June–August	2467	48.5	59.2

[1] Retention rate is defined as the percent of base-year respondents who were interviewed in any given survey year. Included in the calculations are deceased and institutionalized respondents, as well as those serving in the military.

[2] This retention rate excludes respondents known to be deceased in each survey year. This rate may be underestimated, as it is likely that some respondents classified as "refused" or "unable to locate" are actually deceased.

User Notes: Although each of the personal interviews contains data of roughly the same degree of completeness, data gathered during the telephone interviews were not meant to update the longitudinal record of a respondent. Rather, the telephone interviews were intended to obtain a brief update of information on each respondent and to maintain sufficient contact so that the lengthier personal interview could be completed. The combination of fluctuating fielding periods and type of interview (i.e., personal, mail, or phone) may affect not only the probability of reinterview but also the reference periods of time-related questions.

There is another source of inconsistency with respect to time references. A given year's survey instrument may use the previous calendar year as a reference period for some questions, while other questions will collect data for the period since the last interview. Income data, for example, may be collected for the calendar year, corresponding to the time frame for a respondent's tax records; employment data are usually collected for the period since the last interview.

2.5 Interview Methods

Before each survey period begins, the Census Bureau generates lists of respondents to be interviewed and distributes them to 12 regional offices. Current addresses and contact information are generated from data collected during the last interview and through a postal check conducted by Census, and cases are assigned to interviewers who live in the same geographic area as the respondent. Interviewers then receive copies of the questionnaire (or a laptop computer for CAPI interviews), respondents' *Household Record Cards*, and flashcard and information booklets.

In each survey round, interviewers are responsible for contacting each respondent in their caseload and for using additional local level resources to locate those respondents who have moved since the last interview. Respondents who have moved outside the geographic district of the original interviewer are assigned to another unless there are no personnel nearby. In the latter event, an effort is made to interview the respondent by telephone.

Each respondent to be interviewed is sent various materials to encourage continued participation. Advance letters thanking respondents for taking part in the interviews and informing them of the coming survey are mailed prior to each interview period. Fact sheets highlighting recent research findings from each cohort's survey data are also provided. Respondents who initially refuse to participate in a survey are sent letters and some additional materials by the regional offices designed to encourage their participation and are once again contacted by local level interviewers to secure the interview.

While the type of survey, personal or telephone, determines the chief mode of contact, an alternate contact method is used for certain respondents. During a personal survey, for example, those respondents who live long distances from the Census interviewer's base of operation or those for whom the Census supervisor has decided that another contact method is warranted are contacted by telephone. Although survey instruments are written in English only, multilingual interpreters are made available by the regional offices to interviewers who need them.

In 1995, respondents in the two women's cohorts were interviewed during the same time period; a single computer-assisted personal interview (CAPI) replaced the paper-and-pencil interview (PAPI)

instruments used during the previous interviews. While data were collected simultaneously for the two cohorts, they were released separately by cohort. This CAPI interview has continued on a biennial basis.

The average length of an interview varies depending on the type conducted, with personal PAPI interviews lasting 50–60 minutes, CAPI interviews lasting about 70 minutes, and telephone interviews averaging 20–25 minutes. No stipends have been paid to Original Cohort respondents for their participation.

2.6 Eligible Sample & Reasons for Noninterview

In general, respondents selected for interviewing each year are those who participated in the initial survey and who are alive, residing within the United States at the interview date, and noninstitutionalized. (If a respondent had joined the Armed Forces, she would also have been excluded from interview during her enlistment, but no Mature Women respondents were members of the military during the survey period.) However, the criteria used to select the eligible sample—respondents whom the Census Bureau attempts to interview in a given round—have varied somewhat over the years.

Beginning in 1968, any respondent who had refused to be interviewed during a previous round was dropped from the eligible sample. Beginning in 1971, respondents were also dropped from the eligible sample if they had not been interviewed in two consecutive surveys for reasons other than death or refusal (for example, respondents who could not be located or contacted during the field period—those with 'Reason for Noninterview' codes of 1, 2, 3, 4, 5, 6, 8, or 11). In 1982, Census ceased dropping individuals for these two reasons but did not attempt to reinterview those already dropped. For example, a respondent who missed the 1979 and 1981 interviews, or any two consecutive interviews prior to that year, for a reason other than death or refusal would not be eligible to participate in 1982 or any subsequent year. Similarly, a respondent who refused to participate in 1981 or any earlier survey would not be eligible in 1982 or any later survey. However, respondents who refused to participate or missed their second consecutive interview in 1982 are retained in the sample and are eligible for all subsequent interviews, unless they have died or been institutionalized. The User Notes after Table 2.6.2 describe how dropped respondents can be identified.

Table 2.6.1 below depicts reasons for exclusion from the eligible sample and the years each applied; Tables 2.6.3 and 2.6.4 later in this section present reasons for noninterview across survey years.

Table 2.6.1 Reasons for Exclusion from the Eligible Sample

Out-of-Scope Reason	Years Exclusion Reason in Effect
Institutionalized	All years
In the Armed Forces	All years
Residing outside the U.S.	All years
Deceased	All years
Refusal during any one previous interview	1967–82. If interviewed in 1984, a respondent remained in the eligible sample for subsequent interviews.
Dropped due to two consecutive noninterviews for reasons other than refusal, death, or membership in the Armed Forces	1971–82. If interviewed in 1984, a respondent remained in the eligible sample for subsequent interviews.
Congressional Refusal[1]	1984–present

[1] Congressional Refusal refers to a congressional representative requesting a respondent not be contacted again for an NLS survey after a respondent has completed one or more survey rounds.

Each survey year, CHRR creates a cumulative 'Reason for Noninterview' variable for the full sample of respondents. Variable reference numbers for this series from 1968 to 1999 are: R00856., R00884., R01338., R02053., R02883., R03084., R03295., R04555., R04912., R05284., R06664.10, R07215.10, R07833.10, R08878.10, R10093.10, R16012., R34981., and R42670.   This created variable is a combination of (1) the noninterview reasons provided by Census for the subset of respondents designated as eligible for interview in that survey year and (2) the reason for noninterview assigned during a previous survey to out-of-scope respondents. For several surveys, CHRR released an additional variable reflecting the reasons for noninterview for only those respondents with whom interviews were attempted that year. This type of variable is available in 1974 (R07755.) and in 1992–99 (e.g., R10093.). The number of respondents that Census designates as eligible for interviewing fluctuates by survey year.

Instructions to interviewers on how to code a respondent's reason for noninterview appear within the *Interviewer's Reference Manuals* (or *Field Representative's Manuals)*. The set of noninterview coding categories present during the initial survey years has been supplemented over the years with additional reasons for noninterview, and the meanings of existing categories have been refined. Table 2.6.2 presents the raw coding categories present on the public data files and specifies the survey years during which each category was utilized.

**Table 2.6.2 Conceptual & Raw Coding Categories
for the Reason for Noninterview Variables**

Conceptual Category	Raw Coding Category[1]	Code & Survey Years	
CAN'T LOCATE	Unable to locate [contact] R - reason not specified	[1]	All (1967–present)
	[Unable to locate R] - mover - no good address	[4]	All
INTERVIEW IMPOSSIBLE	[Unable to locate R] - mover - good address given but interview impossible to obtain (e.g., "moved to Germany" or "lives too far from PSU - distance too great")[2]	[2]	All
	[Unable to locate R] - mover - good address given but unable to obtain interview after repeated attempts, etc.	[3]	All
	[Unable to locate R] - nonmover - unable to obtain interview after repeated attempts, etc.	[5]	All
	Temporarily absent	[6]	All
	Other	[11]	All
REFUSAL	Refusal	[9]	All
	Congressional refusal[3]	[14]	1984–present
OUT OF SCOPE	In Armed Forces	[7]	All
	Institutionalized	[8]	All
	Moved outside U.S. (other than Armed Forces)	[13]	1979–present
DECEASED	Deceased	[10]	All
DROPPED	Non-interview for two years, R dropped from sample	[12]	1971–present

[1] Specific instructions to Census interviewers on use of these coding categories can be found in the cohort-specific *Interviewer's Reference Manuals.*

[2] Beginning in the 1979 survey year, the separate "moved outside the U.S." coding category was added as a reason for noninterview and the "unable to locate" coding category no longer included those respondents who had moved outside the United States.

[3] "Congressional refusal" refers to a congressional representative requesting a respondent not be contacted again for an NLS survey after a respondent has completed one or more survey rounds.

User Notes: Researchers can use the 'Reason for Noninterview' variables to identify respondents who were dropped from the eligible sample. Respondents with a code of 12 were dropped due to missing two consecutive interviews for reasons other than death or refusal. It is more difficult to determine which respondents were dropped because they refused an interview in 1981 or earlier, because they are assigned the same code as respondents refusing an interview in later years. To identify these respondents, researchers must examine the 'Reason for Noninterview' variables and assume that a respondent was dropped if she has a code of 9 for every survey since she first refused, if that first refusal was in 1981 or earlier. Respondents who have consistently refused in more recent surveys, but who did not refuse an interview before 1982, remain in the eligible sample.

The reason for noninterview coding categories depicted in Tables 2.6.3 and 2.6.4 below were constructed from the raw coding categories as shown in Table 2.6.2. For example, the conceptual category "can't locate" is the sum of codes "1" and "4." Tables 2.6.3 and 2.6.4 depict the number of respondents not interviewed by survey year, reason, and race.

Table 2.6.3 Reasons for Noninterview: 1968–99

Survey Year	Total Interviewed	Total Not Interviewed	Reason for Noninterview					
			Can't Locate	Interview Impossible	Refusal	Out of Scope[1]	Deceased	Dropped[2]
1968	4910	173	49	25	76	1	22	–
1969	4712	371	50	69	210	7	35	–
1971	4575	508	56	65	292	6	60	29
1972	4471	612	39	49	389	2	72	61
1974	4322	761	41	31	479	5	101	104
1976	4172	911	34	40	580	7	131	119
1977	3964	1119	22	49	761	6	140	141
1979	3812	1271	21	27	867	11	176	169
1981	3677	1406	18	17	963	9	216	183
1982	3542	1541	15	26	1061	8	238	193
1984	3422	1661	31	25	1113	13	285	194
1986	3335	1748	38	35	1130	10	341	194
1987	3241	1842	30	45	1195	14	364	194
1989	3094	1989	29	49	1265	21	431	194
1992	2953	2130	62	18	1286	24	546	194
1995	2711	2372	69	91	1321	33	664	194
1997	2608	2475	96	49	1293	38	805	194
1999	2467	2616	81	68	1311	48	914	194

Note: This table is based on R00856., R00884., R01338., R02053., R02883., R03084., R03295., R04555., R04912., R05284., R06664.10, R07215.10, R07833.10, R08878.10, R10093.10, R16012., R34981., and R42670.

[1] Beginning with the 1979 survey, "moved outside the U.S." became a separate out-of-scope coding category. Respondents who could not be interviewed during the 1968–77 surveys because their residence– either within or outside of the U.S.– was too far away were coded within the "interview impossible" category. Out-of-scope counts for pre-1979 survey years thus may be understated.

[2] Respondents who had been noninterviews for two consecutive survey years due to reasons other than refusal or death were eliminated from the eligible sample beginning with the 1971 interview. After the 1982 interview, no additional respondents were dropped based on this rule.

Table 2.6.4 Reasons for Noninterview by Race: 1968–99

| Survey Year | Total Interviewed | | Total Not Interviewed | | Reason for Noninterview | | | | | | | | | | | |
| | | | | | Can't Locate | | Interview Impossible | | Refusal | | Out of Scope[1] | | Deceased | | Dropped[2] | |
	Non-black	Black	Non-black	Black	Non-black	Black	Non-black	Black	Non-black	Black	Non-black	Black	Non-black	Black	Non-black	Black
1968	3576	1334	117	56	26	23	16	9	60	16	1	0	14	8	–	–
1969	3418	1294	275	96	31	19	48	21	171	39	3	4	22	13	–	–
1971	3330	1245	363	145	29	27	52	13	228	64	1	5	33	27	20	9
1972	3264	1207	429	183	20	19	36	13	298	91	0	2	36	36	39	22
1974	3157	1165	536	225	19	22	24	7	369	110	3	2	55	46	66	38
1976	3049	1123	644	267	18	16	30	10	443	137	3	4	74	57	76	43
1977	2892	1072	801	318	12	10	36	13	583	178	3	3	79	61	88	53
1979	2781	1031	912	359	13	8	14	13	663	204	10	1	103	73	109	60
1981	2685	992	1008	398	9	9	13	4	738	225	6	3	126	90	116	67
1982	2583	959	1110	431	11	4	16	10	816	245	5	3	139	99	123	70
1984	2510	912	1183	478	16	15	16	9	855	258	11	2	161	124	124	70
1986	2453	882	1240	508	19	19	22	13	872	258	7	3	196	145	124	70
1987	2383	858	1310	532	18	12	34	11	915	280	10	4	209	155	124	70
1989	2277	817	1416	573	15	14	29	20	977	288	13	8	258	173	124	70
1992	2170	783	1523	607	38	24	13	5	1008	278	15	9	325	221	124	70
1995	2012	699	1681	691	36	33	65	26	1043	278	15	18	398	266	124	70
1997	1939	669	1754	721	67	29	35	14	1026	267	22	16	480	325	124	70
1999	1848	619	1845	771	53	28	56	12	1029	282	30	18	553	361	124	70

Note: This table is based on R00023. (race), R00856., R00884., R01338., R02053., R02883., R03084., R03295., R04555., R04912., R05284., R06664.10, R07215.10, R07833.10, R08878.10, R10093.10, R16012., R34981., and R42670.

[1] Beginning with the 1979 survey, "moved outside the U.S." became a separate out-of-scope coding category. Respondents who could not be interviewed during the 1968–77 surveys because their residence– either within or outside of the U.S.– was too far away were coded within the "interview impossible" category. Out-of-scope counts for pre-1979 survey years thus may be understated.

[2] Respondents who had been noninterviews for two consecutive survey years due to reasons other than refusal or death were eliminated from the eligible sample beginning with the 1971 interview. After the 1982 interview, no additional respondents were dropped based on this rule.

2.7 Sample Representativeness and Attrition

The retention rate for the Mature Women as of the 1999 interview was 48.5 percent, or 2,467 of the original 5,083 respondents. Retention rate is defined as the percent of base-year respondents who were interviewed in any given survey year; included in the calculations are deceased and other out-of-scope respondents (see Table 2.6.2 for definitions). An analysis of selected characteristics of respondents interviewed in the tenth year samples of the Original Cohorts found that noninterviews had not seriously distorted the sample representativeness of any of the cohorts for the characteristics studied (Rhoton 1984). A second analysis of differential attrition among wealthy and non-wealthy subsamples of each of the four Original Cohorts found that non-wealthy respondents of each cohort showed a consistent tendency toward greater attrition (Rhoton and Nagi 1991). Among the three younger cohorts, almost all

of the difference between wealthy and non-wealthy subsamples is accounted for by attrition reasons other than the death of the respondent. In a more recent analysis, Zagorsky and Rhoton (1998) concluded that respondents with lower socio-economic status attrited at a higher rate than those with higher income and educational attainment. Further, the authors found that white respondents were more likely to remain in the survey than blacks and those of other races. For year-by-year retention rates, consult Table 2.4.1 in the "Interview Schedule & Fielding Periods" section of this chapter.

In Table 2.7.1, the percentage of sampled respondents of each race is presented for the base survey year (1967) and the most recent interview year for which data is available. This table also provides information on numbers of deceased respondents by race. Figure 2.7.1 characterizes the percentage of the original sample, by race, who have been interviewed at each survey point.

Table 2.7.1 Sample Characteristics by Race: 1967 and 1999

Race[1]	Number of Interviewed Respondents		Retention (1999 as % of 1967)	Number of Deaths as of 1999[2]
	1967	1999		
Non-black	3693 (72.7 %)	1848 (75.0%)	50.0%	553
Black	1390 (27.3 %)	619 (25.0%)	44.5%	361

[1] See section on "Race, Ethnicity & Nationality" in this guide for details on race classifications. Respondent totals in this table are based on R00023.
[2] Numbers are derived from R42670.

Figure 2.7.1 Interview Completion Rates among Living Respondents by Race and Survey Year
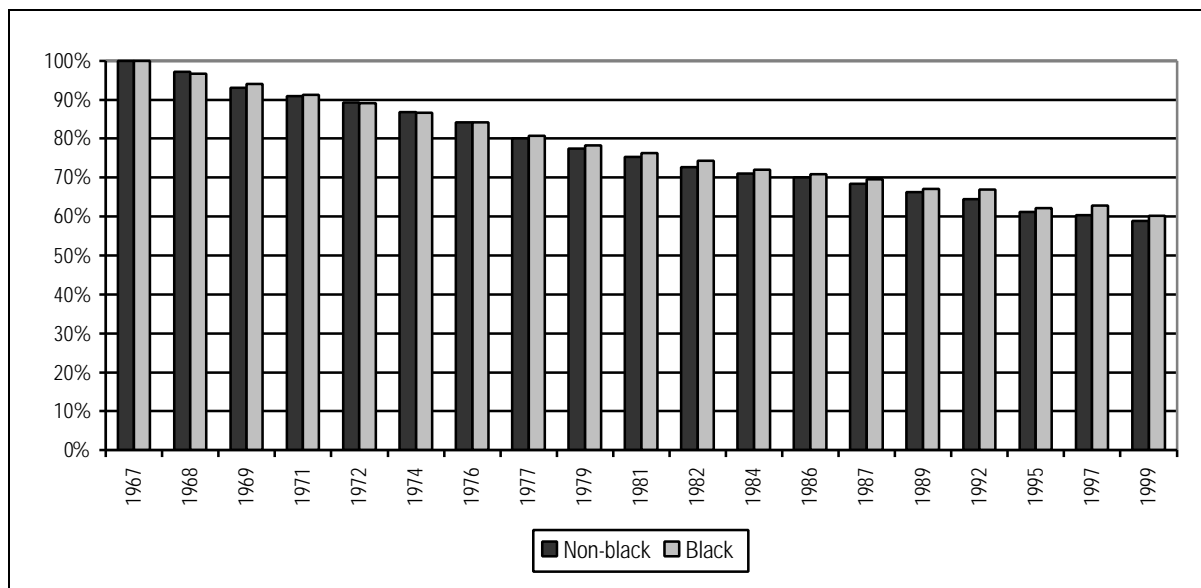
Finally, Table 2.7.2 presents the number of interviews completed by respondents, broken down by race. In this table, the "number who completed" columns show how many respondents completed **exactly** that number of surveys. The "cumulative %" columns show a cumulative total percent of those completing **at least** a given number of surveys rather than a percentage of those completing an **exact** number of surveys.

**Table 2.7.2 Number of Interviews Respondents Completed
out of 19 Surveys, by Race: 1967–99**

Number of Surveys[1]	All Respondents		Non-black Respondents		Black Respondents	
	Number who completed	Cumulative %	Number who completed	Cumulative %	Number who completed	Cumulative %
19	1890	37.2%	1435	38.9%	455	32.7%
18	494	46.9	355	48.5	139	42.7
17	320	53.2	220	54.4	100	49.9
16	260	58.3	180	59.3	80	55.7
15	223	62.7	156	63.5	67	60.5
14	171	66.1	117	66.7	54	64.4
13	94	67.9	69	68.6	25	66.2
12	105	70.0	77	70.6	28	68.2
11	92	71.8	54	72.1	38	70.9
10	48	72.7	32	73.0	16	72.1
9	132	75.3	97	75.6	35	74.6
8	149	78.3	108	78.5	41	77.6
7	204	82.3	154	82.7	50	81.2
6	154	85.3	111	85.7	43	84.2
5	155	88.4	110	88.7	45	87.5
4	127	90.9	85	91.0	42	90.5
3	144	93.7	92	93.5	52	94.2
2	188	97.4	144	97.4	44	97.4
1	133	100.0	97	100.0	36	100.0
Total	**5083**	**100.0**	**3693**	**100.0**	**1390**	**100.0**

Note: This table is based on R00023. (race), R00002., R00856.10, R00884.10, R01338.10, R02053.10, R02883.10, R03084.10, R03295.10, R04565.10, R04912.10, R05284.10, R06664.20, R07215.20, R07833.20, R08878.20, R10093.20, R16014., R34985., and R42671.
[1] Surveys completed in any year, not necessarily consecutive survey years.

2.8 Sample Weights

This section is divided into a description of the procedures used to develop sample weights and a discussion of the practical application of these weights. Before using NLS data in an analysis, the user should consult the practical usage discussion below to determine when weighting of data is appropriate. Sample-based weights are designed to reflect the underlying population in the year in which the cohort was initially surveyed. Individual weights are assigned after each interview; these weights produce group estimates that are demographically representative of each cohort's base-year population when used in tabulations. Sampling weights for each respondent can be found on the corresponding public data release.

Base-Year Sampling Weights

Population data derived from the NLS are based on multi-stage ratio estimates. The first step was to assign each sample case a basic weight consisting of the reciprocal of the final probability of selection. This probability reflects the differential sampling by race within each stratum. The base-year weights for all those interviewed were adjusted to account for the overrepresentation of blacks in the sample as well as for persons selected after screening who were not interviewed in the initial survey. This adjustment was made separately for each of 16 groupings for the Mature Women, based on the four Census regions (Northeast, North Central, South, and West), urban/rural residence, and race (non-black/black).

In the first stage of ratio weight adjustment, differences at the time of the 1960 Census between the distribution by race and residence of the population as estimated from the sample PSUs and that of total population in each of the four major regions of the country were taken into account. Using 1960 Census data, estimated population totals by race and residence for each region were computed by appropriately weighting the Census counts for PSUs in the sample. Ratios were then computed between these estimates (based on sample PSUs) and the actual population totals for the region as shown by the 1960 Census.

In the second stage ratio adjustment, sample proportions were adjusted to independent current estimates of the civilian noninstitutionalized population by age, sex, and race. These estimates were prepared by carrying forward the most recent Census data (1960) to take account of subsequent aging of the population, mortality, and migration between the United States and other countries (Census Bureau 1966). The adjustment was made by race within three age groups.

Sampling Weight Nonresponse Adjustment

Since the initial interview, reductions in sample size have occurred due to noninterviews. To compensate for these losses, the sampling weights of the individuals who were interviewed are revised.

The Mature Women cohort is a panel of individuals into which no new individuals were added after the base year. As a result, all reweighting after the initial survey is calibrated to base-year population parameters. This revision is done in two stages. First, out-of-scope noninterviews in each year are identified by the Census Bureau and eliminated from the sample of noninterviews. This group consists of individuals who are institutionalized, have died, are members of the armed services, or have moved outside the United States—that is, individuals who are no longer members of the U.S. noninstitutionalized civilian population.

The second stage in the adjustment acknowledges the possible nonrepresentative characteristics of the in-scope interviews. For each survey year, those who are eligible but not interviewed, as well as those who are interviewed, are distributed into 24 nonresponse adjustment cells based on race (black and non-black), length of residence in the United States at first interview (nine or fewer years, ten or more years, N/A), and education (N/A, eight or fewer years, nine to eleven years, twelve or more years) reported in 1967. Within each of the cells, the base-year sampling weights of those interviewed are increased by a factor equal to the reciprocal of the reinterview rate (using base-year weights) in that year.

In 1991, CHRR began investigating the effects of differential nonresponse on sampling weights as then calculated. The original weighting routine was designed to minimize an increase in variance caused by large weights for individuals with certain characteristics. One effect of this procedure was that certain subsegments of the sample were assigned identical sampling weights. CHRR adjusted the weights to avoid this problem.

Practical Usage

The Mature Women sample is based upon stratified, multi-stage random samples with an oversample of blacks. Each case in each interview year is assigned a weight specific to that year. This weight can be interpreted as an estimate of the number of people in the corresponding population that the individual in the sample represents. This section discusses some ramifications of the weights when used for data analysis.

To tabulate characteristics of the sample (i.e., sample means, totals, or proportions) for a single interview year in order to describe the population being represented, it is necessary to weight the observations using the weights provided. For example, to estimate the average hours worked in 1987 by women age 30–44 as of March 31, 1967, researchers would simply use the weighted average of hours worked, where weight is the 1987 sample weight. These weights are approximately correct when used in this way, with item nonresponse possibly generating small errors. Other applications for which users may wish to apply weighting, but for which the application of weights may not produce the intended result, include:

Samples Generated by Dropping Observations with Item Nonresponses: Often users confine their analysis to subsamples of respondents who provided valid answers to certain questions. In this case, a weighted mean will not represent the entire population, but rather those persons in the population who would have given a valid response to the specified questions. Item nonresponse because of refusals, don't knows, or invalid skips is usually quite small, so the degree to which the weights are incorrect is probably quite small. In the event that item nonresponse constitutes a small proportion of the variables under analysis, population estimates (i.e., weighted sample means, medians, and proportions) would be reasonably accurate. However, population estimates based on data items that have relatively high nonresponse rates, such as family income, may not necessarily be representative of the underlying population of the cohort.

Data from Multiple Waves: Because the weights are specific to a single wave of the study, and because respondents occasionally miss an interview but are contacted in a subsequent wave, a problem similar to item nonresponse arises when the data are used longitudinally. In addition, the weights for a respondent in different years may occasionally be quite dissimilar, leaving the user uncertain about which weight is appropriate. In principle, if a user wished to apply weights to multiple wave data, weights would have to be recomputed based upon the persons for whom complete data are available. If the sample is limited to respondents interviewed in a terminal or end point year, the weight for that year can be used. Users with a more complex sample selection often can obtain reasonably accurate results by using the base-year weights.

Regression Analysis: A common question is whether one should use the provided weights to perform weighted least squares when doing regression analysis. Such a course of action may lead to incorrect estimates. If particular groups follow significantly different regression specifications, the preferred method of analysis is to estimate a separate regression for each group or to use dummy (or indicator) variables to specify group membership. If one wishes to compute the population average effect of, for example, education upon earnings, one may simply compute the weighted average of the regression coefficients obtained for each group, using the sum of the weights for the persons in each group as the weights to be applied to the coefficients. While least squares is an estimator that is linear in the dependent variable, it is nonlinear in explanatory variables, so weighting the observations will generate different results than taking the weighted average of the regression coefficients for the groups. The process of stratifying the sample into groups thought to have different regression coefficients and then testing for equality of coefficients across groups using an F-test is described in most statistics texts.

Researchers unsure of the appropriate grouping may wish to consult a statistician or other person knowledgeable about the data set before specifying the regression model. Note that if subgroups have

different regression coefficients, a regression on a random sample of the population would be misspecified.

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