III. Sample Design and Implementation

This chapter describes the design and procedures used for selecting schools and students into the NELS:88 base year sample. It provides information on the calculation of sample weights and the relative efficiency of the sample design. The chapter also provides information about procedures used to adjust sample weights for nonresponse and about the effect of nonresponse on estimates. A detailed description of the sample design and its implementation is available in the *NELS:88 Base Year Sample Design Report.*

3.1 Base Year Sample Design

The base year survey employed a two-stage, stratified sample design, with schools as the first-stage unit and students within schools as the second-stage unit. Within each stratum, schools were selected with probabilities proportional to their estimated eighth grade enrollment. In addition, schools were oversampled in certain special strata. Within each school approximately 26 students were randomly selected (typically, 24 regularly sampled students and 2 OBEMLA-supplement Hispanic and Asian/Pacific Islander oversampled students). In schools with fewer than 24 eighth graders, all eligible students were selected. From a national frame of about 39,000 schools with eighth grades, a total of 1,734 schools were selected, of which 1,057 participated. Thus, the target sample size of 1,032 schools was achieved and in fact surpassed.

In designing a sampling frame for a survey one can either use an explicit or an implicit list of the elements to be sampled. For NELS:88, the creation of an explicit list of all eighth grade students in the U.S. would have been an impossible task. NORC therefore elected to use an implicit list of students, by using a list of public and private schools in the U.S. It was imperative that the list of schools be as complete and accurate as possible, and that as many of the schools as possible have data on the variables to be used in the stratification of the sampling frame.

Investigation of various sources indicated that the most readily available source for a complete and accurate frame was the database compiled by Quality Education Data, Inc. (QED) of Denver, Colorado. This database includes both public and private parochial and non-parochial schools. QED performs annual, late-summer updates by telephoning each public school district, each Catholic diocese, and all private schools on its records. In addition, QED receives a constant flow of current information from agencies such as the National Catholic Educational Association (NCEA), the Council of American Private Education (CAPE), the Association of Christian Schools, and the like, concerning school openings and closings, enrollments, and so forth. The QED records were successfully employed in the five NELS:88 field test states, and proved highly accurate. The number of schools with eighth grades not included in their lists is estimated to be small.

The QED list contained information about whether a school was urban, suburban, or rural. NORC used this information for stratification purposes. The QED list did not contain information about the racial/ethnic composition of public schools usable for the NELS:88 sampling frame. Racial/ethnic composition data were obtained from Westat, Inc. in its capacity as an NORC subcontractor for the NELS:88 base year study. As part of their work on the National Assessment of Educational Progress (NAEP), Westat had obtained data from the Office of Civil Rights (OCR) and from other sources (e.g., district personnel) that identified those schools with a minority enrollment of greater than 19 percent. The schools for which the OCR data were available tended to be large schools in large SMSAs; Westat also obtained the black and Hispanic percentages directly from district person-

nel in selected districts that, according to the QED information, enrolled large proportions of black or Hispanic students. In all cases, data on percent black and Hispanic were compiled only for schools in the primary sampling units of the Year-17 NAEP survey. In all, less than half of the eighth graders in the NELS:88 frame came from schools for which such minority enrollment data were available. However, this procedure allowed the explicit stratification and allocation of schools with very large percentages of black or Hispanic students. Stratification information on whether a school was public, Catholic (private), or other private was obtained from the QED list and lists of private schools.

3.1.1 Exclusions from the Sample

Exclusion of students. The study excluded certain kinds of students: specifically, mentally handicapped students and students not proficient in English, for whom the NELS:88 tests would be unsuitable; and students having physical or emotional problems that would make participation in the survey unwise or unduly difficult. Data were obtained on the numbers of students excluded as a result of these restrictions to facilitate inferences to the larger populations that include such persons.

Seven ineligibility categories were employed at the time of student sample selection:

A. attends this school only on a part-time basis, primary enrollment at another school. (Each eighth grade student was to have one **and only one** first-stage [that is, school-level] chance of selection into the NELS:88 sample.)

B. physical disability precludes filling out questionnaires and taking tests.

C. mental disability precludes filling out questionnaires and taking tests.

D. dropout: absent or truant for 20 consecutive days, and is not expected to return to school.

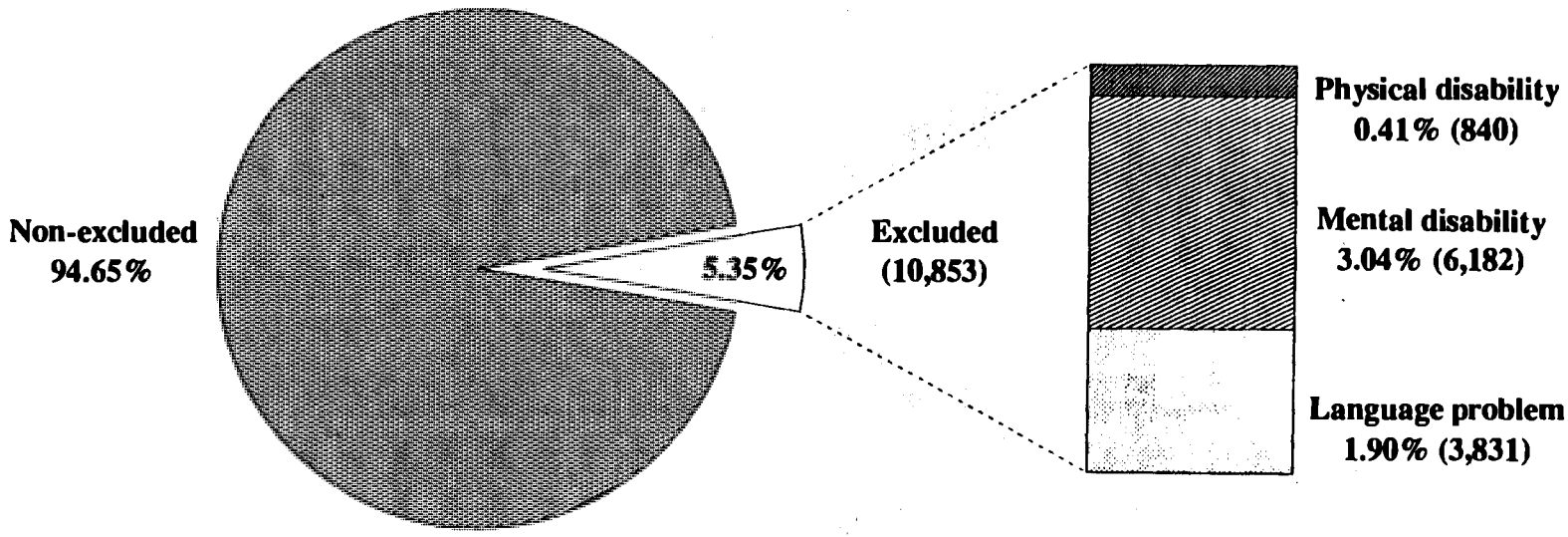
E. does not have English as the mother tongue **and** has insufficient command of English to complete the NELS:88 questionnaires and tests.

F. has transferred out of the school since roster was compiled.

G. is deceased.

In cases D, F, and G, the student was no longer at the school. In cases A, B, C, and E, the student, though still enrolled at the school, was excluded from the sample. The exclusion of part-time students (category A) has no implications for estimation. However, exclusion of cases covered by categories B, C, and E may have implications for estimates drawn from the base year sample and subsequent study waves. Details are presented in the *NELS:88 Base Year Sample Design Report*. Figure 3-1 gives the number and percentage of excluded and non-excluded students who fall into these three categories.

Figure 3-1.--Excluded and non-excluded eighth grade students in NELS:88 base year schools



N = 202,996 (Total number of eighth grade students enrolled in 1,052 participating schools.)

Exclusion of schools. Just as certain students were considered to be ineligible, so too certain kinds of schools were ineligible for selection. The eligible populations of schools are restricted to "regular" schools in the U.S., private as well as public. Excluded from the sample are Bureau of Indian Affairs (BIA) schools, special education schools for the handicapped, area vocational schools that do not enroll students directly, and schools for dependents of U.S. personnel overseas. Of course, students who are educated at home or in private tutorial settings, and those who have dropped out of school prior to reaching eighth grade, also fall outside the NELS:88 base year sample. These exclusions have implications for national inferences based on NELS:88 data, although their impact on such estimates generally is quite small. Information from various sources suggests that approximately 10 percent of American Indian school children attend schools that are affiliated with BIA, including schools directly operated by BIA and those operated by American Indian communities under contract to BIA. Other sources suggest that less than 10,000 eighth graders attend Department of Defense Dependent Schools (DODDS) serving dependents of U.S. personnel overseas.

The NELS:88 core sample was designed to minimize overlap with the NAEP sample for the 1987-88 school year. To accomplish this goal, the selection of the NELS:88 schools involved a two-phase process. The first phase was the NAEP selection. Any schools that were not selected for NAEP were eligible for NELS:88 selection and any schools that were selected for NAEP were not eligible for NELS:88 selection. In principle, then, no school was eligible for selection in both surveys. Exceptions to this principle could have occurred in practice because not all of the schools originally selected for NAEP agreed to participate, and therefore substitute schools were selected. While NORC was able to eliminate the originally selected NAEP schools from the NELS:88 sample, it was not able to screen out NAEP substitute schools.

Additional sample selections within superstrata were made for schools that refused to participate in the survey. No additional selections were made for students who, for whatever reason, failed to participate. Each school (and student) was assigned a weight equal to the number of schools (or students) in the universes they represented. The derivation of student case weights is discussed below. Use of weights properly projects estimates (within sampling error) to the population of eighth grade students who meet the NELS:88 eligibility criterion in United States schools in 1987-1988 (that is, about 95 percent of all eighth graders), and for subgroups within that population. The current weights give estimates reasonably close to those from other data sources. Table 4.4-1 in Chapter IV reviews sample selection and sample eligibility.

3.2 Calculation of Sample Weights

The general purpose of the weighting scheme is to compensate for unequal probabilities of selection into the base year sample and to adjust for the fact that not all individuals selected into the sample actually participated. The weights are based on the inverse of the probabilities of selection into the sample and on nonresponse adjustment factors computed within weighting cells.

For the base year survey two different weights have been calculated to adjust for the fact that not all sample members have data for all instruments. The weight BYQWT applies to 24,599 student questionnaires (and is also used in conjunction with parent data)[2], while BYADMWT applies to the

2 See section 3.3 for a discussion of the parent questionnaire weighting and generalizability.

1,035 school administrator questionnaires. These weights project to the population of approximately 3,008,080 eligible eighth graders in public, Catholic, and other private schools in 1988.

The weighting procedures consisted of two basic stages:

Stage 1. Calculation of a preliminary base year weight based on the inverse of the product of the probabilities of selection for the base year sample.

Stage 2. Adjustment of this preliminary weight to compensate for "unit" nonresponse, that is, for noncompletion of an entire school questionnaire or student questionnaire. The unit varied depending upon the weight being adjusted.

The nonresponse-adjusted school weight was derived as the product of the school's stage 1 weight times a nonresponse adjustment factor intended to adjust for the fact that some of the sampled schools did not return a completed questionnaire. The stage 1 weight for students was based upon the inverse of the probability that the student's school was selected into the sample multiplied by the inverse of the probability that the student was sampled within the school. The nonresponse-adjusted student weight was derived as the product of the student's stage 1 weight times a nonresponse adjustment factor intended to adjust for the fact that some of the sampled students did not participate, that is, did not return a completed questionnaire. Statistical properties of the weights are presented in Table 3.2-1.

Table 3.2-1. NELS:88 base year statistical properties of sample case weights

Weight	School BYADMWT	Student Sample BYQWT
Mean	37.46	122.28
Variance	2,109.17	4,359.25
Standard deviation	45.92	66.02
Coefficient of variation	122.59	53.99
Minimum	1.54	2.44
Maximum	387.30	836.91
Skewness	2.69	2.17
Kurtosis	9.47	16.32
Sum	38,774.12	3,008,079.63
Number of cases	1,035	24,599

Each school appearing on the NELS:88 school file, and each student appearing on the NELS:88 student file, has a value for a final weight variable. The weight represents the probability of selection into the sample plus a factor that adjusts for nonresponse. Thus, the weight serves the purpose of allowing a particular case to represent other nonsampled cases within its sampling stratum, and to represent nonresponding cases similar to it in various respects. Because separate final student and school weights have been provided, the construction of each will be considered separately in the following discussion.

The final school weight, BYADMWT, was derived using a multistage process. First, an initial weight was attached to each school record in a file containing records for all eligible schools in the NELS:88 sample. The intitial weight represented the inverse of the school's selection probability. A logistic regression procedure was used to estimate (in terms of a probability of nonresponding) the degree to which each of the responding schools resembled a nonresponding school. This estimated probability of nonresponse was the first adjustment factor applied to a school's weight.

Next, a polishing procedure further adjusted the weights to sum to known population totals within strata. Estimating the nonresponse probability for each of the responding schools was possible because key background information on almost all of the nonresponding schools was available.

The final result of these procedures was a weight for each of the responding schools adjusted to compensate for nonresponse. For the purpose of adjusting the school weight, a nonresponding school was defined as a school for which both school administrator questionnaire data and student questionnaire data were unavailable.

The final student weight, BYQWT, was also derived using a multistage process. A design weight for each eligible student on a participating school's sample roster represented the student's probability of selection within the school. A student-level nonresponse adjustment factor was calculated by forming weighting cells based upon the combination of certain levels of variables representing school type, region, ethnicity, and gender. For each student, the product of a nonresponse-adjusted preliminary school weight and the student's design weight was formed. (The preliminary school weight was slightly different from BYADMWT. BYADMWT was adjusted to accommodate the 17 schools for which school administrator questionnaire data were available but student questionnaire data were missing. The preliminary school weight eliminated this step in the adjustment process. Thus, it is appropriate for application to the 1,052 schools with student questionnaire data available). This product was summed for participating and nonparticipating students within weighting cells. The ratio of the sums for participating and nonparticipating students was considered to be a participating student's propensity for nonparticipation and was used as the nonresponse adjustment factor for each student's design weight.

3.3 A Note About the Parent Survey: Weighting and Generalizability

Because of the success in obtaining a parent questionnaire for such a high percentage of students, a separate weight adjusted for parent-nonresponse was not included on either the student or parent data files. A very close approximation of weighted parent values can be computed by applying the base year student weight, BYQWT, to parent responses. Note that because this is a student-based weight, the associated parent data will be missing for the 1,948 cases for which there is a student questionnaire, but no parent questionnaire.

In using the parent data, it is necessary to keep in mind the qualified sense in which the parent survey is representative of eighth grade parents in the United States in the spring of 1988. First, because some types of schools and some students were excluded or considered ineligible, there is a class of parents of eighth graders who had no chance of selection. Second, some extremely small number of parents had more than one chance of selection into the sample. This most often occurred in the case of parents of twins, or parents with children near in age, one of whom was out of the normal grade sequence. Third, orphans with an institutional guardianship arrangement constitute another rare population. Fourth, an important limit to the generalizability of the data is the fact that for purposes of the

public release tape, parents of nonparticipants have been excluded, even though parent questionnaires were frequently obtained for this group. Finally, the NELS:88 parent survey obtained data from only one parent or guardian of each child, though a majority of NELS:88 eighth graders lived in two-parent homes. The parent respondent was self-selected rather than randomly selected, and a broad definition of parent or guardian was applied. In some cases a grandparent or other relative who filled the role of parent, or a foster parent or other guardian, completed the parent questionnaire. These qualifications should be kept in mind when generalizing findings from the NELS:88 parent data.

3.4 School and Item Nonresponse Analyses

Although the sample design yields, in theory, a sample that mirrors the population within sampling error, in practice, nonresponse can introduce distortions. In the NELS:88 base year survey there were two stages of sample selection and therefore two stages of potential nonresponse. During the base year survey, schools were asked to permit the selection of eighth grade students from school rosters and to hold survey and makeup days for the collection of student data. Not all of the selected schools agreed to take part in the study. In addition, not all of the individual students selected for the sample within cooperating schools (or the teachers or parents linked to these students) provided the data sought from them.

During the base year survey, shortened versions of the NELS:88 school administrator questionnaire were sent to nonresponding schools in the pool of original selections. Almost all of these schools provided data. These data provide a basis for assessing the impact of school-level nonresponse on base year estimates. The analysis suggests that school-level nonresponse introduces a negligible amount of bias into the estimates. However, the amount of bias is slightly higher than for the High School and Beyond survey.[3] The school non-response analysis suggests that, to the extent that schools can be characterized by different types of students, the impact of nonresponding schools on the quality of the student sample is small. The effect of student-level nonresponse within the responding schools was not assessed. Full details of the school nonresponse analysis are presented in the *NELS:88 Base Year Sample Design Report.*

An analysis of student questionnaire item nonresponse was also undertaken. The percentages of multiple responses, missing responses, and where applicable, "don't know" responses were calculated for each of the questions in the student questionnaire. The analysis was conducted after data cleaning had taken place. This means that a response to an item could have come from the eighth grade respondent or from the logic-driven machine cleaning process. Nonresponse reflects the failure of both of these sources to provide a response. Nonresponse rates for each item were examined by item type, topic, and position in the questionnaire. The average item nonresponse rate was 4.7 percent. Nonresponse was slightly higher for items that were part of a filter (5.8 percent) than for those that were unfiltered, perhaps reflecting the eighth grader's difficulty in dealing with the filter-dependent, skip pattern structure of these relatively complicated types of items. Item nonresponse was higher for the final third of the questionnaire (7.5 percent), than for the beginning (3.7 percent) and middle (2.8 percent) thirds. Higher nonresponse at the end of the questionnaire may reflect the effects of fatigue and of having to respond to a set of items asking about participation in a long list of activities. Selected items with relatively high nonresponse rates were examined by selected student charac-

3 Frankel, M., Kohnke, L., Buonanno, D., and Tourangeau, R., *High School and Beyond Base Year (1980) Sample Design Report* (1981).

teristics. Average item nonresponse for the parent survey was slightly higher than for the student (7.46). A full report of the item response analyses can be found in the *NELS:88 Base Year Sample Design Report.*

Without examining the cognitive tests item-by-item, an indicator of item nonresponse is the average number of items not attempted for each of the tests. For each test, this average across all students taking the test is less than one, indicating that the majority of students attempted all of the test items. For the reading test the average number of items not attempted is .38; for the science test it is .43; for the mathematics test it is .90; and for the social studies (history/government) test it is .28. The weighted percent of students not attempting at least one of the test items is 13.7 for reading, 18.8 for science, 32.0 for mathematics, and 10.7 for social studies (history/government). A detailed analysis of the psychometric properties of the NELS:88 cognitive test battery can be found in the NELS:88 psychometric report.[5]

As documented in Chapter VII, there were cases when information not provided by the school administrator or the student was obtained from other sources. One example is when information from the QED datafile, used to create the sample frame, was also used to fill in missing information about the grade range of the school. Similarly, information on the student's sex and race were obtained from the school rosters when they were missing from the student questionnaire. A full description of these substitutions appears in Chapter VII and Appendix D. In addition, as explained above, certain responses were imputed logically, as the result of machine cleaning. In general, however, there were no other attempts at imputing data for missing values. Because of this, nonresponse bias may be a problem, especially for items with high item nonresponse. These items are documented in the item nonresponse section of the sample design report.

3.5 Standard Errors and Design Effects

Statistical estimates calculated using NELS:88 survey data are subject to sampling variability. Because the sample design involved stratification, disproportionate sampling of certain strata, and clustered (i.e. multi-stage) probability sampling, the calculation of exact standard errors for survey estimates can be difficult and expensive. Popular statistical analysis packages such as SPSS (Statistical Program for the Social Sciences) or SAS (Statistical Analysis System) do not calculate standard errors by taking into account complex sample designs. Several procedures are available for calculating precise estimates of sampling errors for complex samples. Procedures such as Taylor series approximations, Balanced Repeated Replication (BRR), and Jackknife Repeated Replication (JRR) produce similar results.[6] Consequently it is largely a matter of convenience which approach is taken. For this report, the Taylor Series procedure was used to calculate the standard errors.

The impact of departures from simple random sampling on the precision of sample estimates is often measured by the design effect. For any statistical estimator (for example, a mean or a proportion), the design effect is the ratio of the estimate of the variance of a statistic derived from consideration of the sample design to that obtained from the formula for simple random samples.

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5 Rock, Donald A. and Pollack, Judith M., *Psychometric Report for the NELS:88 Base Year Test Battery,* (1989).

6 Frankel, M., Inference from Survey Samples: *An Empirical Investigation* (Ann Arbor: Institute for Social Research, 1971.)

Standard errors and design effects were selected for 30 means and proportions based on the NELS:88 student, parent, and school data. The 30 variables from the student questionnaire were selected to overlap as much as possible with those variables examined in High School and Beyond. The remaining variables from the student questionnaire and from the parent and school questionnaires were selected randomly. We calculated the standard errors and design effects for each statistic both for the sample as a whole and for selected subgroups. For both the student and parent analyses, the subgroups were based on the student's sex, race and ethnicity, school type (public, Catholic, and other private), and socioeconomic status (lowest quartile, middle two quartiles, and highest quartile). For the school analysis, the subgroups were based on two levels of school type (public and combined private) and eighth grade enrollment (at or below the median and above the median).

Design effects for questions selected from the student, parent, and school questionnaires are presented in Tables 3.5-1 through 3.5-3. On the whole, the design effects indicate that the NELS:88 sample was slightly more efficient than the High School and Beyond sample. For means and proportions based on student questionnaire data for all students (see Table 3.5-1), the average design effect in the NELS:88 survey was 2.54; the comparable figure was 2.88 for the High School and Beyond sophomore cohort and 2.69 for the senior cohort. Tables 3.5-4 through 3.5-6 show that this difference is also apparent for subgroup estimates. *The High School and Beyond Sample Design Report* presents design effects for ten subgroups defined similarly to those in Table 3.5-4. For eight of the ten subgroups, the NELS:88 design effects are smaller on the average than those for both the High School and Beyond sophomore and senior cohorts. The increased efficiency is especially marked for students attending Catholic schools. In NELS:88, the average design effect is 2.70; in High School and Beyond, it was 3.60 for the sophomores and 3.58 for the seniors.

The smaller design effects in the NELS:88 may reflect the somewhat smaller cluster size used in the later survey. The High School and Beyond base year sample design called for 36 sophomore and 36 senior selections from each school; the NELS:88 sample called for the selection of only 24 students from each school. Clustering tends to increase the variability of survey estimates, because the observations within a cluster are similar and therefore add less information than independently selected observations.

The design effects for the estimates based on parent questionnaire data (see Table 3.5-2) are similar to those for the student questionnaires. For estimates applying to all students, the mean design effect was 2.48 for the parent data and 2.54 for the student data.

For all but one of the subgroups, the average design effect for the student items is about the same as, or larger than, the average design effect for parent items. This suggests that the homogeneity of student responses within clusters is about the same as, or greater than, the homogeneity of parent responses within the domain clusters. Given the students' shared school experiences, in general, and the uniform questionnaire administration procedures, in particular, this is not surprising. For private schools, the design effect for the parent items is considerably larger than the design effect for the student items. This suggests that parents within a particular private school gave strikingly similar responses to the 30 NELS:88 items used in the design effect analysis.

The design effects for the school questionnaire data (see Table 3.5-3) reflect only the impact of stratification and unequal selection probabilities; the sample of schools was not clustered. As a result, the design effects for estimates based on the school data tend to be small compared to those for estimates based on the student and parent data. The mean design effect for estimates concerning all schools is 1.82.

Tables 3.5-4 through 3.5-6 give the mean design effects (DEFFs) and mean root design effects (DEFTs) for each data set and subgroup. A detailed presentation of design effects for individual items for the total sample and for various subsamples is presented in the *NELS:88 Base Year Sample Design Report.*

3.6 Design Effects and Approximate Standard Errors

Researchers who do not have access to software for computing accurate estimates of standard errors can use the mean design effects presented in Tables 3.5-4, 3.5-5, and 3.5-6 to approximate the standard errors of statistics based on the NELS:88 data. Design-corrected standard errors for a proportion can be estimated from the standard error computed using the formula for the standard error of a proportion based on a simple random sample and the appropriate mean root design effect (DEFT):

$$SE = DEFT \times (p\,(1-p)/n)^{1/2} \qquad (1)$$

where p is the weighted proportion of respondents giving a particular response, n is the size of the sample, and DEFT is the mean root design effect.

Similarly, the standard error of a mean can be estimated from the weighted variance of the individual scores and the appropriate mean DEFT:

$$SE = DEFT \times (Var/n)^{1/2} \qquad (2)$$

where Var is the sample variance, n is the size of the sample, and DEFT is the mean root design effect.

Tables 3.5-4, 3.5-5, and 3.5-6 make it clear that the design effects and root design effects vary considerably by subgroup. It is therefore important to use the mean DEFT for the relevant subgroup in calculating approximate standard errors for subgroup statistics.

Standard error estimates may be needed for subgroups that are not tabulated here. One rule of thumb may be useful in such situations: design effects will generally be smaller for groups that are formed by subdividing the subgroups listed in the tables. (This is because smaller subgroups will be less affected by clustering than larger subgroups.) Estimates for Hispanic males, for example, will generally have smaller design effects than the corresponding estimates for all Hispanics or all males. For this reason, it will usually be conservative to use the subgroup mean DEFT to approximate standard errors for estimates concerning a portion of the subgroup. This rule applies only when the variable used to subdivide a subgroup crosscuts schools. Sex is one such variable, since most schools include students of both sexes. It will not reduce the average cluster size to form groups that are based on subsets of schools.

Standard errors may also be needed for other types of estimates than the simple means and proportions that are the basis for the results presented here. A second rule of thumb can be used to estimate approximate standard errors for comparisons between subgroups. If the subgroups crosscut

schools, then the design effect for the difference between the subgroup means will be somewhat smaller than the design effect for the individual means; consequently, the variance of the difference estimate will be less than the sum of the variances of the two subgroup means from which it is derived:

$$\text{Var}(b\text{-}a) < \text{Var}(b) + \text{Var}(a) \qquad (3)$$

in which Var(b-a) refers to the variance of the estimated difference between the subgroup means, and Var(a) and Var(b) refer to the variances of the two subgroup means. It follows from equation (3) that Var(a) + Var(b) can be used in place of Var(b-a) with conservative results.

A final rule of thumb is that more complex estimators show smaller design effects than simple estimators.[6] Thus, correlation and regression coefficients tend to have smaller design effects than subgroup comparisons, and subgroup comparisons have smaller design effects than means.This implies that it will be conservative to use the mean root design effects presented here in calculating approximate standard errors for complex statistics, such as multiple regression coefficients. The procedure for calculating such approximate standard errors is the same as with simpler estimates: first, a standard error is calculated using the formula for data from a simple random sample; then, the simple random sample standard error is multiplied by the appropriate mean root design effect.

6 Kish, L., and Frankel, M., "Inference from Complex Samples," *Journal of the Royal Statistical Society: Series B* (Methodological), 36 (1974): 2-37.

Table 3.5-1.--NELS:88 base year student questionnaire data: standard errors and design effects

All students

Survey item (or composite variable)		Esti-mate	Design S.E. [a]	DEFF	DEFT	N	SRS S.E. [b]
Mother/female guardian living	BYS2A	99.35	0.06	1.35	1.16	24126	0.05
Father/male guardian currently employed	BYS7A	91.48	0.26	1.94	1.39	22775	0.19
Expect to attend public high school	BYS14	88.13	0.43	4.21	2.05	24156	0.21
Father finished college	BYS34A	29.36	0.65	4.18	2.04	20450	0.32
Mother finished college	BYS34B	22.94	0.50	3.03	1.74	21504	0.29
Parents require chores to be done	BYS38B	90.11	0.23	1.39	1.18	24392	0.19
Watch more than 2 hours of TV per weekday	BYS42A	66.35	0.47	2.18	1.48	22042	0.32
I feel good about myself	BYS44A	92.26	0.23	1.73	1.31	24355	0.17
Good luck more important than hard work	BYS44C	11.87	0.25	1.48	1.22	24245	0.21
Every time I get ahead something stops me	BYS44F	28.50	0.40	1.87	1.37	24266	0.29
Plans hardly work out, makes me unhappy	BYS44G	20.16	0.34	1.78	1.34	24258	0.26
I feel I do not have much to be proud of	BYS44L	14.26	0.29	1.64	1.28	24200	0.22
Expects to finish college	BYS45	65.44	0.49	2.62	1.62	24384	0.30
Expects to graduate from high school	BYS46	98.20	0.10	1.46	1.21	24332	0.09
Talk to father about planning H.S. prgms.	BYS50A	73.98	0.41	2.05	1.43	23795	0.28
Students cutting class a problem at school	BYS58C	14.96	0.37	2.51	1.58	23849	0.23
Student use of alcohol a problem at school	BYS58G	15.32	0.35	2.23	1.49	23838	0.23
Parents wanted R to take algebra	BYS62	57.42	0.60	2.25	1.50	15084	0.40
Enrolled in advanced mathematics	BYS66D	41.09	0.51	2.46	1.57	23159	0.32
English will be useful in my future	BYS70C	84.14	0.30	1.60	1.26	23379	0.24
Afraid to ask questions in social studies	BYS71B	15.09	0.32	1.82	1.35	23225	0.23
Ever held back a grade in school	BYS74	17.66	0.37	2.12	1.46	22771	0.25
Often come to class without homework	BYS78C	21.86	0.34	1.60	1.26	23062	0.27
Participated in school varsity sports	BYS82B	47.85	0.57	2.96	1.72	22578	0.33
Participated in dance	BYS82G	26.67	0.50	2.86	1.69	22383	0.30
Participated in religious organization	BYS82T	14.89	0.34	2.07	1.44	22120	0.24
Reading test formula score	BYTXRFS	10.23	0.08	4.12	2.03	23791	0.04
Mathematics test formula score	BYTXMFS	15.98	0.16	4.99	2.23	23778	0.07
Science test formula score	BYTXSFS	9.86	0.08	4.82	2.20	23765	0.04
History/government test formula score	BYTXHFS	15.12	0.11	5.01	2.24	23673	0.05
Mean				2.54	1.56		
Minimum				1.35	1.16		
Maximum				5.01	2.24		
Standard deviation				1.11	0.33		
Median				2.15	1.47		

[a]Standard error calculated taking into account the sample design.

[b]Standard error calculated under assumptions of simple random sampling.

Table 3.5-2.--NELS:88 base year parent questionnaire data: standard errors and design effects

All parents

Survey item (or composite variable)		Esti-mate	Design S.E.[a]	DEFF	DEFT	N	SRS S.E.[b]
Parent lives with student year-round	BYP1B	96.86	0.13	1.37	1.17	23516	0.11
Older child(ren) dropped out of school	BYP6	16.66	0.41	1.71	1.31	13809	0.32
Child was born outside of U.S.	BYP17	5.10	0.24	2.82	1.68	23094	0.14
Spanish spoken at home	BYP22D	7.85	0.62	12.38	3.52	23134	0.18
Parent attended college	BYP30	43.52	0.61	3.58	1.89	23442	0.32
Spouse works full time	BYP35	64.05	0.46	2.11	1.45	23365	0.31
Child attended kindergarten	BYP38D	92.81	0.24	1.83	1.35	21224	0.18
Child skipped a grade	BYP41	2.01	0.11	1.52	1.23	23029	0.09
Child was held back a grade	BYP44	19.95	0.40	2.33	1.53	23016	0.26
Child has a hearing problem	BYP47B	2.51	0.12	1.31	1.14	23442	0.10
Child is mentally retarded	BYP47I	0.09	0.02	1.33	1.15	23417	0.02
Child receives special services	BYP48A-J	21.43	0.35	1.66	1.29	22529	0.27
Child receives learning disability services	BYP49D	4.19	0.18	1.98	1.41	23437	0.13
Child enrolled in program for the gifted	BYP51	12.53	0.34	2.48	1.57	23468	0.22
Contacted by school about child's courses	BYP57C	39.68	0.73	5.09	2.26	22663	0.32
Contacted school about child's program	BYP58B	34.93	0.45	1.92	1.38	22000	0.32
Parent acts as a school volunteer	BYP59D	19.19	0.41	2.48	1.57	22417	0.26
Child attends classes outside own school	BYP60A-H	63.53	0.49	2.36	1.54	22525	0.32
Child borrows books from public library	BYP61AB	1.46	0.01	0.03	0.17	23544	0.08
Parent goes to history museums	BYP61EA	45.92	0.56	2.79	1.67	22145	0.33
Child involved in Boys Club-Girls Club	BYP63D	9.42	0.36	3.41	1.85	21801	0.20
Rules about when child can watch television	BYP64B	83.96	0.29	1.47	1.21	22681	0.24
Regular talks with child about HS plans	BYP67	47.44	0.45	1.88	1.37	23460	0.33
Mom not home when child returns from school	BYP72A	13.52	0.29	1.70	1.30	22865	0.23
Strongly agree that homework is worthwhile	BYP74B	23.47	0.39	1.92	1.39	22799	0.28
Strongly disagree that school is safe	BYP74I	3.22	0.15	1.71	1.31	22726	0.12
Child has a parent living outside of home	BYP78	31.57	0.45	2.18	1.48	23426	0.30
Spent less than $100 on education this year	BYP82AA	75.64	0.52	3.29	1.81	22193	0.29
Saved money for child's educ. after H.S.	BYP84	42.24	0.50	2.38	1.54	23312	0.32
Child's grades won't qualify for fin. aid	BYP85E	24.18	0.37	1.49	1.22	19960	0.30
Mean				2.48	1.49		
Minimum				0.03	0.17		
Maximum				12.38	3.52		
Standard deviation				2.04	0.51		
Median				1.92	1.39		

[a] Standard error calculated taking into account the sample design.

[b] Standard error calculated under assumptions of simple random sampling.

Table 3.5-3.--NELS:88 base year school questionnaire data: standard errors and design effects

All schools

Survey item (or composite variable)		Esti-mate	Design S.E.[a]	DEFF	DEFT	N	SRS S.E.[b]
Seventh grade included in school	BYSC1I	98.55	0.33	0.80	0.89	1037	0.37
Average number of days in school year	BYSC6	178.29	0.15	1.26	1.12	1029	0.13
Average % attendance rate for 8th graders	BYSC11	94.60	0.21	2.58	1.61	1017	0.13
Average % Hispanic 8th graders	BYSC13C	6.05	0.57	1.36	1.17	1028	0.49
Avg. number of students in remedial reading	BYSC16B	37.28	1.69	0.51	0.71	1035	2.37
Avg. number of full time regular teachers	BYSC17	23.21	0.59	1.03	1.02	1037	0.58
Average number of Black (non-Hisp.) teachers	BYSC20D	1.92	0.13	0.51	0.72	1018	0.18
Students assigned to school by geog. area	BYSC24A	54.98	1.47	0.91	0.95	1035	1.55
School has formal admission procedures	BYSC25	39.23	1.86	1.51	1.23	1036	1.52
Avg. maximum school tuition (private only)	BYSC31	1547.61	72.39	0.63	0.79	228	91.53
Tchrs.: "Lot" of infl. assgning H.S. courses	BYSC36B	48.13	2.42	2.43	1.56	1035	1.55
Stdnts held back if hist. comp. test failed	BYSC38D	5.25	1.06	2.34	1.53	1029	0.70
School requires full year of science	BYSC39C	93.34	1.48	3.66	1.91	1036	0.77
School requires some music instruction	BYSC39I	67.15	2.00	1.86	1.36	1029	1.46
Program for gifted available to 8th graders	BYSC40	45.85	2.06	1.76	1.33	1037	1.55
School band available to 8th graders	BYSC46B	68.54	2.19	2.30	1.52	1037	1.44
Science club available to 8th graders	BYSC46H	20.61	1.49	1.40	1.18	1036	1.26
Yearbook available to 8th graders	BYSC46N	54.18	2.29	2.19	1.48	1037	1.55
Intramural sports available to 8th graders	BYSC46T	56.92	2.42	2.47	1.57	1037	1.54
Classroom environment is very structured	BYSC47D	44.34	2.36	2.34	1.53	1036	1.54
Tchrs.: "Very" difficult motivating students	BYSC47I	2.35	0.68	2.09	1.45	1034	0.47
School emphasizes sports	BYSC47N	9.64	1.50	2.67	1.64	1036	0.92
Visitors required to sign in main office	BYSC48A	73.11	2.26	2.70	1.64	1037	1.38
Vocational counseling avail. to 8th graders	BYSC48H	40.89	2.07	1.83	1.35	1034	1.53
Cutting classes is a serious problem	BYSC49C	0.51	0.23	1.06	1.03	1037	0.22
Students possessing weapons is serious pblm.	BYSC49I	0.74	0.31	1.35	1.16	1036	0.27
Students expelled: first drug offense	BYSC50AD	36.95	2.28	2.28	1.51	1026	1.51
Stdnts. susp. or expld.: phys. abuse of teachers	BYSC50AJ	98.78	0.59	2.91	1.71	1022	0.34
Stdnts. expelled: repeat alcohol possession	BYSC50BC	70.45	1.91	1.79	1.34	1021	1.43
Stdnts. susp.: repeat verbal abuse of teachers	BYSC50BI	51.12	2.31	2.19	1.48	1026	1.56
Mean				1.82	1.32		
Minimum				0.51	0.71		
Maximum				3.66	1.91		
Standard deviation				0.77	0.30		
Median				1.86	1.36		

[a] Standard error calculated taking into account the sample design.

[b] Standard error calculated under assumptions of simple random sampling.

Table 3.5-4. Mean design effects (DEFFs) and root design effects (DEFTs) for student questionnaire data

Group	Mean DEFF	Mean DEFT
All students	2.54	1.56
Male[7]	1.98	1.39
Female	1.93	1.38
White and other[8]	2.25	1.48
Black	1.65	1.27
Hispanic	2.06	1.41
Asian/Pacific Islander	2.00	1.40
Public schools	2.27	1.48
Catholic schools	2.70	1.59
Other private schools	8.80	1.83
Low SES	1.58	1.25
Middle SES	1.66	1.28
High SES	1.84	1.34

Note: Each mean is based on 30 questionnaire items.

7 Sex categories are based on the composite sex variable.

8 Race categories are based on the composite race variable.

Table 3.5-5. Mean design effects (DEFFs) and root design effects (DEFTs) for parent questionnaire data

Group	Mean DEFF	Mean DEFT
All parents[9]	2.48	1.49
Male	2.08	1.37
Female	1.67	1.26
White and other	1.94	1.35
Black	1.55	1.21
Hispanic	1.97	1.36
Asian/Pacific Islander	1.64	1.26
Public schools	2.30	1.43
Catholic schools	2.03	1.34
Other private schools	4.11	1.88
Low SES	1.60	1.22
Middle SES	1.73	1.27
High SES	1.79	1.29

Note: Each mean is based on 30 questionnaire items.

Table 3.5-6. Mean design effects (DEFFs) and root design effects (DEFTs) for school questionnaire data

Group	Mean DEFF	Mean DEFT
All schools	1.82	1.32
Public	2.23	1.46
All private	1.40	1.15
Large	1.26	1.11
Small	1.38	1.16

Note: Each mean is based on 30 questionnaire items.

9 One purpose of these tables is to show the relative efficiency of each of the surveys. This comparability is facilitated by choosing comparable domains within which to compare the student and parent surveys. Thus parent survey design effects were conducted using the student's sex and the student's race as subgroups. As in the student survey, the sex and race composites were used to obtain domain categories.