U.S. Department of Education
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Executive Summary

The theory of sampling that is the basis for the majority of surveys conducted for the federal government assumes that accurate responses are obtained for all the sampled units. Surveys have always had some level of nonresponse, thus violating this assumption, and the level of nonresponse has been increasing over time. Nonresponse bias is a function of the nonresponse rate and the difference between respondents and nonrespondents. To the extent that those who respond to surveys and those who do not are different in important ways, there is a potential for nonresponse biases in estimates from survey data. As survey response rates decline, understanding the relationship between response rates and nonresponse bias has become even more important. One approach to understanding the relationship is to conduct nonresponse bias studies. This report documents a nonresponse bias study for the 2005 National Household Education Surveys Program (NHES:2005). The goal of the research was to investigate the potential for nonresponse bias in estimates from the NHES:2005 surveys.

NHES, a survey program sponsored by the National Center for Education Statistics (NCES) in the Institute of Education Sciences, U.S. Department of Education, is designed to study educational issues that cannot be addressed in institutional surveys. The NHES surveys conducted in 2005 were the Early Childhood Program Participation Survey (ECPP-NHES:2005), After-School Programs and Activities Survey (ASPA-NHES:2005), and Adult Education Survey (AE-NHES:2005). ECPP gathered information on the nonparental care arrangements and educational programs of preschool children. ASPA addressed nonparental care and activities during the after-school hours of elementary- and middle school-age children. AE addressed participation in formal adult educational activities and informal learning activities done for personal interest.

The estimates from NHES:2005 are subject to bias because of unit nonresponse to both the Screener survey (used to determine household eligibility for sampling) and the extended interview surveys, as well as nonresponse to specific items. Generally speaking, the best approach to minimizing nonresponse bias is to plan and implement data collection procedures aimed at achieving high response rates. For NHES:2005, such procedures included extensive training of the interviewers, advance mailings to the respondents, effective call scheduling strategies, and, where necessary, refusal conversion methods that included recontacting households by both telephone and mail if mailable addresses could be obtained. However, because some nonresponse occurs even with the best strategies, statistical adjustments are necessary to minimize the potential for nonresponse bias in the survey estimates.

This report includes assessments of the potential for both unit and item nonresponse bias. The analysis of unit nonresponse bias showed no evidence of bias in the estimates considered from the ECPP and ASPA Surveys. For the AE Survey, the only evidence of unit nonresponse bias is in estimates of sex; females were more likely to respond than males. The weighting class adjustment for nonresponse to the AE Survey used sex in forming the weighting classes (see Hagedorn et al. forthcoming for details.) and should, therefore, reduce this bias.

The analysis of item nonresponse bias included two components: (1) a comparison of means or distributions, including imputed values versus excluding imputed values; and (2) a comparison of means or distributions based on extreme assumptions to the original means or distributions. It is important to consider the two components of the item nonresponse bias analysis in tandem. The former component of the item nonresponse bias analysis revealed no important differences[1], thus suggesting that there was no *reduction* in item nonresponse bias. The latter component did reveal the *potential* for item nonresponse bias, if the item nonrespondents differ considerably from the respondents. However, it is that particular situation in which the hot-deck would be expected to be most effective in reducing item nonresponse bias; by using variables to form hot-deck cells that are associated with either the item itself or its item response propensity, the hot-deck reduces item nonresponse bias. Therefore, taken together, these two components of the item nonresponse bias analysis suggest that the likely scenario is that there was no substantial item nonresponse bias, and that the extreme assumptions imposed in this analysis are unrealistic.

It is important to note that although no evidence of nonresponse bias was found in this analysis, the analysis was limited. Nonresponse bias could be present in estimates not considered in this analysis, but most of the techniques used in this evaluation could be applied by analysts to examine the potential for nonresponse bias in their estimates.

[1] None of the differences were 3 percentage points or more and statistically significant at the $\alpha = 0.05$ level.

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1. Introduction

The theory of sampling that is the basis for the majority of surveys conducted for the federal government assumes that accurate responses are obtained for all the sampled units. Surveys have always had some level of nonresponse, thus violating this assumption, and the level of nonresponse has been increasing over time. For example, Atrostic, Bates, Burt, and Silberstein (2001) report that the rates of nonresponse were increasing for in-person household surveys conducted by the U.S. Census Bureau at the end of the 20th century. In a random digit dial (RDD) telephone survey, Curtin, Presser, and Singer (2005) state that the response rates to the Survey of Consumer Attitudes declined by an annual rate of three-quarters of a percentage point from 1979 to 1996, and by 1.5 percentage points per year on average from 1996 to 2003.

To the extent that those who respond to surveys and those who do not are different in important ways, there is a potential for nonresponse biases in estimates from survey data. As survey response rates decline, understanding the relationship between response rates and nonresponse bias has become even more important. One approach to understanding the relationship is to conduct nonresponse bias studies. This report documents a nonresponse bias study for the 2005 National Household Education Surveys Program (NHES:2005). The goal of the research is to investigate the potential for nonresponse bias in estimates from the NHES:2005 surveys. This analysis is similar to analyses undertaken to evaluate the potential for nonresponse bias in the NHES:1999 and NHES:2001 surveys. (See Nolin et al. (2000) and Nolin et al. (2004), respectively). A more extensive study of nonresponse bias in NHES:2001, which included an examination of nonresponse bias under hypothetical data collection scenarios involving lower levels of effort (resulting in lower response rates), is described in Brick et al. (forthcoming).

An overview of the NHES:2005 surveys is given in the next section, followed by a discussion of the relationship between response rates and nonresponse bias (section 1.2), and a discussion of the analysis methods used in this study (section 1.3). Section 2 contains a discussion of unit nonresponse bias, including unit response rates (section 2.1), an analysis of characteristics associated with unit response propensities (section 2.2), and a comparison of estimates based on adjusted and unadjusted weights for the ECPP and ASPA surveys (section 2.3.1), as well as the AE survey (section 2.3.2). Section 3 contains a discussion of item nonresponse bias, including item response rates and items included in the analysis (section 3.1), an assessment of means or distributions for items with and without imputed values

(section 3.2), and a discussion of using extreme assumptions to assess the potential for item nonresponse bias (section 3.3). Conclusions are given in section 4.

1.1 Overview of the National Household Education Surveys Program

NHES, a survey program sponsored by the National Center for Education Statistics (NCES) in the Institute of Education Sciences, U.S. Department of Education, is designed to study educational issues that cannot be addressed in institutional surveys. For example, studies of the educational experiences of young children cannot be conducted solely through institutional surveys because children may be educated or cared for in a variety of formal and informal settings and may be cared for only in their own homes. Similarly, adults may participate in educational activities in a variety of settings, including traditional schools or colleges, community organizations, businesses, and so on; therefore, institutional surveys are not suitable to address the broad range of adult education activities. NHES collects timely information on specific education topics from a relatively large, targeted sample of households and has been conducted approximately every other year since 1991. NHES gathers data on several important topics on a rotating basis. For instance, adult education and early childhood program participation have been the focus of several NHES surveys. One-time surveys on current issues, such as school safety and discipline and civic involvement, have been conducted as well.

The NHES surveys are RDD telephone surveys of households in the United States. Interviews are administered using computer-assisted telephone interview (CATI) technology, which is a data collection methodology specifically designed so that relatively complex questionnaires can be handled smoothly and efficiently. Previous NHES surveys have been conducted in 1991, 1993, 1995, 1996, 1999, 2001, and 2003. All surveys were conducted at the same time of the year, winter to early spring. The 2005 administration was conducted by Westat, a social science research organization, from January 3 through April 24, 2005.

The NHES surveys conducted in 2005 (NHES:2005) were the Early Childhood Program Participation Survey (ECPP-NHES:2005), After-School Programs and Activities Survey (ASPA-NHES:2005), and Adult Education Survey (AE-NHES:2005).[2] ECPP gathered information on the

[2] Hereafter, these are referred to as simply the ECPP, ASPA, and AE surveys, respectively

nonparental care arrangements and educational programs of preschool children. ASPA addressed nonparental care and activities during the after-school hours of elementary and middle school-age children. AE addressed participation in formal adult educational activities and informal learning activities done for personal interest.

NHES provides national cross-sectional estimates for the 50 states and the District of Columbia. The NHES design also yields estimates for subgroups of interest for each survey, for example, age or grade for children, educational participation status for adults, and race and Hispanic origin for all populations of interest. In addition to providing cross-sectional estimates, NHES is also designed to provide estimates of change over time in key statistics. The survey instruments are designed to address the selected issues in sufficient detail so that analyses can be performed to help explain the phenomena of interest.

1.2 Relationship Between Response Rates and Nonresponse Bias

The estimates from NHES: 2005 are subject to bias because of unit nonresponse to both the Screener[3] and the extended interview surveys, as well as nonresponse to specific items. Generally speaking, the best approach to minimizing nonresponse bias is to plan and implement data collection procedures aimed at achieving high cooperation rates. For NHES:2005, such procedures included extensive training of the interviewers, advance mailings to the respondents, effective call scheduling strategies, and, where necessary, refusal conversion methods that included recontacting households by both telephone and mail if mailable addresses could be obtained. However, because some nonresponse occurs even with the best strategies, statistical adjustments are necessary to minimize the potential for nonresponse bias in the survey estimates.

The term bias has a specific technical definition in this context. Bias is the expected difference between the estimate from the survey and the actual population value. For example, if all households were included in the survey, the difference between the estimate from the survey and the actual population value (which includes the responses of persons who did not respond to the survey) is the

[3] The Screener was completed by a member of the household who was age 18 or older. It was used to determine whether sampled telephone numbers belonged to households, gather information needed to sample household members for interviews, select the appropriate parent or guardian for ECPP or ASPA interviews, and collect household information where no one was sampled for an extended interview.

bias due to nonresponse. Since NHES is a sample survey, the bias is defined as the expected or average value of this difference over all possible samples.

A deterministic view of nonresponse[4] implies that the population can be partitioned so that every unit can be classified into respondent and nonrespondent strata, irrespective of whether the unit was sampled (Cochran 1977, p. 361-362). For an estimate of a mean, a common way of describing the relationship between the response rate and nonresponse bias under this approach is

$$bias(\bar{y}_r) = P_m \{\bar{Y}_r - \bar{Y}_m\},$$

where $\bar{y}_r$ is the estimated mean of characteristic *y* based on the respondents only, P_m is the proportion of the population in the nonrespondent stratum, $\bar{Y}_r$ is the mean of the characteristic in the respondent stratum, and $\bar{Y}_m$ is the mean of the characteristic in the nonrespondent stratum. This expression shows that, under this deterministic viewpoint, the nonresponse bias of an estimated mean depends on the relative sizes of the strata and the difference in the mean of the characteristic between the two strata.

Thus, nonresponse bias can be substantial when two conditions hold. First, the differences between the characteristics of respondents and nonrespondents must be relatively large. For example, consider estimating the percentage of adults who participated in an adult education activity in the past year. If the participation rate is nearly identical for both respondents and nonrespondents, then the nonresponse bias of the estimate will be negligible.

Second, the nonresponse rate must be relatively high. If the nonresponse rate is very low relative to the magnitude of the estimates, then the nonresponse bias in the estimates will be small, even if the differences in the characteristics between respondents and nonrespondents are relatively large. For example, if the nonresponse rate is only 2 percent, then estimates of totals that comprise 20 or 30 percent of the population will not be greatly affected by nonresponse, even if the differences in these characteristics between respondents and nonrespondents are relatively large. It is important to realize that this condition requires the nonresponse rate to be large relative to the size of the estimates. If the estimate

[4] An alternative perspective of nonresponse, not discussed here, is the stochastic viewpoint. See Brick et al. (forthcoming) for a discussion of this viewpoint.

is for a small domain or subgroup, then even a relatively low rate of nonresponse can result in important biases if the differences between respondents and nonrespondents are large.

1.3 Analysis Methods

The nonresponse bias study for NHES:2005 involves two components: an examination of bias due to unit nonresponse (discussed in section 2) and an examination of bias due to item nonresponse (discussed in sections 3 and 4). Details of the study design and analysis methods for each of these components are provided in context in the respective sections. In this section, we describe general criteria and methods used throughout the analysis.

The estimates and standard errors presented in this report were produced using WesVar software and a jackknife replication procedure (Westat 2000). The tests of significance used are based on two-tailed tests using Student's t statistics for the comparison of individual estimates and for bivariate relationships. The type I error rate used for all tests was $\alpha = 0.05$. Where appropriate (for example, in the comparisons of nonresponse adjusted and unadjusted estimates discussed in section 2.3), the standard error in the denominator of the test statistic was computed to account for correlations in the estimates.

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2. Unit Nonresponse Bias

As noted in section 1.2, nonresponse bias can be substantial when the nonresponse rate is relatively high and the nonrespondents differ considerably from the respondents. This section contains an evaluation of the potential for bias due to unit nonresponse. In many surveys, such an evaluation would contain an examination of differences between unit respondents and the full sample in characteristics available on the sampling frame. However, in RDD samples, the sampling frame data are limited to general characteristics of the telephone exchange (the area served by the 3-digit prefix of a telephone number), and in the case of NHES:2005, there is also the temporal consideration that these characteristics pertained at the time of the 2000 decennial census. For these reasons, there were no characteristics available for the full frame and the respondents for analysis.

Section 2.1 contains an examination of unit response rates. An analysis of characteristics associated with unit response propensities is given in section 2.2. An analysis conducted to inform the nonresponse adjustment (discussed in section 2.2) identified the characteristics most associated with unit nonresponse (with these sampling frame variables considered as potential candidates), and those characteristics were used in the adjustment. To examine the effect of weighting on unit nonresponse bias, section 2.3 contains a comparison of estimates based on nonresponse adjusted and unadjusted weights for the three surveys, ECPP, ASPA, and AE.

2.1 Unit Response Rates

A unit 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 numerators or denominators of the ratio must be estimated.

For reporting the results from NHES:2005, the overall unit response rate[5] indicates the percentage of possible interviews that were completed taking all survey stages into account, while the unit

[5] In earlier NHES publications, this was referred to as simply the response rate.

response rate[6] measures the percentage of interviews that were 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. The Screener unit response rate is the ratio of the number of households with completed Screener interviews to the estimated number of households in the sample. If no household member completed the first-stage Screener, then no members could be sampled for other interviews. Under this design, the unit response rate for the second stage (ECPP, ASPA, or AE interviews) is the percentage of sampled persons who completed these interviews. The overall unit response rate is the product of the first- and second-stage unit response rates (i.e., the Screener unit response rate multiplied by the extended interview unit response rate).

Unit response rates and overall unit response 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 unit response rates in the categories with different selection probabilities vary considerably. All of the unit response rates discussed in this report are weighted.

One Screener interview is given for all survey components. The Screener unit response rate was 67 percent. This rate is multiplied by the ECPP, ASPA, and AE unit response rates to obtain overall unit response rates for each of those survey components. Table 1 in section 2.2 shows the nonresponse adjustment cells and estimated response rates for each cell for the Screener.

The ECPP Survey had a unit response rate of 84 percent and an overall unit response rate of 56 percent (the product of the Screener unit response rate, 67 percent, and the ECPP unit response rate, 84 percent). The bulk of the unit nonresponse for the ECPP interview was due to refusal of the parent/guardian to respond (47.9 percent of nonresponse). Other reasons for ECPP interview nonresponse

[6] In earlier NHES publications, this was referred to as the completion rate.

Table 1. Screener nonresponse adjustment cells: 2005

Cell	Mailable status	Number of answering machine messages left	Percent White	Census division	Percent Hispanic	Census region	Median home value	Percent with income $75,000 or higher	Percent homeowners	MSA Status	Estimated response rate (percent)[1]
1	1	0	0,1	0,2,5,6,7,9	†	†	†	†	†	†	64.9
2	1	0	0,1	1,3,4,8	†	†	†	†	†	†	74.5
3	1	0	2,3	†	0,1	†	†	†	†	†	70.3
4	1	0	2,3	†	2,3	†	†	†	†	†	63.2
5	1	0	2,3	†	4,5	†	†	†	†	†	66.4
6	1	0	2,3	†	6-9	†	†	†	†	†	74.0
7	1	0	4-6	†	†	1	†	†	†	†	65.6
8	1	0	4-6	†	†	2-4	†	†	†	†	76.0
9	1	0	7,8	†	†	1	†	†	†	†	73.2
10	1	0	7,8	†	†	2-4	†	†	†	†	81.5
11	1	0	9	†	†	1	†	†	†	†	80.3
12	1	0	9	†	†	2,4	†	†	†	†	85.4
13	1	0	9	†	†	3	†	†	†	†	82.8
14	1	1	0-2	†	†	†	†	†	†	†	57.3
15	1	1	3,4	†	†	†	0-6	†	†	†	66.8
16	1	1	3,4	†	†	†	7-9	†	†	†	56.5
17	1	1	5,6	†	†	†	†	0-2	†	†	69.0
18	1	1	5,6	†	†	†	†	3-9	†	†	61.9
19	1	1	7,8	†	†	1	†	†	†	†	62.8
20	1	1	7,8	†	†	2-4	†	†	†	†	70.3
21	1	1	9	0-2,5,9	†	†	†	†	†	†	70.1
22	1	1	9	3,6,7	†	†	†	†	†	†	74.3
23	1	1	9	4,8	†	†	†	†	†	†	78.2
24	1	2	†	†	†	†	†	†	0-6	†	50.6
25	1	2	†	†	†	†	†	†	7-9	†	57.3
26	1	3,4	†	†	1-4	†	†	†	†	†	93.0
27	1	3,4	†	†	5-9	†	†	†	†	†	72.6
28	1	3,4	†	†	0	†	†	†	†	1-3	97.2
29	1	3,4	†	†	0	†	†	†	†	4,5	100.0
30	2	0	†	†	†	†	†	†	†	†	46.0
31	2	1	†	†	†	†	†	†	†	1-4	51.2
32	2	1	†	†	†	†	†	†	0-7	5	56.1
33	2	1	†	†	†	†	†	†	8,9	5	72.8
34	2	2-4	†	†	†	†	†	†	†	†	43.1
35	3,4	†	†	†	†	†	†	†	†	†	39.3

† Not applicable. In these cases, the cell consisted of all values of the particular variable.

[1] The estimated response rate is the number of completed interviews divided by the sum of the number of completed interviews, nonresponses, and 22 percent of the unresolved telephone numbers, weighted by the probability of selection. (See Hagedorn et al. forthcoming.)

NOTE: Category codes were as follows: Mailable Status: 1 = valid address obtained; 2 = address not obtained; 3,4 = postmaster return.

Percent White, Percent Hispanic, Percent with income $75,000 or higher, and Percent homeowners: 0 = less than 10 percent, 1 = 10 to 19 percent, 2 = 20 to 29 percent, 3 = 30 to 39 percent, 4 = 40 to 49 percent, 5 = 50 to 59 percent, 6 = 60 to 69 percent, 7 = 70 to 79 percent, 8 = 80 to 89 percent, 9 = 90 percent or more.

Census Division: 0 = Alaska and Hawaii; 1 = New England; 2 = Middle Atlantic; 3 = East North Central; 4 = West North Central; 5 = South Atlantic; 6 = East South Central; 7 = West South Central; 8 = Mountain; 9 = Pacific (excluding Alaska and Hawaii).

Census Region: 1=Northeast, 2=Midwest, 3=South, 4=West.

Median Home Value: 0 = below the 10th percentile in sample, 1 = 10th to 19th percentile in sample, 2 = 20th to 29th percentile in sample, 3 = 30th to 39th percentile in sample, 4 = 40th to 49th percentile in sample, 5 = 50th to 59th percentile in sample, 6 = 60th to 69th percentile in sample, 7 = 70th to 79th percentile in sample, 8 = 80th to 89th percentile in sample, 9 = 90th percentile in sample or higher.

MSA Status: 1 = in county in central city, 2 = in county not in central city, 3 = subcounty of MSA, 4 = MSA is its own county, 5 = non-MSA.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Household Education Surveys Program (NHES), 2005.

were inability to make contact with the parent/guardian (36.0 percent of nonresponse), language problems (2.9 percent of nonresponse), and other miscellaneous reasons (13.2 percent of nonresponse) such as the parent/guardian being unavailable for an interview during the field period.

The ASPA Survey had a unit response rate of 84 percent with an overall unit response rate of 56 percent (the product of the Screener unit response rate, 67 percent, and the ASPA unit response rate, 84 percent). The main reason for ASPA interview nonresponse was the refusal of the parent/guardian to respond (50.7 percent of ASPA interview nonresponse). Other reasons for nonresponse to the ASPA interview were inability to make contact with the parent/guardian respondent (34.4 percent of ASPA interview nonresponse), language problems (3.1 percent of ASPA interview nonresponse), and other miscellaneous reasons for nonresponse (11.8 percent of nonresponse) such as the parent/guardian being unavailable for an interview during the field period.

The estimated unit response rate for the AE interview was 71 percent and the overall unit response rate was 48 percent (the product of the Screener unit response rate, 67 percent, and the AE unit response rate, 71 percent). For the AE interview, the bulk of the nonresponse was due to refusal of the sampled adult to respond (53.5 percent of nonresponse). Other reasons for AE interview nonresponse were inability to make contact with the sampled adult (27.8 percent of nonresponse), language problems with the sampled adult (4.8 percent of nonresponse), and other miscellaneous reasons (13.9 percent of nonresponse) such as the sampled adult being unable to respond due to illness.

2.2 Analysis of Characteristics Associated with Unit Response Propensities

Unit nonresponse bias may be mitigated through statistical adjustments that take advantage of relationships between auxiliary variables and the probability of response. (See, for example, Little 1986; and Kalton and Flores-Cervantes 2003.) To identify characteristics associated with unit nonresponse, a multivariate analysis was done using a categorical search algorithm called Chi-Square Automatic Interaction Detection (CHAID). CHAID begins by identifying the characteristic of the data that is the best predictor of response. Then, within the levels of that characteristic, CHAID identifies the next best predictor(s) of response, and so forth, until a tree is formed with all of the response predictors that were identified at each step. The final result is a division of the entire data set into cells by attempting to determine sequentially the cells that have the greatest discrimination with respect to the unit response

rates. In other words, it divides the data set into groups so that the unit response rate within cells is as constant as possible, and the unit response rate between cells is as different as possible. It is important to note that the variables considered for use as predictors of response must be available for both respondents and nonrespondents.

For Screener nonresponse adjustment, the only variables available for both respondents and nonrespondents were variables available on the RDD sampling frame (which were primarily demographic and socioeconomic characteristics of the telephone exchange) and paradata items associated with the data collection effort. Ten variables were identified by CHAID and used for Screener nonresponse adjustment, including the mailable[7] status of the telephone number; the number of answering machine messages left; and the following characteristics of the telephone exchange: percent White, Census division, percent Hispanic, Census region, median home value, percent with income $75,000 or higher, percent homeowners, and metropolitan statistical area (MSA) status.[8] The final Screener nonresponse adjustment cells and their category codes, as well as the Screener unit response rate for these cells, are shown in table 1. Category codes are described in the table notes. These unit response rates vary among adjustment cells from a low of 39 percent to a high of 100 percent. That is, Screener responses were obtained for an estimated 39 percent of households for which an address match can be obtained but postmaster returns are received when mailings are sent (cell 35). In contrast, Screener responses were obtained for an estimated 100 percent of households for which a valid address match can be obtained, at which 3 or 4 answering machine messages were left, in telephone exchanges with less than 10 percent Hispanic, where the area is non-MSA or the MSA is its own county (cell 29).

For ECPP and ASPA, variables considered for nonresponse adjustment included a combination of age and grade, whether or not the child was home schooled, Census region, and urbanicity. Most of these items were not available for consideration in nonresponse adjustment until after the Screener was completed. Based on results from the CHAID analysis, a combination of age and grade was used to adjust for nonresponse using the following categories: 0 year olds, 1 year olds, 2 year olds, 3 through 6 year olds who were unenrolled, 3 through 6 year olds enrolled in preschool, kindergartners, and each single grade for grades 1 through 8. The ECPP and ASPA nonresponse adjustment cells, with their unit response rates, are given in tables 2 and 3, respectively. For ECPP, the unit response rates vary

[7] "Mailable" means a valid mailing address could be matched to the sampled telephone number.

[8] In addition to the variables identified by CHAID for use in Screener nonresponse adjustment, the following variables were also considered: percentage Black in the telephone exchange, percentage high school graduates in the telephone exchange, and percentage renters in the telephone exchange.

among adjustment cells from 83 percent to 86 percent, and for ASPA, the unit response rates also range from 83 percent to 86 percent.

For AE, four variables were identified by CHAID and used for nonresponse adjustment: whether the respondent was also the Screener respondent, educational attainment of the adult as reported by the Screener respondent, adult education participation as reported by the Screener respondent, and sex of the adult (see table 4). Also included in the CHAID analysis but not used for nonresponse adjustment were Census region and urbanicity. As with ECPP and ASPA, most of these items were not available until after the Screener was completed. For AE, the unit response rates vary among adjustment cells from 48 percent to 89 percent.

2.3. A Comparison of Estimates Based on Adjusted and Unadjusted Weights

One way of examining the magnitude of unit nonresponse bias and the likely effectiveness of statistical adjustments in reducing that bias is to compare estimates computed using adjusted weights to those computed using unadjusted weights. The unadjusted weight is the reciprocal of the probability of selection, reflecting all stages of selection. The adjusted weight is the extended interview weight adjusted for unit nonresponse (without the raking adjustment). It should be noted that the final raking adjustment also reduces nonresponse bias but is omitted from this analysis[9]. In this analysis, the statistical significance of differences in estimates was investigated only for those differences having practical significance; in this case, differences of at least 3 percentage points were judged to be of practical significance, since effects other than unit nonresponse bias may contribute in part to the differences in the estimates.

[9] Although raking adjustments were done on the nonresponse adjusted weights, those types of adjustments also adjust for undercoverage in addition to nonresponse. For that reason, the comparison of unadjusted and adjusted estimates when assessing for nonresponse bias would be contaminated by using the raked weights.

Table 2. ECPP interview nonresponse adjustment cells:2005

Explanatory variables[1]	Number of respondents in cell	Weighted unit response rate (percent)[2]
Age 0	1,036	82.9
Age 1	1,176	84.4
Age 2	1,386	85.9
Unenrolled (ages 3 through 6)	1,482	83.5
Nursery school/prekindergarten	2,126	84.7

[1] Variables include age or grade/equivalent from the Screener.

[2] The unit response rate is the number of completed interviews divided by the sum of the number of completed interviews and nonresponses, weighted for the probability of selection but not adjusted for nonresponse.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation Survey (ECPP) of the National Household Education Surveys Program (NHES), 2005.

Table 3. ASPA interview nonresponse adjustment cells: 2005

Explanatory variables[1]	Number of respondents in cell	Weighted unit response rate (percent)[2]
Kindergarten/transitional kindergarten/pre-1st grade	1,110	82.6
1st grade or equivalent	1,081	86.4
2nd grade or equivalent	1,026	84.4
3rd grade or equivalent	1,066	84.8
4th grade or equivalent	1,148	83.1
5th grade or equivalent	1,142	84.1
6th grade or equivalent	1,702	83.5
7th grade or equivalent	1,686	84.1
8th grade or equivalent	1,726	84.6

[1] Variables include age or grade/equivalent from the Screener.

[2] The unit response rate is the number of completed interviews divided by the sum of the number of completed interviews and nonresponses, weighted for the probability of selection but not adjusted for nonresponse.

SOURCE: U.S. Department of Education, National Center for Education Statistics, After School Programs and Activities Survey (ASPA) of the National Household Education Surveys Program (NHES), 2005.

Table 4. AE interview nonresponse adjustment cells: 2005

Explanatory variables[1]	Number of respondents in cell	Weighted unit response rate (percent)[2]
Screener respondent/high school diploma/adult education participant/female	1,717	88.7
Screener respondent/high school diploma/adult education participant/male	797	85.3
Screener respondent/high school diploma/adult education nonparticipant/female	1,679	84.5
Screener respondent/high school diploma/adult education nonparticipant/male	933	83.3
Screener respondent/no high school diploma/adult education participant/female	131	88.7
Screener respondent/no high school diploma/adult education participant/male	55	85.2
Screener respondent/no high school diploma/adult education nonparticipant/female	533	75.8
Screener respondent/no high school diploma/adult education nonparticipant/male	289	76.9
Not Screener respondent/high school diploma/adult education participant/female	601	64.1
Not Screener respondent/high school diploma/adult education participant/male	714	60.6
Not Screener respondent/high school diploma/adult education nonparticipant/female	374	58.2
Not Screener respondent/high school diploma/adult education nonparticipant/male	568	53.0
Not Screener respondent/no high school diploma[3]	513	48.4

[1] Variables include an indicator of whether sampled adult was the Screener respondent, an indicator of whether sampled adult has a high school diploma (from Screener), adult education participation status (from the Screener), and sex

[2] The unit response rate is the number of completed interviews divided by the sum of the number of completed interviews and nonresponses, weighted for the probability of selection but not adjusted for nonresponse.

[3] For this adjustment cell, adult education participation status (Screener) and sex were collapsed due to large adjustment factors for the original cells.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education Survey (AE) of the National Household Education Surveys Program (NHES), 2005.

2.3.1 Estimates of Characteristics for the ECPP and ASPA Interviews

In order to determine the effects of the unit nonresponse adjustment on the ECPP and ASPA components of NHES: 2005, several characteristics of the child and of the child's family were examined in a comparison of estimates constructed using the unit nonresponse-adjusted weights and the unadjusted weights (tables 5 and 6). In addition to these, estimates of the child's development and care and of the child's school were computed by race/ethnicity of the child separately for ECPP and ASPA, using the nonresponse-adjusted weights and the unadjusted weights (tables 7 and 8). Separate estimates for subgroups formed by race/ethnicity were considered in this analysis because they are key analytic subgroups. No measurable differences were observed in these comparisons of estimates. The fact that there were no measurable differences suggests that none of these variables were powerful predictors of unit response propensity. Therefore, the unit nonresponse adjustment had little effect on the potential bias, but it is possible that there was little to be removed. Even though grade did not differ between the nonresponse-adjusted and unadjusted estimates, it was used for unit nonresponse adjustment because of its high correlation with characteristics of the child's after-school care and program participation. Also, important analytic subgroups are formed using grade.

2.3.2 Estimates of Characteristics for the AE Interview

In order to determine the effects of the unit nonresponse adjustment on the estimates from the Adult Education Survey of NHES:2005, estimates of several characteristics of adults were examined in a comparison of estimates based on the unit nonresponse-adjusted weights and the unadjusted weights (table 9). In addition to these, nonresponse-adjusted and unadjusted estimates of overall adult education participation and participation in each type of adult education were compared, overall and by educational attainment, sex, and race/ethnicity (tables 10, 11, and 12). Separate estimates for subgroups formed by these variables were considered in this analysis because they are key analytic subgroups. No significant differences were found between estimates using the two different weights, with the exception of the estimates of sex. Differential response between males and females is typical in NHES, so to reduce bias, sex (as reported by the Screener respondent) was used in unit nonresponse adjustment for the AE Survey.

Table 5. ECPP comparison of estimates based on nonresponse-adjusted weights and unadjusted weights for children age 0 to 6 who are enrolled in preschool or not enrolled, by child and family characteristics: 2005

Characteristic	Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.
Age/grade of child				
Infant (age 0 to 2), unenrolled (age 3 to 6)	73	0.6	73	0.5
Nursery school/preschool/prekindergarten/Head Start	27	0.6	27	0.5
Census region[1]				
Northeast	17	0.6	18	0.8
Midwest	35	0.7	33	0.8
South	24	0.6	24	0.8
West	24	0.6	25	0.7
Race/ethnicity of child				
White, non-Hispanic	61	0.7	60	0.7
Black, non-Hispanic	8	0.4	8	0.4
Hispanic	21	0.5	22	0.5
Other[3]	10	0.5	10	0.5
Sex of child				
Male	52	0.6	52	0.6
Female	48	0.6	48	0.6
Mother's employment status[2]				
Employed	54	0.8	54	0.9
Unemployed	44	0.8	45	0.8
Retired/disabled or unable to work	#	†	#	†
No mother present	2	0.2	2	0.2
Mother's home language				
English	85	0.6	85	0.6
Not English	14	0.5	14	0.5
No mother present	2	0.2	2	0.2
Educational attainment of mother				
Less than a high school diploma or its equivalent	13	0.6	13	0.6
High school diploma or its equivalent	22	0.7	22	0.7
Vocational education or some college	19	0.6	19	0.6
College degree	31	0.8	31	0.8
Graduate/professional training or degree	14	0.7	14	0.7
No mother present	2	0.2	2	0.2

See notes at end of table.

Table 5. ECPP comparison of estimates based on nonresponse-adjusted weights and unadjusted weights for children age 0 to 6 who are enrolled in preschool or not enrolled, by child and family characteristics: 2005—Continued

Characteristic	Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.
Family type				
Two parents	82	0.6	82	0.6
None or one parent	18	0.6	18	0.6
Household income				
$5,000 or less	4	0.4	4	0.4
$5,001 to $10,000	5	0.3	5	0.3
$10,001 to $15,000	5	0.4	5	0.4
$15,001 to $20,000	5	0.4	5	0.4
$20,001 to $25,000	7	0.5	7	0.5
$25,001 to $30,000	5	0.4	5	0.4
$30,001 to $35,000	5	0.4	5	0.4
$35,001 to $40,000	5	0.4	5	0.4
$40,001 to $45,000	4	0.3	4	0.3
$45,001 to $50,000	5	0.3	5	0.3
$50,001 to $60,000	9	0.5	9	0.5
$60,001 to $75,000	12	0.5	13	0.5
$75,001 to $100,000	13	0.6	13	0.6
Over $100,000	16	0.7	16	0.6

Rounds to zero.

† Not applicable.

[1] The Northeast Census region contains Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, New Jersey, New York, and Pennsylvania. The Midwest region contains Indiana, Illinois, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota. The South region contains Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas. The West region contains Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, Wyoming, Alaska, California, Hawaii, Oregon, and Washington.

[2] "Mother's employment status" estimates exclude mothers who are not in the labor force.

[3] "Other" includes children who were multiracial and not of Hispanic ethnicity, or who were American Indian or Alaska Natives, or were not Hispanic, White, Black, Asian, or Pacific Islander.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation Survey (ECPP) of the National Household Education Surveys Program (NHES), 2005.

Table 6. ASPA comparison of estimates based on nonresponse-adjusted weights and unadjusted weights for children age 3 to 15 who are enrolled in kindergarten through 8th grade, by child and family characteristics: 2005

Characteristic	Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.
Grade of child				
Kindergarten	12	0.4	12	0.4
1	11	0.3	11	0.4
2	10	0.3	10	0.4
3	11	0.4	11	0.4
4	11	0.4	11	0.4
5	11	0.3	11	0.3
6	12	0.3	12	0.3
7	11	0.3	11	0.3
8	12	0.3	12	0.3
Census region[1]				
Northeast	18	0.3	19	0.5
Midwest	35	0.5	33	0.7
South	24	0.5	24	0.6
West	24	0.4	25	0.6
Race/ethnicity of child				
White, non-Hispanic	61	0.5	61	0.6
Black, non-Hispanic	11	0.4	10	0.4
Hispanic	20	0.5	20	0.5
Other[3]	9	0.3	9	0.3
Sex of child				
Male	52	0.6	52	0.6
Female	48	0.6	48	0.6
Mother's employment status[2]				
Employed	62	0.6	62	0.6
Unemployed	34	0.6	34	0.6
Retired/disabled or unable to work	1	0.1	1	0.1
No mother present	4	0.2	4	0.3
Mother's home language				
English	86	0.4	85	0.3
Not English	11	0.3	11	0.3
No mother present	4	0.2	4	0.3

See notes at end of table.

Table 6. ASPA comparison of estimates based on nonresponse-adjusted weights and unadjusted weights for children age 3 to 15 who are enrolled in kindergarten through 8th grade, by child and family characteristics: 2005 —Continued

Characteristic	Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.
Educational attainment of mother				
Less than a high school diploma or its equivalent	13	0.5	13	0.5
High school diploma or its equivalent	24	0.5	24	0.5
Vocational education or some college	19	0.5	19	0.5
College degree	29	0.6	29	0.6
Graduate/professional training or degree	11	0.4	11	0.4
No mother present	4	0.2	4	0.3
Family type				
Two parents	74	0.6	74	0.6
None or one parent	26	0.6	26	0.6
Household income				
$5,000 or less	3	0.3	3	0.3
$5,001 to $10,000	4	0.3	4	0.3
$10,001 to $15,000	5	0.3	5	0.3
$15,001 to $20,000	5	0.3	5	0.3
$20,001 to $25,000	7	0.3	7	0.3
$25,001 to $30,000	5	0.3	5	0.3
$30,001 to $35,000	5	0.3	5	0.3
$35,001 to $40,000	5	0.3	5	0.3
$40,001 to $45,000	3	0.2	3	0.2
$45,001 to $50,000	5	0.3	5	0.3
$50,001 to $60,000	9	0.4	9	0.4
$60,001 to $75,000	12	0.3	12	0.3
$75,001 to $100,000	13	0.4	13	0.4
Over $100,000	18	0.4	18	0.4

[1] The Northeast Census region contains Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, New Jersey, New York, and Pennsylvania. The Midwest region contains Indiana, Illinois, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota. The South region contains Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas. The West region contains Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, Wyoming, Alaska, California, Hawaii, Oregon, and Washington.

[2] "Mother's employment status" estimates exclude mothers who are not in the labor force.

[3] "Other" includes children who were multiracial and not of Hispanic ethnicity, or who were American Indian or Alaska Natives, or were not Hispanic, White, Black, Asian, or Pacific Islander.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, After School Programs and Activities Survey (ASPA) of the National Household Education Surveys Program (NHES), 2005.

Table 7. ECPP comparison of estimates of selected characteristics based on nonresponse-adjusted weights and unadjusted weights for children age 0 to 6 who are enrolled in preschool or not enrolled, by race/ethnicity: 2005

Characteristic	Overall				Race/ethnicity													
					White, non-Hispanic				Black, non-Hispanic				Hispanic				Other race/ethnicity			
	NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Child receiving relative care																				
Yes	22	0.6	22	0.6	21	0.9	21	0.8	27	2.5	27	2.5	22	1.0	22	1.0	24	2.6	24	2.6
No	78	0.6	78	0.6	79	0.9	79	0.8	73	2.5	73	2.5	78	1.0	78	1.0	76	2.6	76	2.6
Child receiving non-relative care																				
Yes	15	0.6	15	0.5	17	0.8	17	0.8	10	1.3	10	1.3	11	1.1	11	1.1	9	1.2	10	1.3
No	85	0.6	85	0.5	83	0.8	83	0.8	90	1.3	90	1.3	89	1.1	89	1.1	91	1.2	90	1.3
Child receiving center-based care																				
Yes	38	0.7	38	0.6	41	0.9	41	0.9	46	2.6	46	2.6	27	1.3	28	1.3	41	2.6	41	2.5
No	62	0.7	62	0.6	59	0.9	59	0.9	54	2.6	54	2.6	73	1.3	72	1.3	59	2.6	59	2.5
Child developmentally delayed																				
Yes	1	0.3	1	0.3	1	0.4	1	0.4	2	1.2	2	1.2	1	0.6	1	0.6	#	†	#	†
No	99	0.3	99	0.3	99	0.4	99	0.4	98	1.2	98	1.2	99	0.6	99	0.6	100	0.1	100	0.1
Child has specific learning disability																				
Yes	2	0.3	2	0.3	2	0.4	2	0.4	4	1.3	4	1.3	2	0.6	2	0.6	1	0.6	1	0.6
No	98	0.3	98	0.3	98	0.4	98	0.4	96	1.3	96	1.3	98	0.6	98	0.6	99	0.6	99	0.6
Child has other health impairment																				
Yes	4	0.3	4	0.3	4	0.4	4	0.4	3	1.0	3	1.0	3	0.5	3	0.5	4	0.8	4	0.8
No	96	0.3	96	0.3	96	0.4	96	0.4	97	1.0	97	1.0	97	0.5	97	0.5	96	0.8	96	0.8

See notes at end of table.

Table 7. ECPP comparison of estimates of selected characteristics based on nonresponse-adjusted weights and unadjusted weights for children age 0 to 6 who are enrolled in preschool or not enrolled, by race/ethnicity: 2005 —Continued

Characteristic	Overall				Race/ethnicity															
					White, non-Hispanic				Black, non-Hispanic				Hispanic				Other race/ethnicity[1]			
	NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Child has good choices for child care/early childhood pgms																				
Yes	65	0.8	65	0.8	70	1.0	70	1.0	60	2.8	60	2.8	52	1.6	52	1.6	62	2.6	62	2.5
No	20	0.6	20	0.8	17	0.8	17	0.8	28	2.6	28	2.7	25	1.4	25	1.4	24	2.1	24	2.1
Have not tried to find care	15	0.6	15	0.7	12	0.8	12	0.8	12	1.6	12	1.6	24	1.3	24	1.3	14	1.9	14	1.9
Number of times child read to in past week																				
Not at all	6	0.3	5	0.3	3	0.4	3	0.4	6	1.4	6	1.4	12	1.1	12	1.1	4	0.8	4	0.8
Once or twice	14	0.5	14	0.5	10	0.6	10	0.6	18	1.6	18	1.6	22	1.4	22	1.4	12	1.3	12	1.3
3 or more times	23	0.6	23	0.6	22	0.9	22	0.9	28	2.2	28	2.2	24	1.3	24	1.3	23	2.4	23	2.4
Every day	58	0.8	58	0.8	64	1.0	65	1.0	48	2.3	48	2.3	42	1.7	42	1.7	60	2.5	60	2.5
Someone in family taught child letters, words, or numbers																				
Yes	95	0.4	95	0.4	94	0.6	94	0.6	96	1.1	96	1.1	94	0.9	94	0.9	96	1.4	96	1.4
No	5	0.4	5	0.4	6	0.6	6	0.6	4	1.1	4	1.1	6	0.9	6	0.9	4	1.4	4	1.4
Child recognizes letters of alphabet																				
All letters	22	0.6	22	0.6	24	1.0	24	1.0	21	2.3	21	2.4	12	1.3	12	1.3	26	2.5	26	2.5
Most letters	23	0.8	22	0.8	24	1.2	24	1.2	26	2.6	26	2.6	17	1.3	17	1.3	23	2.5	23	2.5
Some letters	38	0.8	38	0.9	37	1.1	37	1.1	37	2.8	37	2.7	44	1.7	44	1.7	37	2.6	37	2.6
No letters	18	0.6	18	0.7	15	1.0	15	1.0	16	2.2	16	2.2	27	1.6	27	1.6	14	2.2	14	2.2

See notes at end of table.

Table 7. ECPP comparison of estimates of selected characteristics based on nonresponse-adjusted weights and unadjusted weights for children age 0 to 6 who are enrolled in preschool or not enrolled, by race/ethnicity: 2005—Continued

Characteristic	Overall				Race/ethnicity															
					White, non-Hispanic				Black, non-Hispanic				Hispanic				Other race/ethnicity[1]			
	NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Child can write own name																				
Yes	44	0.9	44	0.9	45	1.2	45	1.2	44	3.2	45	3.2	38	1.9	38	1.9	45	2.9	45	2.9
No	56	0.9	56	0.9	55	1.2	55	1.2	56	3.2	55	3.2	62	1.9	62	1.9	55	2.9	55	2.9

† Not applicable.

Rounds to zero.

[1] "Other race/ethnicity" includes children who were multiracial and not of Hispanic ethnicity, or who were American Indian or Alaska Natives, or were not Hispanic, White, Black, Asian, or Pacific Islander.

NOTE: NR-adjusted is nonresponse-adjusted. s.e. is standard error. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation Survey (ECPP) of the National Household Education Surveys Program (NHES), 2005.

Table 8. ASPA comparison of estimates of selected characteristics based on nonresponse-adjusted weights and unadjusted weights for children age 3 to 15 who are enrolled in kindergarten through 8th grade, by race/ethnicity: 2005

Characteristic	Overall				Race/ethnicity													
					White, non-Hispanic				Black, non-Hispanic				Hispanic				Other race/ethnicity[1]			
	NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Child receiving relative care																				
Yes	15	0.4	15	0.4	13	0.5	13	0.5	22	1.7	22	1.7	15	0.9	15	0.9	17	1.7	17	1.7
No	85	0.4	85	0.4	87	0.5	87	0.5	78	1.7	78	1.7	85	0.9	85	0.9	83	1.7	83	1.7
Child receiving non-relative care																				
Yes	6	0.3	6	0.3	6	0.4	6	0.4	5	0.8	5	0.8	5	0.7	5	0.7	6	0.9	6	0.9
No	94	0.3	94	0.3	94	0.4	94	0.4	95	0.8	95	0.8	95	0.7	95	0.7	94	0.9	94	0.9
Child receiving center-based care																				
Yes	20	0.5	21	0.5	17	0.6	17	0.6	33	2.0	33	2.0	24	1.3	24	1.3	22	2.1	22	2.1
No	80	0.5	79	0.5	83	0.6	83	0.6	67	2.0	67	2.0	76	1.3	76	1.3	78	2.1	78	2.1
Child receiving after school care																				
Yes	52	0.6	52	0.6	61	0.8	61	0.8	37	1.9	37	1.9	33	1.3	33	1.3	49	2.2	49	2.2
No	48	0.6	48	0.6	39	0.8	39	0.8	63	1.9	63	1.9	67	1.3	67	1.3	51	2.2	51	2.2
Child receiving self care																				
Yes	13	0.4	13	0.4	13	0.5	13	0.5	17	1.3	17	1.2	13	0.8	13	0.8	14	1.3	14	1.3
No	87	0.4	87	0.4	87	0.5	87	0.5	83	1.3	83	1.2	87	0.8	87	0.8	86	1.3	86	1.3
Child has specific learning disability																				
Yes	7	0.3	7	0.3	7	0.4	7	0.3	9	1.0	9	1.0	6	0.5	6	0.5	6	0.8	6	0.8
No	93	0.3	93	0.3	93	0.4	93	0.3	91	1.0	91	1.0	94	0.5	94	0.5	94	0.8	94	0.8
Child has other health impairment																				
Yes	5	0.3	5	0.3	6	0.3	6	0.3	6	0.9	6	0.9	4	0.5	4	0.5	5	0.9	5	0.9
No	95	0.3	95	0.3	94	0.3	94	0.3	94	0.9	94	0.9	96	0.5	96	0.5	95	0.9	95	0.9

See notes at end of table.

Table 8. ASPA comparison of estimates of selected characteristics based on nonresponse-adjusted weights and unadjusted weights for children age 3 to 15 who are enrolled in kindergarten through 8th grade, by race/ethnicity: 2005—Continued

Characteristic	Overall				Race/ethnicity															
					White, non-Hispanic				Black, non-Hispanic				Hispanic				Other race/ethnicity[1]			
	NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted		NR-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
School type																				
Public	88	0.4	88	0.4	86	0.6	86	0.6	90	1.1	90	1.1	93	0.7	93	0.7	90	1.3	90	1.3
Private	12	0.4	12	0.4	14	0.6	14	0.6	10	1.1	10	1.1	7	0.7	7	0.7	10	1.3	10	1.3
Whether school assigned or chosen																				
Assigned	84	0.5	84	0.5	86	0.5	86	0.5	74	1.8	74	1.8	85	0.9	84	0.9	77	2.2	77	2.2
Chosen	14	0.4	14	0.4	11	0.5	11	0.5	24	1.8	24	1.8	14	0.9	14	0.9	19	1.9	19	1.9
Assigned school is chosen	2	0.2	2	0.2	3	0.3	3	0.3	2	0.5	2	0.5	2	0.3	2	0.3	4	0.8	4	0.8
Contact from school about child's behavior																				
Yes	16	0.4	16	0.4	14	0.5	14	0.5	28	1.7	28	1.6	16	1.0	16	1.0	18	1.8	16	1.0
No	84	0.4	84	0.4	86	0.5	86	0.5	72	1.7	72	1.6	84	1.0	84	1.0	82	1.8	84	1.0
Child's overall grades																				
Mostly As	34	0.5	34	0.5	37	0.7	37	0.7	29	1.5	29	1.5	27	1.2	27	1.2	37	2.3	37	2.2
Mostly Bs	24	0.5	23	0.5	22	0.6	22	0.6	29	1.4	29	1.4	28	1.1	28	1.1	18	1.4	18	1.4
Mostly Cs	9	0.3	9	0.3	8	0.4	8	0.4	14	1.3	14	1.3	10	0.9	10	0.9	7	1.2	7	1.2
Mostly Ds	2	0.1	2	0.1	1	0.2	1	0.2	2	0.3	2	0.3	3	0.4	3	0.4	1	0.3	1	0.3
Mostly Fs	1	0.1	1	0.1	1	0.1	1	0.1	1	0.4	1	0.4	1	0.3	1	0.3	#	†	#	†
No grades given	31	0.5	32	0.5	32	0.7	32	0.7	25	1.4	25	1.4	31	1.3	32	1.3	36	2.1	36	2.1
Contact from school about child's school work																				
Yes	21	0.5	21	0.5	19	0.6	20	0.6	26	1.4	26	1.4	23	1.1	23	1.1	21	1.8	21	1.8
No	79	0.5	79	0.5	81	0.6	81	0.6	74	1.4	74	1.4	77	1.1	77	1.1	79	1.8	79	1.8

† Not applicable.
# Rounds to zero.
[1] "Other race/ethnicity" includes children who were multiracial and not of Hispanic ethnicity, or who were American Indian or Alaska Natives, or were not Hispanic, White, Black, Asian, or Pacific Islander.
NOTE: NR-adjusted is nonresponse-adjusted. s.e. is standard error. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, After School Programs and Activities Survey (ASPA) of the National Household Education Surveys Program (NHES), 2005.

Table 9. AE comparison of estimates based on nonresponse-adjusted weights and unadjusted weights for adults, by demographic characteristics: 2005

Characteristic	Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.
Census region[1]				
Northeast	18	0.5	19	0.6
Midwest	36	0.8	34	0.8
South	24	0.7	24	0.6
West	23	0.7	23	0.7
Educational attainment				
Less than a high school diploma or its equivalent	11	0.4	10	0.4
High school diploma or its equivalent and/or some college, associate's degree, or voc/tech school	56	0.8	56	0.8
Bachelor's degree or higher	33	0.8	34	0.7
Household income				
$5,000 or less	3	0.2	3	0.2
$5,001 to $10,000	4	0.3	4	0.3
$10,001 to $15,000	5	0.3	5	0.3
$15,001 to $20,000	5	0.3	5	0.3
$20,001 to $25,000	6	0.4	6	0.4
$25,001 to $30,000	5	0.3	5	0.3
$30,001 to $35,000	5	0.3	5	0.3
$35,001 to $40,000	5	0.4	5	0.4
$40,001 to $50,000	4	0.2	4	0.2
$50,001 to $75,000	5	0.4	5	0.4
Over $75,000	10	0.5	10	0.5
Race/ethnicity				
White, non-Hispanic	75	0.7	75	0.7
Black, non-Hispanic	7	0.3	7	0.3
Hispanic	11	0.5	10	0.4
Other[6]	7	0.5	7	0.5
Sex				
Male	48	0.6	44	0.7
Female	52	0.6	56	0.7

See notes at end of table.

Table 9. AE comparison of estimates based on nonresponse-adjusted weights and unadjusted weights for adults, by demographic characteristics: 2005—Continued

Characteristic	Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.
Type of adult education activity				
Any adult education activity[2]	45	0.7	46	0.7
Any ABE/GED[3,4]	1	0.2	1	0.1
Any ESL[5]	5	0.7	5	0.7
Any credential programs[2]	11	0.5	11	0.5
Any apprenticeship program	1	0.2	1	0.1
Any work-related course	29	0.7	29	0.6
Any personal development course	22	0.7	23	0.6
Any vocational/technical course	2	0.2	2	0.2
Any distance learning course	31	1.0	32	0.9
Any informal learning course	72	0.8	73	0.8

[1] The Northeast Census region contains Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, New Jersey, New York, and Pennsylvania. The Midwest region contains Indiana, Illinois, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota. The South region contains Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas. The West region contains Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, Wyoming, Alaska, California, Hawaii, Oregon, and Washington.

[2] Adults who participated in a credential program on a full-time basis only, for part or all of the year, and did not participate in any other type of formal educational activity are not counted as participants in adult education. Adults who participated in a credential program on a full-time basis only and also participated in another type of adult education are included in the overall rate and the rate for the type of noncredential adult education in which they participated, but not in the credential program rate. Adults who participated in a credential program on a part-time basis only or on both part-time and full-time basis are included in the credential rate and the overall rate.

[3] Adult basic education/general education development (ABE/GED). Respondents who did not have a high school diploma or its equivalent, received a high school diploma or its equivalent in the past 12 months, or received a high school diploma in a foreign country were asked about participation in adult basic education, GED preparation classes, adult high school equivalency programs.

[4] Persons with a bachelor's degree or more education were not asked about participation in adult basic education, GED preparation classes, adult high school, or high school equivalency programs.

[5] Respondents whose primary language is other than English were asked about participation in English as a second language classes.

[6] "Other" includes children who were multiracial and not of Hispanic ethnicity, or who were American Indian or Alaska Natives, or were not Hispanic, White, Black, Asian, or Pacific Islander.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education Survey (AE) of the National Household Education Surveys Program (NHES), 2005.

Table 10. AE comparison of estimates based on nonresponse-adjusted and unadjusted weights for adults who took part in various adult education activities in a 12-month period, by race/ethnicity: 2005

Type of adult education activity	Race/ethnicity							
	White, non-Hispanic				Black, non-Hispanic			
	Nonresponse-adjusted		Unadjusted		Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Any adult education activity[1]	47	0.9	48	0.8	46	2.7	47	2.5
Any ABE/GED[2,3]	1	0.1	1	0.1	1	0.3	1	0.3
Any ESL[4]	4	1.2	3	1.2	#	†	#	†
Any credential programs[1]	10	0.6	10	0.5	11	1.5	12	1.5
Any apprenticeship program	1	0.2	1	0.1	1	0.6	1	0.5
Any work-related course	31	0.8	31	0.7	28	2.5	28	2.3
Any personal development course	23	0.9	24	0.8	24	2.1	25	1.9
Any vocational/technical course	1	0.2	1	0.2	2	0.7	2	0.6
Any distance learning course	30	1.1	31	1.1	35	3.1	34	2.7
Any informal learning course	74	0.9	75	0.8	67	2.1	67	2.0

See notes at end of table.

Table 10. AE comparison of estimates based on nonresponse-adjusted and unadjusted weights for adults who took part in various adult education activities in a 12-month period, by race/ethnicity: 2005—Continued

Type of adult education activity	Race/ethnicity							
	Hispanic				Other[5]			
	Nonresponse-adjusted		Unadjusted		Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Any adult education activity[1]	37	2.2	38	2.1	43	2.7	43	2.6
Any ABE/GED[2,3]	7	1.0	7	0.9	1	0.5	1	0.5
Any ESL[4]	7	1.1	7	1.0	3	1.2	3	1.3
Any credential programs[1]	10	1.3	11	1.3	18	3.0	18	2.9
Any apprenticeship program	2	0.8	2	0.6	1	0.4	1	0.5
Any work-related course	17	1.7	19	1.6	24	2.6	25	2.4
Any personal development course	16	1.5	17	1.4	22	2.5	23	2.4
Any vocational/technical course	2	0.6	2	0.5	2	0.4	2	0.4
Any distance learning course	30	3.3	31	3.1	41	4.6	39	4.2
Any informal learning course	58	2.6	59	2.6	78	2.9	78	2.9

† Not applicable.
# Rounds to zero.
[1] Adults who participated in a credential program on a full-time basis only, for part or all of the year, and did not participate in any other type of formal educational activity are not counted as participants in adult education. Adults who participated in a credential program on a full-time basis only and also participated in another type of adult education are included in the overall rate and the rate for the type of noncredential adult education in which they participated, but not in the credential program rate. Adults who participated in a credential program on a part-time basis only or on both part-time and full-time basis are included in the credential rate and the overall rate.
[2] Adult basic education/general education development (ABE/GED). Respondents who did not have a high school diploma or its equivalent, received a high school diploma or its equivalent in the past 12 months, or received a high school diploma in a foreign country were asked about participation in adult basic education, GED preparation classes, and adult high school equivalency programs.
[3] Persons with a bachelor's degree or more education were not asked about participation in adult basic education, GED preparation classes, adult high school, and adult high school equivalency programs.
[4] Respondents whose primary language is other than English were asked about participation in English as a second language classes.
NOTE: s.e. is standard error. Percents for different types of adult education sum to more than the overall participation rate because some adults participate in more than one type of activity or program.
[5] "Other" includes children who were multiracial and not of Hispanic ethnicity, or who were American Indian or Alaska Natives, or were not Hispanic, White, Black, Asian, or Pacific Islander.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education Survey (AE) of the National Household Education Surveys Program (NHES), 2005.

Table 11. AE comparison of estimates based on nonresponse-adjusted and unadjusted weights for adults who took part in various adult education activities in a 12-month period, by sex: 2005

Type of adult education activity	Sex							
	Male				Female			
	Nonresponse-adjusted		Unadjusted		Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Any adult education activity[1]	42	1.1	43	1.1	51	1.0	49	0.9
Any ABE/GED[2,3]	1	0.3	1	0.2	2	0.2	1	0.1
Any ESL[4]	4	1.0	4	1.0	6	0.9	5	0.8
Any credential programs[1]	10	0.6	10	0.6	12	0.7	11	0.7
Any apprenticeship program	2	0.3	1	0.3	1	0.1	1	0.1
Any work-related course	26	1.0	27	0.9	31	1.0	31	1.0
Any personal development course	19	1.0	19	1.0	25	0.9	26	0.9
Any vocational/technical course	2	0.3	2	0.3	1	0.2	1	0.2
Any distance learning course	34	1.8	35	1.8	29	1.4	30	1.3
Any informal learning course	72	1.1	73	1.0	72	1.0	73	1.0

[1] Adults who participated in a credential program on a full-time basis only, for part or all of the year, and did not participate in any other type of formal educational activity are not counted as participants in adult education. Adults who participated in a credential program on a full-time basis only and also participated in another type of adult education are included in the overall rate and the rate for the type of noncredential adult education in which they participated, but not in the credential program rate. Adults who participated in a credential program on a part-time basis only or on both part-time and full-time basis are included in the credential rate and the overall rate.

[2] Adult basic education/general education development (ABE/GED). Respondents who did not have a high school diploma or its equivalent, received a high school diploma or its equivalent in the past 12 months, or received a high school diploma in a foreign country were asked about participation in adult basic education, GED preparation classes, and adult high school equivalency programs.

[3] Persons with a bachelor's degree or more education were not asked about participation in adult basic education, GED preparation classes, adult high school, and adult high school equivalency programs.

[4] Respondents whose primary language is other than English were asked about participation in English as a second language classes.

NOTE: s.e. is standard error. Percents for different types of adult education sum to more than the overall participation rate because some adults participate in more than one type of activity or program.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education Survey (AE) of the National Household Education Surveys Program (NHES), 2005.

Table 12. AE comparison of estimates based on nonresponse-adjusted and unadjusted weights for adults who took part in various adult education activities in a 12-month period, by educational achievement:2005

Type of adult education activity	Educational attainment							
	Less than a high school diploma or its equivalent				High school diploma or its equivalent, some college, associate's degree, or vocational/technical school			
	Nonresponse-adjusted		Unadjusted		Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.	Percent	s.e.	Percent	s.e.
Any adult education activity[1]	20	1.4	20	1.3	40	0.9	41	0.9
Any ABE/GED[2,3]	7	1.0	7	0.8	1	0.2	1	0.1
Any ESL[4]	6	1.4	6	1.4	6	1.2	5	1.1
Any credential programs[1]	2	0.4	1	0.4	13	0.8	12	0.8
Any apprenticeship program	1	0.2	1	0.2	1	0.2	1	0.2
Any work-related course	4	0.6	4	0.6	23	0.8	24	0.7
Any personal development course ...	11	1.1	11	1.1	20	0.9	21	0.9
Any vocational/technical course	1	0.4	1	0.3	2	0.2	2	0.2
Any distance learning course	21	3.4	23	3.4	32	1.4	32	1.3
Any informal learning course	46	1.9	46	1.8	71	1.2	71	1.1

See notes at end of table.

Table 12. AE comparison of estimates based on nonresponse-adjusted and unadjusted weights for adults who took part in various adult education activities in a 12-month period, by educational achievement: 2005 —Continued

Type of adult education activity	Educational attainment			
	Bachelor's degree or higher			
	Nonresponse-adjusted		Unadjusted	
	Percent	s.e.	Percent	s.e.
Any adult education activity[1]	62	1.3	63	1.2
Any ABE/GED[2,3]	#	†	#	†
Any ESL[4]	3	1.2	3	1.3
Any credential programs[1]	11	0.7	12	0.7
Any apprenticeship program	1	0.3	1	0.2
Any work-related course	46	1.4	46	1.3
Any personal development course	30	1.2	31	1.1
Any vocational/technical course	1	0.2	1	0.2
Any distance learning course	32	1.6	32	1.4
Any informal learning course	83	1.1	84	1.0

†Not applicable.
#Rounds to zero.
[1] Adults who participated in a credential program on a full-time basis only, for part or all of the year, and did not participate in any other type of formal educational activity are not counted as participants in adult education. Adults who participated in a credential program on a full-time basis only and also participated in another type of adult education are included in the overall rate and the rate for the type of noncredential adult education in which they participated, but not in the credential program rate. Adults who participated in a credential program on a part-time basis only or on both part-time and full-time basis are included in the credential rate and the overall rate.
[2] Adult basic education/general education development (ABE/GED). Respondents who did not have a high school diploma or its equivalent, received a high school diploma or its equivalent in the past 12 months, or received a high school diploma in a foreign country were asked about participation in adult basic education, GED preparation classes, and adult high school equivalency programs.
[3] Persons with a bachelor's degree or more education were not asked about participation in adult basic education, GED preparation classes, adult high school, and adult high school equivalency programs.
[4] Respondents whose primary language is other than English were asked about participation in English as a second language classes.
NOTE: s.e. is standard error. Percents for different types of adult education sum to more than the overall participation rate because some adults participate in more than one type of activity or program.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education Survey (AE) of the National Household Education Surveys Program (NHES), 2005.

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3. Item Nonresponse Bias

In the ECPP, ASPA, and AE Surveys, 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 such cases, the items that were not internally consistent were set to missing. This section contains an evaluation of the potential for bias due to item nonresponse. In many surveys, such an evaluation would contain an examination of differences between item respondents and the full sample in characteristics available on the sampling frame. However, in RDD samples, the sampling frame data are limited to general characteristics of the telephone exchange, which only cover a small percentage of items in the survey. Also, for the items in the survey that do match frame data, there is the temporal consideration that these characteristics pertained at the time of the 2000 decennial census.

Section 3.1 gives item response rates for the three surveys, and describes the items that are included in the item nonresponse bias analysis. For the ECPP, ASPA, and AE surveys, the median item response rates were 99.3 percent, 99.2 percent, and 98.8 percent, respectively, and the median total response rates (the product of the item response rates and overall unit response rates) were 56.0 percent, 55.8 percent, and 47.0 percent, respectively. With such high item response rates, there is little potential for item nonresponse bias for most items. However, because there is the potential for item nonresponse bias in estimates involving items with lower item response rates, this analysis focuses on those items.

Because complete data were needed for variables used in weighting and because having complete data will facilitate analyses, numeric and categorical data items with missing data on the file were imputed. (In general, character string variables, such as countries of origin, languages, or "other/specify" responses were not imputed.[10]) A hot-deck procedure was used to impute most missing

[10] The exceptions were some character string variables in the AE interview (e.g., major field of study, industry) that were coded into new variables (e.g., major field of study codes, industry codes). In cases where the original string variable was missing, the string variable was imputed and then coded into the new variable. The restricted-use data files contain the imputed character strings and the public files contain the coded variables based upon these imputed strings.

responses for items.[11] 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. These characteristics, or boundary variables, were used to group respondents into those most likely to have the same response or the same response propensity for the data item to be imputed. Two types of boundary variables were used. *Hard* boundary variables were considered to be so important that the donor and the recipient were required to match exactly. For other boundary variables, called *soft* boundary variables, the values did not have to match exactly. In effect, the hard boundary variables were matching variables and the soft boundary variables were used to order the cases within the matching variables. By forming cells using boundary variables that are associated with the item or with its response propensity, a reduction in item nonresponse bias should be affected by hot-deck imputation.

Section 3.2 contains comparisons of weighted means or frequency distributions for items with and without imputed values, using the final raked weights. This is similar to the analysis comparing adjusted and unadjusted estimates that was conducted to examine unit nonresponse bias, described in section 2.3. Large differences are likely to indicate a reduction in item nonresponse bias through imputation, and an absence of measurable differences suggests that either imputation had little effect on the potential bias or that there was little to be removed.

Section 3.3 examines the potential for item nonresponse bias by imposing extreme assumptions on the item nonrespondents. Because item nonresponse bias may be viewed as a function of both the item nonresponse rate and the extent to which the item nonrespondents differ from the item respondents, bounds on the item nonresponse bias may be obtained by imposing extreme assumptions on the item nonrespondents. Extreme assumptions are created by imputing values that fall in the tails of the original distribution, for example, in the 5^{th} or 95^{th} percentiles, or by imputing equal percentages when the original distribution is skewed.

[11] For some items, the missing values were imputed manually rather than using the hot-deck procedure. In NHES:2005, manual imputation (see Hagedorn, et. al., forthcoming) was done (1) to impute certain person-level demographic characteristics; (2) to impute whether a child is home schooled, whether the child attends regular school for some classes, and the number of hours the child attends regular school; (3) to correct for a small number of inconsistent imputed values; and (4) to impute for a few cases when no donors with matching boundary variable values could be found.

3.1 Item Response Rates and Items Included in this Analysis

As noted above, the median item response rates were 99.3 percent, 99.2 percent, and 98.8 percent for items from the ECPP, ASPA, and AE Surveys, respectively. These median rates are very high; thus, for most items, even if the item nonrespondents differ considerably from the respondents, the item nonresponse bias will be negligible. As a result, only items having an item response rate of less than 90 percent were considered for this item nonresponse bias analysis. The minimum item response rate in this analysis is 70.8 percent, for the AE variable APCLSHR (total hours of classroom instruction). For items that apply to only a very small number of cases, sampling error and other sources of error could have a much larger effect on the estimates than item nonresponse bias. Therefore, only items that applied to 30 or more respondents were included in this analysis. Also, items for third or fourth child care arrangements for ECPP and ASPA, and items for third or higher educational activities for AE were not included. After applying these criteria, the item nonresponse bias analysis was done on three ECPP items, 15 ASPA items, and 31 AE items. (See tables 13, 14, and 15, respectively, for lists of these items and their item response rates.)

Table 13. ECPP items included in the nonresponse bias analysis: 2005

Variable	Question number and description	Number of respondents	Item response rate (percent)	Total response rate (percent)
RCCSTHN1	ED22OV-# OF CHILDREN AMOUNT IS FOR-1	95	89.5	50.5
NCCOST2	EE25-AMT HH PAYS FOR NONREL CARE-2	65	89.2	50.3
RCWKMO2	ED9-# OF WKS/MO RECEIVES REL CARE-2	64	87.5	49.4

NOTE: Total response rate is the product of the item response rate and the overall unit response rate for ECPP.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation (ECPP) Survey of the National Household Education Surveys Program (NHES), 2005.

Table 14. ASPA items included in the nonresponse bias analysis: 2005

Variable	Question number and description	Number of respondents	Item response rate (percent)	Total response rate (percent)
CPCOST1	SH15-AMOUNT HH PAYS FOR PROGRAM-1	1,256	89.5	50.4
CPCOST2	SH15-AMOUNT HH PAYS FOR PROGRAM-2	236	89.4	50.3
CPUNIT2	SH15-UNIT OF TIME/PROGRAM COST-2	224	89.3	50.3
CPUNIT1	SH15-UNIT OF TIME/PROGRAM COST-1	1,181	89.1	50.2
ASWKMO	SI5-# OF WKS/MO IN ACTIVITIES	301	89.0	50.1
RCCSTHH1	SF16-AMOUNT FOR CHILD ONLY OR OTHERS-1	160	88.8	50.0
RCCSTHN1	SF16OV-# OF CHILDREN AMOUNT IS FOR-1	77	88.3	49.7
CPCSTHH1	SH16-AMOUNT FOR CHILD ONLY OR OTHERS-1	744	88.3	49.7
ASDAYWK	SI6-# OF DAYS/WK IN ACTIVITIES	301	88.0	49.6
ASHRWK	SI7-# OF HRS/WK IN ACTIVITIES	301	88.0	49.6
RCWKMO1	SF10 -# OF WKS/MO RECEIVES REL CARE-1	30	86.7	48.8
CPKIDS1	SH24-# OF CHILDREN IN GROUP AT PROGRAM-1	2,266	85.5	48.2
SCWKMO	SJ8-# OF WKS/MO IN SELF-CARE	70	81.4	45.9
CPCSTHN1	SH16OV-# OF CHILDREN AMOUNT IS FOR-1	61	80.3	45.2
NCCOST2	SG14-AMT HH PAYS FOR NONREL CARE-2	32	78.1	44.0

NOTE: Total response rate is the product of the item response rate and the overall unit response rate for ASPA.
SOURCE: U.S. Department of Education, National Center for Education Statistics, After School Programs and Activities (ASPA) Survey of the National Household Education Surveys Program (NHES), 2005.

Table 15. AE items included in the nonresponse bias analysis: 2005

Variable	Question number and description	Number of respondents	Item response rate (percent)	Total response rate (percent)
VOCOMPY1	AE7-VOCA COMPLETION YEAR-1	173	89.0	42.4
VOENRNU1	AE9-HOW LONG ENROLLED IN PRGM-1	173	89.0	42.4
VOENRUN1	AE9-UNIT ENROLLED IN PRGM-1	173	89.0	42.4
CREMPRE2	AD18-EMPLOYER REQUIRED TO TAKE PRGM-2	91	89.0	42.4
CRWRKPL2	AD20-TOOK PRGM AT WORKPLACE-2	91	89.0	42.4
CRWRKHR2	AD21-TOOK PRGM DURING WORK HRS-2	91	89.0	42.4
CREMPAI2	AD22-BEING PAID WHILE TAKING PRGM-2	91	89.0	42.4
CREMPMA2	AD23B-EMPLOYER PAID BOOKS/MTLS-2	91	89.0	42.4
CRSTRTM2	AD8-CRED START MONTH-2	117	88.9	42.3
CRCOMPM2	AD9-CRED COMPLETION MONTH-2	117	88.0	41.9
CREMPTU2	AD23A-EMPLOYER PAID TUITION/FEES-2	91	87.9	41.9
APSTRTMM	AF4-APPR PRGM START MONTH	89	87.6	41.7
BSHRYR	AC8-TOTAL HRS ATTENDED ABE/GED	128	87.5	41.7

See notes at end of table.

Table 15. AE items included in the nonresponse bias analysis: 2005—Continued

Variable	Question number and description	Number of respondents	Item response rate (percent)	Total response rate (percent)
CRCOMPY2	AD9-CRED COMPLETION YEAR-2	117	86.3	41.1
CRMATLS2	AD15B-PERSONAL EXPENSE FOR BKS/MTLS-2	117	86.3	41.1
HINCMRNG	PW18/AM12-TOTAL HH INCOME RANGE	8,904	86.2	41.1
CRSTRTY2	AD8-CRED START YEAR-2	117	85.5	40.7
CRTUITO2	AD15A-PERSONAL EXPENSE FOR TUIT/FEES-2	117	84.6	40.3
CRTUITO2	AD15A-PERSONAL EXPENSE FOR TUIT/FEES-2	117	84.6	40.3
APCOMPMM	AF5-APPR PRGM COMPLETION MONTH	89	84.3	40.1
APCOMPYY	AF5-APPR PRGM COMPLETION YEAR	89	83.2	39.6
HINCM50K	PW19/AM120V-HH INCOME BELOW/ABOVE $50K	6,404	82.9	39.5
CRENRNU2	AD12-HOW LONG ENROLLED IN PRGM-2	117	79.5	37.8
CRENRUN2	AD12-UNIT ENROLLED IN PRGM-2	117	79.5	37.8
CRCRDHR2	AD13-TOTAL CREDIT HRS ENROLLED-2	117	79.5	37.8
HINCOME	PW19/AM120V-TOTAL HH INCOME RANGE 2	8,904	78.6	37.4
EARNAMT	AL25-AMOUNT OF EARNINGS	5,940	78.6	37.4
EARNUNT	AL25-UNIT OF EARNINGS	5,940	78.6	37.4
VOCLSHR1	AE12-TOTAL CLASSROOM HRS-1	76	72.4	34.5
VOCRDHR1	AE11-TOTAL CREDIT HRS ENROLLED-1	173	72.3	34.4
APCLSHR	AF6-TOTAL CLASSROOM INST HRS	89	70.8	33.7

NOTE: Total response rate is the product of the item response rate and the overall unit response rate for AE.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Adult Education (AE) Survey of the National Household Education Surveys Program (NHES), 2005.

3.2 Assessment of Means or Distributions for Items With and Without Imputed Values

For each item designated for nonresponse bias analysis, means (for continuous variables) or frequency distributions (for dichotomous and categorical variables) were estimated both with and without imputed values to assess the effect of imputation. Tables 16 and 17 give means and relative frequency distributions, respectively, for each item with and without the imputed values for the ECPP, ASPA, and AE Surveys. These means and relative frequency distributions were compared, and no measurable differences were detected between any of the means or distributions with imputed values and without imputed values.[12] These results suggest that even for these items with response rates of less than 90 percent, the potential for bias due to item nonresponse is minimal.

[12] Some apparent differences are between estimates with relatively large standard errors (over 50% of the related estimate). Interpreting results from statistical tests based on relatively large standard errors may not be substantively meaningful. Many estimates in tables 16 and 17 have large standard errors because of small sample sizes.

Table 16. Means for items with and without imputed values: 2005

Continuous variables	With imputed values		Without imputed values	
	Mean	s.e.	Mean	s.e.
ECPP				
Amount household pays for non-relative care arrangement 2 (NCCOST2)	116!	73.4	116!	80.9
ASPA				
Amount household pays for center-based care arrangement 1 (CPCOST1)	141	22.0	143	24.5
Amount household pays for center-based care arrangement 2 (CPCOST2)	169	33.2	139	22.4
Number of hours per week in activity (ASHRWK)	3	0.1	3	0.1
Number of kids in center-based arrangement 1 (CPKIDS1)	20	0.4	19	0.5
Amount household pays for non-relative care arrangement 2 (NCCOST2)	56!	28.9	54!	33.3
AE				
Total hours attended ABE/GED (BSHRYR)	61	11.3	56	10.5
Personal expenses for books/materials, degree/credential arrangement 2 (CRMATLS2)	372	62.5	385	64.0
Personal expenses for tuition/fees, degree/credential arrangement 2 (CRTUITO2)	3,801	866.8	4,040	1,003.5
Total degree/credential credit hours enrolled, arrangement 2 (CRCRDHR2)	22	3.2	23	3.6
Derived earnings per year (EARNAMTYR)[1]	39,243	597.9	38,588	633.8
Total vocational classroom hours, arrangement 1 (VOCLSHR1)	95	14.5	97	14.9
Total vocational credit hours enrolled, arrangement 1 (VOCRDHR1)	55	4.7	54	5.8
Total apprenticeship classroom instruction hours (APCLSHR)	62	8.3	56	6.8
Derived total months in vocational arrangement 1 (VOTIME1)[2]	19	2.4	15	2.1
Derived total months in degree/credential arrangement 2 (CRTIME2)[2]	39	2.8	37	2.7
Derived total months in apprenticeship arrangement (APTIME)[2]	22	3.6	19	4.1

!Interpret data with caution; coefficient of variation is 50 percent or more.

[1]EARNAMTYR is derived from EARNAMT and EARNUNT to create an annual earnings variable for analysis.

[2]VOTIME1 is derived from VOSTRTM1, VOSTRTY1, VOCOMPM1, and VOCOMPY1 to create a total number of months in the first vocational program. CRTIME2 is derived similarly from CRSTRTM2, CRSTRTY2, CRCOMPM2, and CRCOMPY2. APTIME is derived similarly from APSTRTMM, APSTRTYY, APCOMPMM, and APCOMPYY.

NOTE: s.e. is standard error. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation (ECPP) Survey of the National Household Education Surveys Program (NHES), 2005, After School Programs and Activities (ASPA) Survey of the National Household Education Surveys Program (NHES), 2005, and Adult Education (AE) Survey of the National Household Education Surveys Program (NHES), 2005.

Table 17. Relative frequency distributions for items with and without imputed values: 2005

Categorical variables	With imputed values		Without imputed values	
	Percent	s.e.	Percent	s.e.
ECPP				
Number of children relative care amount is for, arrangement 1 (RCCSTHN1)				
2 children	86	6.0	86	5.5
3 children	5	2.0	6	2.4
4 children	9!	6.1	8!	5.4
Number of weeks per month child receives relative care, arrangement 2 (RCWKMO2)				
1 week	64	8.5	63	10.0
2 weeks	32	7.8	32	9.1
3 weeks	5!	3.5	5!	4.0
ASPA				
Unit of time, center-based program cost 1 (CPUNIT1)				
Hour	6	0.9	6	1.0
Day	7	0.9	6	0.9
Week	29	1.8	31	2.0
Month	41	2.2	42	2.3
Year	9	1.4	9	1.6
Every two weeks	1	0.2	1	0.3
Other	7	1.6	5	1.0
Unit of time, center-based program cost 2 (CPUNIT2)				
Hour	5!	2.2	5!	2.5
Day	3	1.4	4	1.6
Week	20	3.2	21	3.5
Month	34	4.5	36	4.3
Year	23	4.0	22	3.7
Every two weeks	1!	0.6	1!	0.7
Other	15	3.5	12	3.1
Number of week per month in activities (ASWKMO)				
1 week	27	2.9	25	3.1
2 weeks	56	3.2	57	3.4
3 weeks	16	2.5	17	2.7
Amount for relative care for child only or others, arrangement 1 (RCCSTHH1)				
Child only	48	8.6	48	9.8
Child and others	52	8.6	52	9.8

See notes at end of table.

Table 17. Relative frequency distributions for items with and without imputed values—Continued

Categorical variables	With imputed values		Without imputed values	
	Percent	s.e.	Percent	s.e.
Number of children relative care amount is for, arrangement 1 (RCCSTHN1)				
2 children	67	11.4	68	12.9
3 children	17	6.3	15	5.9
4 children	16!	13.6	17!	15.2
Amount for center-based care for child only or others, arrangement 1 (CPCSTHH1)				
Child only	91	1.4	92	1.5
Child and others	9	1.4	8	1.5
Number of days per week in activity (ASDAYWK)				
1 day	67	3.5	68	3.5
2 days	23	3.1	21	3.2
3 days	5	1.3	5	1.2
4 days	2	0.9	2	1.0
5 days	4	1.5	4	1.7
Number of weeks per month child receives relative care, arrangement 1 (RCWKMO1)				
1 week	50	12.0	49	14.2
2 weeks	50	12.0	51	14.2
Number of weeks per month child in self-care (SCWKMO)				
1 week	68	9.8	72	11.0
2 weeks	30	9.6	27	11.0
3 weeks	1!	0.9	1!	1.2
Number of children center-based amount is for, arrangement 1 (CPCSTHN1)				
2 children	80	8.0	79	9.2
3 children	17!	7.7	17!	8.9
4 children	3!	3.1	4!	3.7
AE				
Vocational completion year, program 1 (VOCOMPY1)				
Never completed	5	2.3	6	2.7
Do not intend to complete	5	2.2	3	1.7
2004	46	5.3	46	5.8
2005	30	4.3	30	4.0
2006	10	2.7	11	3.1
2007	3!	1.7	3!	2.0
2009	2!	1.7	1!	1.1

See notes at end of table.

Table 17. Relative frequency distributions for items with and without imputed values—Continued

Categorical variables	With imputed values		Without imputed values	
	Percent	s.e.	Percent	s.e.
Degree/credential completion year, program 2 (CRCOMPY2)				
Never completed	1!	1.1	1!	1.2
Do not intend to complete	2!	1.0	2!	1.1
2004	14	3.3	13	3.5
2005	22	4.7	20	4.9
2006	25	6.1	25	6.8
2007	25	5.4	28	6.0
2008	3!	1.8	3!	2.0
2009	5!	3.9	5!	4.3
2010	4!	2.8	2!	2.0
Apprenticeship completion year (APCOMPYY)				
Never completed	8	3.5	7	3.7
Do not intend to complete	7	2.8	7	3.1
2004	36	7.4	36	8.3
2005	34	7.7	35	8.2
2006	11	5.1	11	5.9
2008	1!	1.1	1!	1.3
2009	3!	2.1	3!	2.5
Degree/credential start year, program 2 (CRSTRTY2)				
1990	1!	0.7	1!	0.8
1995	#	†	1!	0.6
1997	1!	0.5	#	†
1998	1!	0.9	1!	1.0
1999	2!	0.8	1!	0.8
2000	4!	2.5	5!	2.9
2001	12	4.6	12	5.2
2002	5	1.7	5	2.0
2003	26	5.7	22	4.7
2004	32	6.4	35	7.2
2005	17	5.6	17	6.3

See notes at end of table.

Table 17. Relative frequency distributions for items with and without imputed values—Continued

Categorical variables	With imputed values		Without imputed values	
	Percent	s.e.	Percent	s.e.
How long enrolled in vocational program 1, number of months (VOENRNU1/VOENRUN1)				
1 month	17	5.1	18	5.2
2 months	12	4.7	12	4.7
3 months	18	5.8	19	6.2
4 months	5!	3.4	5!	3.7
5 months	6	2.9	5	2.9
6 months	13	5.4	12	4.7
7 months	3!	1.9	3!	2.0
8 months	14!	7.5	14!	8.0
9 months	5!	2.5	5!	2.7
10 months	1!	1.1	1!	0.7
12 months	6!	2.8	6!	3.1
How long enrolled in vocational program 1, number of semesters (VOENRNU1/VOENRUN1)				
1 semester	62	10.9	59	13.3
2 semesters	19	6.6	27	10.2
3 semesters	10!	5.6	9!	6.0
4 semesters	9!	5.6	6!	3.8
How long enrolled in vocational program 1, number of quarters (VOENRNU1/VOENRUN1)				
1 quarter	27	10.7	27	10.9
2 quarters	23!	13.6	23!	13.8
3 quarters	27!	14.9	26!	15.0
4 quarters	24	10.2	24	10.2
Employer required to take degree/credential program 2 (CREMPRE2)				
Yes	6	2.6	5	2.2
No	94	2.6	95	2.2
Took degree/credential program 2 at workplace (CRWRKPL2)				
Yes	14	5.4	13	6.0
No	86	5.4	87	6.0
Yes	23	7.2	23	7.2
No	77	7.2	77	7.2
Being paid while taking degree/credential program 2 (CREMPAI2)				
Yes	10	3.4	10	3.5
No	90	3.4	90	3.5

See notes at end of table.

Table 17. Relative frequency distributions for items with and without imputed values—Continued

Categorical variables	With imputed values		Without imputed values	
	Percent	s.e.	Percent	s.e.
Employer paid for books/materials for degree/credential program 2 (CREMPMA2)				
Yes	18	6.0	19	6.6
No	82	6.0	81	6.6
Degree/credential program 2 start month (CRSTRTM2)				
January	28	6.3	29	6.7
February	2!	1.1	2!	1.2
April	#	†	#	†
May	1!	0.5	1!	0.6
June	12	3.6	11	3.9
July	4!	2.2	4!	2.5
August	20!	5.7	18!	4.9
September	23!	5.1	24!	5.6
October	7!	4.2	7!	4.6
November	2!	1.0	1!	0.5
December	2!	1.8	2!	1.8
Degree/credential program 2 completion month (CRCOMPM2)				
January	2!	1.1	2!	1.2
February	#	†	#	†
April	4!	2.9	4!	3.2
May	40	6.4	41	6.9
June	17	5.4	17	6.0
July	3!	1.9	2!	1.7
August	8	3.3	9	3.7
September	2!	1.2	1!	0.9
October	3!	2.3	4!	2.5
November	1!	1.2	1!	1.3
December	17	4.0	16	4.0
Never completed	1!	1.1	1!	1.2
Do not intend to complete	2!	1.0	2!	1.1
Employer paid tuition/fees, degree/credential program 2 (CREMPTU2)				
Yes	34	6.2	33	6.8
No	66	6.2	67	6.8

See notes at end of table.

Table 17. Relative frequency distributions for items with and without imputed values—Continued

Categorical variables	With imputed values		Without imputed values	
	Percent	s.e.	Percent	s.e.
Apprenticeship program start month (APSTRTMM)				
January	22	7.9	18	7.4
February	11	4.5	11	4.4
March	6!	4.8	7!	5.5
April	7!	3.9	7!	4.3
May	4!	2.1	5!	2.5
June	7	3.0	7	3.4
July	11	4.1	10	3.9
August	8	3.3	9	3.8
September	5!	2.3	5!	2.7
October	11!	6.4	11!	7.3
November	3!	1.6	3!	1.7
December	6!	4.4	7!	5.0
Enrolled part-time, full-time, or both in degree/credential program 2 (CRPTFT2)				
Part-time	51	6.0	47	6.4
Full-time	37	5.8	39	6.7
Both part-time and full-time	12	4.7	14	5.4
Total household income range (HINCMRNG)				
$25,000 or less	22	0.0	22	0.3
More than $25,000	78	0.0	78	0.3
Apprenticeship program completion month (APCOMPMM)				
January	3!	1.4	3!	1.7
February	15	6.9	11	6.2
March	14	5.4	13	5.8
April	8	3.8	8	4.3
May	15	5.9	17	6.8
June	6	2.7	7	3.2
July	4!	2.3	5!	2.7
August	2!	1.3	2!	1.6
September	2!	1.7	3!	2.0
October	3!	2.0	3!	2.0
November	5	2.2	5	2.7
December	8!	4.6	10!	5.3
Never completed	8	3.5	7	3.8
Do not intend to complete	7	2.8	7	3.2
Total household income range (HINCM50K)[1]				
$25,001 to $50,000	35	0.9	35	0.9
More than $50,000	65	0.9	65	0.9

See notes at end of table.

Table 17. Relative frequency distributions for items with and without imputed values—Continued

Categorical variables	With imputed values		Without imputed values	
	Percent	s.e.	Percent	s.e.
How long enrolled in degree/credential program 2, number of months (CRENRNU2/CRENRUN2)				
1 month	39	6.9	42	7.5
2 months	39	7.1	35	8.3
3 months	15	4.2	15	4.3
4 months	7	3.0	8	3.8
How long enrolled in degree/credential program 2, number of semesters (CRENRNU2/CRENRUN2)				
1 semester	25!	24.6	30!	29.4
2 semesters	27!	16.4	19!	15.0
3 semesters	12!	7.2	9!	6.7
4 semesters	36!	19.2	43!	23.8
How long enrolled in degree/credential program 2, other (CRENRNU2/CRENRUN2)				
1 (unit other than semester or quarter)	79!	79.8	92!	92.0
2 (unit other than semester or quarter)	7!	25.4	8!	92.0
6 (unit other than semester or quarter)	14!	55.8	#	†
Total household income (HINCOME)				
$5,000 or less	3	0.2	3	0.2
$5,001 to $10,000	4	0.2	3	0.3
$10,001 to $15,000	5	0.3	5	0.4
$15,001 to $20,000	5	0.3	5	0.3
$20,001 to $25,000	6	0.3	6	0.4
$25,001 to $30,000	6	0.4	6	0.5
$30,001 to $35,000	5	0.3	5	0.4
$35,001 to $40,000	6	0.5	6	0.5
$40,001 to $45,000	4	0.3	4	0.3
$45,001 to $50,000	6	0.6	6	0.5
$50,001 to $60,000	11	0.5	11	0.6
$60,001 to $75,000	12	0.5	12	0.6
$75,001 to $100,000	13	0.5	13	0.5
Over $100,001	16	0.5	16	0.5

! Interpret data with caution; coefficient of variation is 50 percent or more.
†Not applicable.
#Rounds to zero.
[1] Households with incomes of $25,000 or less did not receive this item and were excluded from this calculation.
NOTE: s.e. is standard error. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation (ECPP) Survey of the National Household Education Surveys Program (NHES), 2005, After School Programs and Activities (ASPA) Survey of the National Household Education Surveys Program (NHES), 2005, and Adult Education (AE) Survey of the National Household Education Surveys Program (NHES), 2005.

3.3 Using Extreme Assumptions to Assess the Potential for Item Nonresponse Bias

The findings reported in the previous section indicate that imputation did not alter the item distributions. In order to further assess possible nonresponse bias for items from each extended interview, new sets of imputed values were generated by imposing extreme assumptions on the item nonrespondents. For most items, two new sets of imputed values—one based on a "low" assumption and one based on a "high" assumption—were created. For most continuous variables, a "low" imputed value variable was created by resetting imputed values to the value at the 5th percentile of the original distribution; a "high" imputed value variable was created by resetting imputed values to the value at the 95th percentile of the original distribution. For dichotomous and most polytomous variables, a "low" imputed value variable was created by resetting imputed values to the lowest value in the original distribution, and a "high" imputed value variable was created by resetting imputed values to the highest value in the original distribution. Both the "low" imputed value variable distributions and the "high" imputed value variable distributions were compared to the original distributions.

The purpose of creating extreme assumption variables and comparing them to the original distributions is to place bounds on the potential for item nonresponse bias through the use of "worst case" scenarios. Because the distributions of many of the variables included in this evaluation are highly skewed, the extreme assumptions imposed here may, in some cases, be unrealistic. Also, in general, there is a very high correlation between estimates when comparing the extreme imputed value variables to the original variables, since these estimates are based on the same sets of cases and the data for respondents did not change.[13] As a result, even small differences may be statistically significant, so it is important to also consider the practical or substantive significance of such differences.

In some cases, a single extreme imputed value variable was created. For variables with responses heavily concentrated in a single response category, an extreme imputed value variable was created by assigning the nonresponding cases in approximately equal numbers to the response values.[14] For variables that captured cost and unit of various child care arrangements, such as NCCOST2/ NCUNIT2 in ECPP and CPCOST1/CPUNIT1, CPCOST2/CPUNIT2, and NCCOST2/NCUNIT2 in

[13] As noted in section 1.3, these correlations were accounted for in the tests for statistical significance.

[14] This is considered extreme, because the respondent distribution for these types of items are highly skewed. This approach was used for the ECPP variables RCCSTHN1 and RCWKMO2, and ASPA variables ASWKMO, RCCSTHN1, CPCSTHN1, and ASDAYWK.

ASPA, extreme imputed value variables were not created, because the cost extremes depend on the unit and it is not possible to convert these cost variables to a single metric since the costs reported could cover different time units.

Additional techniques were used for AE variables containing information about start and completion time for various educational programs. In order to make useful comparisons, new variables were created for time spent in some educational programs by computing the total number of calendar months each respondent was expected to be enrolled in the program. The extreme imputed value variable was computed by using the earliest starting year and month and the latest expected completion year and month, and then converting this to total calendar months in the program.[15] Survey participants who reported "Never completed" or "Do not intend to complete" were excluded from this part of the analysis. Additionally, the variable EARNAMT (earnings in a 12 month period) was paired with EARNUNT (unit for EARNAMT: hour, day, week, bi-weekly, month, year) to derive a total earnings per year variable (called EARNAMTYR). Extreme imputed value variables for EARNAMTYR were created using the 5th and the 95th percentiles of the respondent distribution, as described earlier. For variables that captured enrollment time and unit of various adult education activities, such as VOENRNU1/VOENRUN1 and CRENRNU2/CRENRUN2, extreme assumption variables were not created, since the enrollment time extremes depend on the unit.

ECPP. Extreme imputed value variables were created for two variables from the ECPP Survey: the number of children in the household for which the relative care fee applies for the first relative care arrangement (RCCSTHN1), and the number of weeks per month the child receives relative care for the second relative care arrangement (RCWKMO2). As described earlier, an extreme imputed value variable was created by assigning one-third of the nonrespondents to each of the three categories. The original and extreme imputed value variable distributions were compared (see table 18) and no measurable differences were found for either variable.

[15] Total months in a particular program variables created for AE include CRTIME2 for the second credential program, VOTIME1 for the first vocational program, and APTIME for the apprenticeship program.

Table 18. Comparison of original and extreme imputed value variable estimates, for items with one extreme imputed value variable: 2005

Variable	Original estimate (percent)	s.e.	Extreme imputed value estimate (percent)	s.e.
ECPP				
Number of children relative care amount is for, arrangement 1 (RCCSTHN1)				
2 children	86	6.0	78	6.7
3 children	5	2.0	8	2.9
4 children	9!	6.1	14!	6.7
Number of weeks per month child receives relative care, arrangement 2 (RCWKMO2)				
1 week	64	8.5	55	10.4
2 weeks	32	7.8	30	8.1
3 weeks	5!	3.5	14!	7.2
ASPA				
Number of week per month in activities (ASWKMO)				
1 week	27	2.9	26	2.9
2 weeks	56	3.2	54	3.5
3 weeks	16	2.5	20	2.9
Number of children relative care amount is for, arrangement 1 (RCCSTHN1)				
2 children	67	11.4	64	11.0
3 children	17	6.3	15	5.5
4 children	16!	13.6	21!	13.1
Number of children center-based care amount is for, arrangement 1 (CPCSTHN1)				
2 children	80	8.0	71	7.9
3 children	17	7.7	21	7.8
4 children	3!	3.1	8!	3.9
Number of days per week in activity (ASDAYWK)				
1 day	67	3.5	64	3.5
2 days	23	3.1	22	3.2
3 days	5	1.3	8	1.8
4 days	2	0.9	2	0.9
5 days	4	1.5	3	1.5

See notes at end of table.

Table 18. Comparison of original and extreme imputed value variable estimates, for items with one extreme imputed value variable: 2005—Continued

Variable	Original estimate (percent)	s.e.	Extreme imputed value estimate (percent)	s.e.
AE				
Derived total months in vocational program 1 (VOTIME1) ..	19	2.4	30	4.2
Derived total months in degree/credential program 2 (CRTIME2)	39	2.8	66	7.9
Derived total months in apprenticeship program (APTIME) .	22	3.6	31	5.5

! Interpret data with caution; coefficient of variation is 50 percent or more.
NOTE: s.e. is standard error. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Program Participation (ECPP) Survey of the National Household Education Surveys Program (NHES), 2005, After School Programs and Activities (ASPA) Survey of the National Household Education Surveys Program (NHES), 2005, Adult Education (AE) Survey of the National Household Education Surveys Program (NHES), 2005.

ASPA. Extreme imputed value variables were formulated for ten variables from the ASPA Survey. For four categorical variables, including the number of weeks per month child receives relative care for the first relative care arrangement (RCWKMO1), if the amount paid for relative care is for child only or for child and others for the first relative care arrangement (RCCSTHH1), if the amount paid for center-based care is for child only or for child and others for the first center-based care arrangement (CPCSTHH1), and the number of weeks per month the child is responsible for him or herself (SCWKMO), both "low" and "high" extreme imputed value variables were created as described earlier.

The original distributions were compared to the "low" and "high" imputed value variable distributions (see table 19). There were no measurable differences found in the comparisons of low to original and original to high distributions between estimates for RCWKMO1. For RCCSTHH1, there were measurable differences between the distributions of both the low and high imputed value variables and the original variable. For CPCSTHH1, there was a measurable difference between the distribution of the high imputed value variable and the original variable; however, the original distribution is highly skewed towards the first response category (91 percent for category 1 vs. 9 percent for category 2), so the extreme assumptions used here are likely to be unrealistic. For SCWKMO, there is a measurable difference between the distributions of the original and high imputed value variables, but no measurable difference between the distributions of the original and low imputed value variables.

Table 19. Comparison of original and extreme imputed value variable estimates, for items with low and high extreme imputed value variables: 2005

Variable	Low imputed value estimate (percent)	s.e.	Original estimate (percent)	s.e.	High imputed value estimate (percent)	s.e.
ASPA						
Number of weeks per month child receives relative care, arrangement 1 (RCWKMO1)						
1 week	57	12.5	50	12.0	42	12.5
2 weeks	43	12.5	50	12.0	58	12.5
Amount for relative care for child only or others, arrangement 1 (RCCSTHH1)						
Child only	53	8.9	48	8.6	43	8.9
Child and others	47	8.9	52	8.6	57	8.9
Amount for center-based care for child only or others, arrangement 1 (CPCSTHH1)						
Child only	92	1.4	91	1.4	82	2.0
Child and others	8	1.4	9	1.4	18	2.0
Number of weeks per month child in self-care (SCWKMO)						
1 week	77	9.0	68	9.8	59	10.3
2 weeks	22	9.0	30	9.6	40	10.1
3 weeks	1!	0.9	1!	0.9	1!	0.9
Number of kids in center-based arrangement 1 (CPKIDS1)	17	0.4	20	0.4	24	0.5
Number of hours per week in activity (ASHRWK)	2	0.1	3	0.1	3	0.2
AE						
Employer required to take degree/credential program 2 (CREMPRE2)						
Yes	13	3.4	6	2.6	4	2.1
No	87	3.4	94	2.6	96	2.1
Took degree/credential program 2 at workplace (CRWRKPL2)						
Yes	21	6.8	14	5.4	12	5.4
No	79	6.8	86	5.4	88	5.4

See notes at end of table.

Table 19. Comparison of original and extreme imputed value variable estimates, for items with low and high extreme imputed value variables: 2005—Continued

Variable	Low imputed value estimate (percent)	s.e.	Original estimate (percent)	s.e.	High imputed value estimate (percent)	s.e.
Took degree/credential program 2 during work hours (CRWRKHR2)						
Yes	30	7.5	23	7.2	12	5.4
No	70	7.5	77	7.2	88	5.4
Being paid while taking degree/credential program 2 (CREMPAI2)						
Yes	18	4.2	10	3.4	9	3.2
No	82	4.2	90	3.4	91	3.2
Employer paid for books/materials for degree/ credential program 2 (CREMPMA2)						
Yes	26	6.9	18	6.0	17	6.0
No	74	6.9	82	6.0	83	6.0
Employer paid tuition/fees, degree/credential program 2 (CREMPTU2)						
Yes	40	7.1	34	6.2	30	5.9
No	60	7.1	66	6.2	70	5.9
Enrolled part-time, full-time, or both in degree/ credential program 2 (CRPTFT2)						
Full-time	54	5.8	51	6.0	41	6.1
Part-time	33	5.9	37	5.8	47	6.6
Both part-time and full-time	12	4.7	12	4.7	12	4.7
Total hours attended ABE/GED (BSHRYR)	51	9.1	61	11.3	73	12.9
Personal expenses for tuition/fees, degree/credential program 2 (CRTUITO2)	3,428	889.9	3,801	866.8	6,154	981.2
Total degree/credential credit hours enrolled, program 2 (CRCRDHR2)	15	1.6	16	1.5	17	1.6
Total vocational classroom hours, program 1 (VOCLSHR1)	67	12.9	95	14.5	153	17.0
Total vocational credit hours enrolled, program 1 (VOCRDHR1)	16	3.4	21	3.5	32	4.1

See notes at end of table.

Table 19. Comparison of original and extreme imputed value variable estimates, for items with low and high extreme imputed value variables: 2005—Continued

Variable	Low imputed value estimate (percent)	s.e.	Original estimate (percent)	s.e.	High imputed value estimate (percent)	s.e.
Total apprenticeship classroom instruction hours (APCLSHR)	42	6.5	62	8.3	93	11.8
Personal expenses for books/materials, degree/ credential program 2 (CRMATLS2)	341	58.6	372	62.5	454	61.0
Total household income range (HINCMRNG)						
$25,000 or less	33	0.4	22	0.0	19	0.3
More than $25,000	67	0.4	78	0.0	81	0.3
Total household income range (HINCM50K)[2]						
$25,001 to $50,000	46	0.8	35	0.9	29	0.8
More than $50,000	54	0.8	65	0.9	71	0.8
Total household income (HINCOME)						
$5,000 or less	24	0.7	3	0.2	2	0.2
$5,001 to $10,000	2	0.2	4	0.2	2	0.2
$10,001 to $15,000	4	0.3	5	0.3	4	0.3
$15,001 to $20,000	4	0.3	5	0.3	4	0.3
$20,001 to $25,000	5	0.3	6	0.3	5	0.3
$25,001 to $30,000	5	0.4	6	0.4	5	0.4
$30,001 to $35,000	4	0.3	5	0.3	4	0.3
$35,001 to $40,000	4	0.4	6	0.5	4	0.4
$40,001 to $45,000	3	0.3	4	0.3	3	0.3
$45,001 to $50,000	5	0.4	6	0.6	5	0.4
$50,001 to $60,000	9	0.5	11	0.5	9	0.5
$60,001 to $75,000	9	0.5	12	0.5	9	0.5
$75,001 to $100,000	10	0.4	13	0.5	10	0.4
Over $100,001	13	0.4	16	0.5	35	0.8
Derived earnings per year (EARNAMTYR)[1]	23,924	569.4	39,243	597.9	51,808	859.2

! Interpret data with caution; coefficient of variation is 50 percent or more.
[1] EARNAMTYR is derived from EARNAMT and EARNUNT to create an annual earnings variable for analysis.
[2] Households with incomes of $25,000 or less did not receive this item and were not included in this calculation.
NOTE: s.e. is standard error. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, After School Programs and Activities (ASPA) Survey of the National Household Education Surveys Program (NHES), 2005, Adult Education (AE) Survey of the National Household Education Surveys Program (NHES), 2005.

For four variables, including the number of weeks per month the child participates in activities or lessons after school (ASWKMO), the number of children in the household for which the relative care fee applies for the first relative care arrangement (RCCSTHN1), the number of children in the household for which the center-based care fee applies for the first center-based care arrangement (CPCSTHN1), and the number of days per week the child does activities or lessons after school (ASDAYWK), one extreme imputed value variable was created as for polytomous variables described earlier. The original and extreme imputed value variable distributions were compared (see table 18) and no measurable differences in distributions were found for ASWKMO, RCCSTHN1, or ASDAYWK. For CPCSTHN1, the distributions of the two variables differ, but since the original distribution is skewed towards the first response category, the extreme assumptions used may be unrealistic.

For the two continuous variables including the number of children in the program in the first center-based care arrangement (CPKIDS1) and the number of hours per week the child does activities or programs after school (ASHRWK), the low and high extreme imputed value variables were created as described earlier. The means of the extreme imputed value variables were compared to the original means (see table 19). For ASHRWK, differences were found between both the low imputed value variable and original means, and the original and high imputed value variable means. Similar to the variable CPCSTHH1, the original distribution of ASHRWK is highly skewed towards the first two response categories (about 90 percent of respondents reported values of 1 or 2 hours) which indicates that the extreme assumptions used may be unrealistic, causing a significant effect on the distribution. As noted earlier, these extremes were chosen to examine worst-case scenarios and to give bounds on the potential for item nonresponse bias.

Measurable differences were detected in the means of CPKIDS1 between the low and original variable, and the original and high variable. The range of values between the low imputed value variable mean and the high imputed value variable mean for this item is from 17 to 24 children in the center-based care arrangement.

AE. Extreme imputed value variables were formulated for 21 variables from the AE Survey. For seven categorical variables, including whether the employer required the degree/certificate program for the second program (CREMPRE2), whether the respondent is taking the degree/certificate program at the workplace for the second program (CRWRKPL2), whether the respondent is taking the degree/certificate program during regular work hours for the second program (CRWRKHR2), whether the respondent is being paid by employer while taking the degree/certificate program for the second program

(CREMPAI2), whether the employer paid for all or part of the costs of books and other materials for the second program (CREMPMA2), whether the employer paid for all or part of the tuition and fees for the degree/certificate program for the second program (CREMPTU2), and whether the respondent attends as a full-time, part-time, or both full- and part-time student for the second program (CRPTFT2), both low and high imputed value variables were created as described earlier.

The original distributions were compared to the low and high imputed value variable distributions (see table 19). Measurable differences were detected between the original and low imputed value variables for all seven variables, but between the original and high imputed value variables for CRPTFT2 only. For all six dichotomous variables, there is a smaller concentration of respondents in the first response category ("yes").

For seven continuous variables including total hours the respondent attended the basic skills or high school completion classes in the last 12 months (BSHRYR), amount of the respondent's or family's money paid for tuition and fees including borrowed money in the last 12 months for the second degree/certificate program (CRTUITO2), total number of credit hours in which respondent was enrolled in the last 12 months for the second degree/certificate program (CRCRDHR2), total number of class hours respondent took in the last 12 months for the first vocational program (VOCLSHR1), total number of credit hours in which the respondent was enrolled in the last 12 months for the first vocational program (VOCRDHR1), total number of class hours the respondent spent in the apprenticeship program in the last 12 months (APCLSHR), and amount of the respondent's or family's money paid for books or other materials including borrowed money in the last 12 months for the second degree/certificate program (CRMATLS2), both low and high extreme imputed value variables were created as described earlier. The means of these extreme imputed value variables were compared to the original means (see table 19). No measurable differences were found when comparing the means for BSHRYR. Differences were found for CRCRDHR2, VOCLSHR1, VOCRDHR1, and APCLSHR between the original means and both the low and high extreme imputed value variable means. For this set of variables, it is important to note the skewness of the distributions and the range of values. Since these variables are reports of classroom hours or credit hours for adult education participation programs, the ranges are rather large and the distributions are skewed. For CRTUITO2, a difference was found between the original and low imputed value variable means, but not between the original and high imputed value variable means. For CRMATLS2, a difference was found between the original and high imputed value variable means, but not the original and low imputed value variable means.

The three derived variables VOTIME1, CRTIME2, and APTIME that capture total number of months in the first vocational program, second credential program, or apprenticeship program, respectively, were each compared to one extreme imputed value variable as described earlier. The original and extreme imputed value variable means were compared (see table 18), and there were differences for all three variables. As with CRCRDHR2, VOCRDHR1, VOCLSHR1 and APCLSHR mentioned earlier, the skewness of the distributions resulted in these differences when extreme conditions were considered, but the range of number of months reported in these programs indicates that these differences may not be substantively important.

For the four AE items pertaining to income and earnings, HINCOME, HINCMRNG, HINCM50K, and the derived variable described earlier, EARNAMTYR, item response rates were relatively low, even in comparison with other items in this analysis. (See table 15 for item response rates.) In these instances, imposing extreme assumptions on the nonrespondents will affect the distributions of these variables. (See table 19.) Additionally, all four of these variables, in particular HINCOME and EARNAMTYR, had skewed distributions so that assigning all nonrespondents to a low or high extreme imputed value has an even more pronounced effect on the distributions.

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4. Conclusions

With survey response rates—in particular, RDD survey response rates—on the decline, the potential for nonresponse bias is an important concern to survey methodologists and data analysts. This report has included assessments of the potential for both unit and item nonresponse bias. The analysis of unit nonresponse bias showed no evidence of potential bias in the estimates considered from the ECPP and ASPA Surveys. For the AE Survey, the only evidence of unit nonresponse bias is in estimates of sex; females were more likely to respond than males. The weighting class adjustment for nonresponse to the AE Survey used sex in forming the weighting classes (see Hagedorn et al. forthcoming for details) and should, therefore, reduce this bias.

The statistical adjustments used in weighting may have corrected at least partially for other biases that might have existed due to differential nonresponse. However, it is possible that nonresponse bias may still be present in other variables that were not studied. For this reason, it is important to consider other methods of examining unit nonresponse bias. One such method is *benchmarking*, or comparing final NHES survey estimates to estimates from external sources. Benchmarking is routinely done during the preparation of the NHES data files. When estimates from the NHES:2005 surveys were compared to external estimates (primarily from the Current Population Survey and from previous NHES surveys), some measurable differences were found. (See Appendix C of Hagedorn et al. forthcoming.) However, in nearly every case, these differences were attributable to factors other than nonresponse bias, such as differences in measurement.

The analysis of item nonresponse bias included two components. The comparison of means or distributions, including imputed values versus excluding imputed values, revealed no measurable differences. From this, one can conclude that either imputation was not effective in reducing item nonresponse bias or that there was no item nonresponse bias present in these items. The second component of the item nonresponse bias analysis, the comparison of means or distributions based on extreme assumptions to the original means or distributions, did reveal some differences. For example, if the item nonrespondents differ considerably from the respondents, the potential for bias exists in the ASPA variable CPKIDS1, but there may be little substantive importance in the difference between the low and high extreme imputed value means (17 versus 24 children). Other differences that were observed in extremes, such as for the ASPA variables CPCSTHH1 and ASHRWK, and the AE income and

earnings variables and months in program variables, are the result of imposing extreme assumptions on variables with highly skewed distributions and a large range of values in the original distributions.

It is important to consider the two components of the item nonresponse bias analysis in tandem. The first component (the comparison of means or distributions, including imputed values versus excluding imputed values) revealed no important measurable differences, thus suggesting that there was no *reduction* in item nonresponse bias. As noted above, the extreme assumptions component did reveal the *potential* for item nonresponse bias, if the item nonrespondents differ considerably from the respondents. However, it is that particular situation in which the hot-deck would be expected to be most effective in reducing item nonresponse bias; by using variables to form hot-deck cells that are associated with either the item itself or its item response propensity, the hot-deck reduces item nonresponse bias. Therefore, taken together, these two components of the item nonresponse bias analysis suggest that the likely scenario is that there was no substantive item nonresponse bias, and that the extreme assumptions imposed in this analysis are unrealistic.

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