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**MEMORANDUM**

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**TO:** KATHRYN CHANDLER  
**FROM:** ESSI  
**SUBJECT:** RESPONSE RATES AND BIAS ANALYSES FOR THE 2006 AND 2008 SSOCS  
**DATE:** MAY 28, 2009

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The purpose of this memo is to detail the response rates and unit-level and item-level bias analyses performed from both the 2005–06 School Survey on Crime and Safety (SSOCS:2006) and the 2007–08 School Survey on Crime and Safety (SSOCS:2008). This information is for the OMB terms of clearance. Please see appendices A-D for further detail on each of these analyses.

## **SSOCS:2006**

### **Unit Response Rates**

Unit response rates can be unweighted or weighted and are traditionally reported because they reflect the potential effects of nonsampling error and indicate whether portions of the population are underrepresented due to nonresponse. In order to calculate any of these measures, it is first necessary to know the disposition (outcome) of each sampled case. Table 1 shows the dispositions of the 3,565 cases initially selected for participation in SSOCS :2006, as well as the unweighted and weighted unit response rates by selected school characteristics.<sup>1</sup> The overall weighted<sup>2</sup> unit response rate was 81 percent.

### **Analysis of Unit Nonresponse Bias**

The existence of nonresponding schools has the potential to introduce bias into survey estimates, depending on the magnitude of the nonresponse and whether differences exist between responding and nonresponding schools in characteristics related to the estimates of interest. A unit-level nonresponse bias analysis was conducted to evaluate the extent of this bias in SSOCS:2006. Responding and nonresponding schools were compared across the characteristics available for both groups: instructional level, enrollment size, type of locale, percent minority enrollment, region, number of full-time-equivalent teachers, student-to-teacher ratio, and percentage of students eligible for free or reduced-price lunch. This analysis indicated that there were no measurable differences between the responding schools and the full sample of schools, leading to the conclusion that nonresponse bias is not an issue. For more information on the analysis of unit nonresponse, please see appendix A.

Table 1. Unweighted and weighted unit response rates, by selected school characteristics: School year

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<sup>1</sup>While it is reasonable to assume that the ineligible rate among nonrespondents is not zero, a zero ineligibility rate was assumed when calculating the unweighted and weighted response rates. This is the most conservative approach.

<sup>2</sup>The weighted response rate is calculated by applying the base sampling rates to the following ratio: completed cases / (total sample - known ineligible).

2005–06

School characteristics	Initial sample	Completed survey <sup>1</sup>	Non-respondents <sup>2</sup>	Ineligibles <sup>3</sup>	Unweighted unit response rate (%) <sup>4</sup>	Weighted unit response rate (%) <sup>5</sup>
Total	3,565	2,724	789	52	77.5	80.6
Instructional level						
Primary	896	715	166	15	81.2	82.1
Middle	1,248	948	278	22	77.3	78.5
High school	1,236	924	307	5	75.1	77.8
Combined	185	137	38	10	78.3	80.1
Enrollment size						
Less than 300	452	357	74	21	82.8	82.8
300–499	630	513	105	12	83.0	83.8
500–999	1,335	1,041	280	14	78.8	79.4
1,000 or more	1,148	813	330	5	71.1	71.7
Type of locale						
City	1,014	697	295	22	70.3	74.5
Urban fringe	1,369	1,046	310	13	77.1	79.1
Town	332	281	48	3	85.4	86.5
Rural	850	700	136	14	83.7	85.4
Percent minority						
Less than 5 percent/missing	635	535	86	14	86.2	89.2
5 to less than 20 percent	909	729	172	8	80.9	81.9
20 to less than 50 percent	873	661	204	8	76.4	78.2
50 percent or more	1,148	799	327	22	71.0	75.7
Region						
Northeast	679	495	177	7	73.7	75.7
Midwest	899	705	172	22	80.4	83.1
South	821	647	164	10	79.8	82.2
West	1,166	877	276	13	76.1	80.4

<sup>1</sup>In SSOCs:2006, a minimum of 60 percent of the 237 subitems eligible for recontact were required to be answered for the survey to be considered complete. Of these 237 subitems, this includes a minimum of 80 percent of the 103 critical subitems (83 out of 103 total), 60 percent of item 16 subitems (17 out of 28 total), and 60 percent of item 22 subitems (18 out of 30 total).

<sup>2</sup>Nonrespondents include schools whose districts denied permission to NCES and those eligible schools that either did not respond or responded but did not answer the minimum number of items required for the survey to be considered complete. In total, there were 40 schools whose districts denied permission to NCES, 345 schools that did not send back a questionnaire, and another 404 that were other noninterviews including refusals, undeliverables, and the partially completed questionnaires that did not qualify as an interview.

<sup>3</sup>Ineligible schools include those that had closed, merged with another school at a new location, changed from a regular public school to an alternative school, or are not a school (“not a school” generally refers to a school record for an organization that does not provide any classroom instruction—for example, an office overseeing a certain type of program or offering tutoring or other services only).

<sup>4</sup>The unweighted response rate is calculated as a ratio: completed cases / (total sample – known ineligible).

<sup>5</sup>The weighted response rate is calculated by applying the base sampling weights to the ratio: completed cases / (total sample – known ineligible).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCs), 2006.

## Item Response Rates

Just as principals sometimes chose not to respond to the SSOCS:2006 survey request, they occasionally chose not to answer all of the survey items. Unweighted item response rates are calculated by dividing the number of sample schools responding to an item by the number of schools asked to respond to the item. Weighted item-level response rates in SSOCS:2006 were generally high, ranging from 66.3 percent to 100.0 percent. Of the 231 subitems on the SSOCS questionnaire, most (205) had response rates greater than 95 percent, 13 had response rates between 85 percent and 95 percent, and 13 had response rates less than 85 percent. The 13 subitems with response rates less than 85 percent are listed below:

- C0234–Number of part-time security guards
- C0236–Number of full-time school resource officers
- C0238–Number of part-time school resource officers
- C0242–Number of part-time sworn law enforcement officers
- C0326–Number of attacks with a weapon
- C0330–Number of attacks without a weapon
- C0406–School allows outside suspension with no services available
- C0408–School used outside suspension with no services available
- C0542–Number of paid part-time special education teachers
- C0546–Number of paid part-time special education aides
- C0550–Number of paid part-time regular classroom teachers
- C0554–Number of paid part-time regular classroom aides/paraprofessionals
- C0558–Number of paid part-time counselors

## Analysis of Item Nonresponse Bias

An item-level bias analysis was performed to determine the extent to which, for items with response rates less than 85 percent, nonresponding schools differed from responding schools. This analysis was done because differences between the schools that did and did not respond to an item can lead to bias in estimates.

The magnitude of item nonresponse bias is determined both by the level of item response and by the differences between item respondents and item nonrespondents on a survey item. Because the values of the survey items are not known for item nonrespondents, the distributions of eight sampling frame variables<sup>3</sup> were compared between the nonrespondents and respondents for the 13 subitems with response rates of less than 85 percent.

Among the items examined, ten (C0234, C0236, C0238, C0242, C0326, C0330, C0542, C0546, C0554, and C0558) were identified as having negligible nonresponse bias. The other three items (C0406, C0408 and C0550) had significant differences in their distributions across most of the key variables examined. The distributions between respondents and nonrespondents for survey items associated with C0406, C0408 and C0550 were then examined. Based on these analyses, it

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<sup>3</sup>The eight 2003–04 CCD frame variables used in this analysis are instructional level, school enrollment size, locale, percent minority enrollment, region, number of full-time-equivalent teachers, student-to-teacher ratio, and percentage of students eligible for free or reduced-price lunch.

was determined that the increased potential for bias in these items was not enough to warrant their exclusion from the data file. More detailed information on the analysis of item nonresponse, including the specific comparisons that were significant in the tests outlined above, is available in appendix B.

## SSOCS:2008

### Unit Response Rates

Unit response rates can be unweighted or weighted and are traditionally reported because they reflect the potential effects of nonsampling error and indicate whether portions of the population are underrepresented due to nonresponse. In order to calculate any of these measures, it is first necessary to know the disposition (outcome) of each sampled case. Table 2 shows the dispositions of the 3,484 cases initially selected for participation in SSOCS:2008, as well as the unweighted and weighted unit response rates by selected school characteristics.<sup>4</sup> The overall weighted<sup>5</sup> unit response rate was 77 percent.

### Analysis of Unit Nonresponse Bias

The existence of nonresponding schools has the potential to introduce bias into survey estimates, depending on the magnitude of the nonresponse and whether differences exist between responding and nonresponding schools in characteristics related to the estimates of interest. A unit-level nonresponse bias analysis was conducted to evaluate the extent of this bias in SSOCS:2008. Responding and nonresponding schools were compared across the characteristics available for both groups: instructional level, enrollment size, type of locale, percent minority enrollment, region, number of full-time-equivalent teachers, student-to-teacher ratio, and percentage of students eligible for free or reduced-price lunch. This analysis indicated that there were no measurable differences between the responding schools and the full sample of schools, leading to the conclusion that nonresponse bias is not an issue. For more information on the analysis of unit nonresponse, please see section appendix C.

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<sup>4</sup>While it is reasonable to assume that the ineligible rate among nonrespondents is not zero, a zero ineligibility rate was assumed when calculating the unweighted and weighted response rates. This is the most conservative approach.

<sup>5</sup>The weighted response rate is calculated by applying the base sampling rates to the following ratio: completed cases / (total sample - known ineligibles).

Table 2. Unweighted and weighted unit response rates, by selected school characteristics: School year 2007–08

School characteristic	Initial sample	Completed survey <sup>1</sup>	Non-respondents <sup>2</sup>	Ineligible <sup>3</sup>	Unweighted response rate (percent) <sup>4</sup>	Weighted response rate (percent) <sup>5</sup>
Total	3,484	2,560	872	52	74.6	77.2
<b>Level</b>						
Primary	833	618	200	15	75.6	77.0
Middle	1,214	897	297	20	75.1	77.0
High school	1,295	936	347	12	73.0	76.2
Combined	142	109	28	5	79.6	80.8
<b>Enrollment size</b>						
Less than 300	371	285	60	26	82.6	83.3
300–499	630	486	131	13	78.8	76.7
500–999	1,318	992	315	11	75.9	76.2
1,000 or more	1,165	797	366	2	68.5	68.6
<b>Urbanicity</b>						
City	1,046	679	335	32	67.0	69.4
Suburb	1,151	814	329	8	71.2	73.1
Town	469	390	70	9	84.8	84.6
Rural	818	677	138	3	83.1	83.9
<b>Percent minority enrollment</b>						
Less than 5 percent	427	353	70	4	83.5	84.3
5 to less than 20 percent	892	707	181	4	79.6	80.8
20 to less than 50 percent	895	656	231	8	74.0	76.7
50 percent or more	1,270	844	390	36	68.4	71.4
<b>Region</b>						
Northeast	597	399	189	9	67.9	69.5
Midwest	832	648	168	16	79.4	80.8
South	1,274	950	304	20	75.8	79.7
West	781	563	211	7	72.7	74.6

<sup>1</sup>In SSOCS:2008, A minimum of 60 percent of the 241 subitems eligible for recontact (i.e., all subitems in the questionnaire except for the seven introductory items) were required to have been answered for a survey to be considered complete, including a minimum of 80 percent of the 103 critical subitems.

<sup>2</sup>Nonrespondents include 94 schools whose districts denied permission to NCES and those eligible schools that either did not respond or responded but did not answer the minimum number of items required for the survey to be considered complete.

<sup>3</sup>Ineligible schools include those that had closed, merged with another school at a new location, or changed from a regular public school to an alternative school.

<sup>4</sup>The unweighted response rate is calculated as the following ratio: completed cases / (total sample - known ineligible).

<sup>5</sup>The weighted response rate is calculated by applying the base sampling rates to the following ratio: completed cases / (total sample - known ineligible).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS:2008).

## Item Response Rates

Just as principals sometimes chose not to respond to the SSOCS:2008 survey request, those that did respond occasionally chose not to answer all of the survey items. Unweighted item response

rates are calculated by dividing the number of sampled schools responding to an item by the number of schools asked to respond to the item. Weighted item-level response rates in SSOCS:2008 were generally high, ranging from 72 to 100 percent. Of the 241 subitems in the SSOCS questionnaire (i.e., all subitems except for the seven introductory items), most (199) had response rates greater than 95 percent, 29 had response rates between 85 and 95 percent, and 13 had response rates less than 85 percent. The 13 subitems with response rates less than 85 percent are listed below:

- C0234—Number of part-time security guards
- C0236—Number of full-time school resource officers
- C0238—Number of part-time school resource officers
- C0240—Number of full-time sworn law enforcement officers
- C0242—Number of part-time sworn law enforcement officers
- C0326—Number of physical attacks or fights with a weapon
- C0330—Number of physical attacks or fights without a weapon
- C0408—Out-of-school suspension or removal for less than the remainder of the school year with no curriculum/services provided was used this school year
- C0542—Number of paid part-time special education teachers
- C0546—Number of paid part-time special education aides
- C0550—Number of paid part-time regular classroom teachers
- C0554—Number of paid part-time regular classroom aides/paraprofessionals
- C0558—Number of paid part-time counselors

### **Analysis of Item Nonresponse Bias**

For all items with response rates below 85 percent, an item-level bias analysis was performed to determine the extent to which schools that did not answer the item differed from schools that did answer the item. This analysis was done because differences between the schools that did and did not respond to an item can lead to bias in estimates.

The magnitude of item nonresponse bias is determined by factors including the level of item response, the differences between item respondents and item nonrespondents on a survey item, and the distribution of item responses across categories of auxiliary variables. Because the values of the survey items are not known for item nonrespondents, the distributions of eight sampling frame variables<sup>6</sup> were compared between the nonrespondents and respondents for the 13 subitems with response rates of less than 85 percent. In addition, item medians were examined to determine if variation exists in responses between the categories of the eight sampling frame variables. The susceptibility to bias was also considered within each item by examining the effects of extreme outliers on the estimates.

Among the items examined, 12 (C0234, C0236, C0238, C0240, C0242, C0326, C0408, C0542, C0546, C0550, C0554, C0558) were identified as having negligible nonresponse bias. The other item (C0330, total number of physical attacks or fights without a weapon) had statistically

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<sup>6</sup>The eight 2005–06 CCD frame variables used in this analysis are instructional level, school enrollment size, locale, percent minority enrollment, region, number of full-time-equivalent teachers, student-to-teacher ratio, and percentage of students eligible for free or reduced-price lunch.

significant differences in its distributions across most of the key variables examined, and had statistically significant differences in its distributions of responses across categories of the eight sampling frame variables. The distributions between respondents and the sample for survey items associated with item C0330 were then examined. Based on these analyses, it was determined that the increased potential for bias in this item was not enough to warrant its exclusion from the data file. More detailed information on the analysis of item nonresponse, including the specific comparisons that were significant in the tests outlined above, is available in appendix D.

**Appendix A:**

**Analysis of Unit Nonresponse Bias, SSOCS:2006**

## **Analysis of Unit Nonresponse Bias**

In its statistical standards, the National Center for Education Statistics (NCES) requires that any survey stage of data collection with a base-weighted (weighted) unit response rate of less than 85 percent be evaluated for the potential magnitude of nonresponse bias before the data or any analysis using the data may be released (U.S. Department of Education 2003). This appendix summarizes the results of the unit-level nonresponse bias analysis performed on the 2005–06 School Survey on Crime and Safety (SSOCS:2006).

Nonresponse can greatly affect the strength and application of survey data by leading to an increase in variance as a result of a reduction in the actual size of the sample. It can also produce bias if the nonrespondents have characteristics of interest that are different from those of the respondents (Statistics Canada 2003). There are two types of nonresponse: unit and item nonresponse. Unit nonresponse rates indicate how many sampled units do not have completed interviews. The SSOCS:2006 sample consists of 3,565 schools, of which 52 were ineligible for the survey and 2,724 completed the survey. Item nonresponse bias can occur when responses to items are not obtained for all interviews.

In this appendix, unit response rates by different school characteristics are presented, followed by comparisons of the selected sample and population distributions and a comparison of respondent and nonrespondent distributions. For the school characteristics with different distributions for respondents and nonrespondents, further examination of the differences in response propensity is conducted using chi-square automatic interaction detection (CHAID), which identifies the characteristics of data that are the best predictors of response. Finally, the full sample (using base weights) and respondents (using nonresponse-adjusted weights) are compared.

### **Response Rate**

The magnitude of unit nonresponse bias is determined by the level of response and can be reflected in the differences between respondents and nonrespondents on key survey variables. As with most surveys, the values of key survey variables are not known for the nonrespondents. However, the SSOCS sampling frame does have eight school-level characteristic variables for responding and nonresponding schools. Five variables (enrollment size, level, locale, percent minority enrollment, and region) were used in the sampling design and the other three variables (number of full-time-equivalent teaching staff, student-to-FTE teaching staff ratio, and percentage of students eligible for free or reduced-price lunch) were derived from continuous variables available on the sampling frame. The categorical versions were created by dividing the weighted sample distribution into roughly equal-size groups, such that approximately one-quarter were in category 1, one-quarter were in category 2, and so on, so that there were an equal number of schools in the categories of each stratification variable.

The first component of nonresponse bias is the response rate, which measures the proportion of the sampling frame that is represented by the responding units in each study. Unit response rates can be either unweighted or weighted. The unweighted rate, computed by dividing the raw number of respondents by the number of eligible sampled schools, provides a useful description of the success of the operational aspects of the survey. The weighted rate, computed by summing

the weights for both the respondents and all eligible sampled schools, 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.

**Table A-1** Response rates, SSOCS:2006

Item description		Response rate (percent)	
		Weighted	Unweighted
<b>Overall</b>		80.6	77.5
<b>Enrollment size</b>	Less than 300	82.9	83.0
	300–499	84.3	83.4
	500–999	79.0	78.6
	1,000 or more	71.1	71.0
<b>Instructional level</b>	Primary	82.3	81.2
	Middle	79.1	77.7
	High school	78.1	75.3
	Combined	75.5	72.7
<b>Type of locale</b>	City	74.5	70.3
	Urban fringe	79.1	77.1
	Town	86.5	85.4
	Rural	85.4	83.7
<b>Percent minority enrollment</b>	Less than 5	89.3	86.2
	5 to less than 20	82.6	81.6
	20 to less than 50	78.0	76.4
	50 or more	75.7	71.0
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	81.0	79.4
	14 to 17	82.2	78.9
	17 to 20	79.8	77.1
	20 or more	80.2	76.3
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	82.4	81.8
	28 to 43	84.6	84.9
	43 to 67	81.4	80.8
	67 or more	74.8	73.0
<b>Percent of students eligible for free or reduced price lunch</b>	Less than 11	80.0	76.9
	11 to 30	82.5	80.3
	30 to 53	81.8	76.9
	53 or more	77.8	74.9
<b>Region</b>	Northeast	75.7	73.7
	Central	83.1	80.4
	Southeast	82.2	79.8
	West	80.4	76.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

For the SSOCS:2006 unit nonresponse bias analysis, the base weight was used, which is the inverse of the selection probability. The overall weighted response rate was 80.6 percent and the overall unweighted response rate was 77.5 percent. Table A-1 provides descriptive statistics on

**Table A-2** Comparison of sample and population, SSOCS:2006

Item description		Sample (percent)	Population (percent)	Likelihood ratio	p value
<b>Enrollment size</b>	Less than 300	25.8	26.9	0.95	0.81
	300–499	28.8	28.5		
	500–999	34.4	33.9		
	1,000 or more	11.0	10.7		
<b>Instructional level</b>	Primary	60.5	60.1	0.88	0.83
	Middle	18.8	19.0		
	High school	14.9	14.6		
	Combined	5.8	6.3		
<b>Type of locale</b>	City	25.4	25.5	0.22	0.97
	Urban fringe	33.2	32.9		
	Town	9.9	9.7		
	Rural	31.5	32.0		
<b>Percent minority enrollment</b>	Less than 5	19.3	19.3	0.28	0.96
	5 to less than 20	25.8	26.2		
	20 to less than 50	23.5	23.1		
	50 or more	31.4	31.5		
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	24.4	23.6	1.40	0.71
	14 to 17	25.6	25.5		
	17 to 20	24.7	25.9		
	20 or more	25.3	25.1		
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	24.7	27.0	8.29	0.04*
	28 to 43	25.2	25.3		
	43 to 67	25.0	24.9		
	67 or more	25.1	22.8		
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	24.5	24.2	1.51	0.68
	11 to 30	24.9	25.1		
	30 to 53	24.8	23.8		
	53 or more	25.9	27.0		
<b>Region</b>	Northeast	18.4	18.3	0.38	0.94
	Central	27.5	28.1		
	Southeast	21.7	21.5		
	West	32.4	32.1		

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

the weighted and unweighted response rates for key school characteristics. A comparison of response rates within a specific characteristic is presented later in this appendix.

### Comparison of the Sample and Population

The SSOCS:2006 sample was compared to the CCD population (from which the sample was drawn) across the selected eight key variables. Table A-2 displays the comparison results. A likelihood ratio test was used to examine whether there were any differences between the

selected sample and the target population, which tests the independence of the row and column variables in a two-way table. The independence of the row and column variables implies that the distributions across row variables of subgroups of column variables will be the same. The analysis results show that all  $p$  values are greater than 0.05 for all variables except the number of full-time equivalent teaching staff (FTE). This means that for all variables but FTE, the sample has the same distribution as the population, and there is no potential selection bias.

### **Comparison of Respondents and Nonrespondents**

The second component of nonresponse bias relates to the differences between respondents and nonrespondents on survey characteristics. Table A-3 compares respondents and nonrespondents on the eight key variables for which data are available from the sampling frame. Weighted distributions and the differences in the distributions between respondents and nonrespondents are shown. The largest differences in distributions were found for city schools (-9.9 percent), rural schools (9.6 percent), schools with less than 5 percent minority enrollment (10.6 percent), schools with 50 percent or more minority enrollment (-10.0 percent), and schools with 67 or more full-time-equivalent teaching staff (-9.7 percent).

The likelihood-ratio test statistic for independence in each two-way table is shown in table A-3, along with its  $p$  value. Within all comparisons, the null hypothesis that the response propensity is independent of school characteristics is rejected for enrollment size, locale, percent minority enrollment, number of full-time-equivalent teaching staff, and region because the corresponding  $p$  values are less than 0.05, the significant level. Therefore, there is a significant relationship between each of these five school characteristic variables and response propensity.

### **Comparison of Response Rates**

In order to compare response rates between different subpopulations for enrollment size, locale, percent minority enrollment, number of full-time-equivalent teaching staff, and region, a procedure was used to identify the categories within each school characteristic variable responsible for the significant differences. PROC LOGLINK in SUDAAN (Research Triangle Institute 2001) was used to perform a log-linear regression to identify these categories. For this analysis, the dependent variable was defined as whether the school responded to the survey. The first category of each variable was taken as the reference group.

In table A-4, the relative response rates (RRRs) are reported. The schools' RRR is the ratio of response rates to the reference category. For example, the RRR for schools in *towns* is 1.16, which means that the estimated response rate of *town* schools is 16 percent higher than the response rate of *city* schools (the reference category).

The lower and upper 95 percent confidence limits of RRRs are also reported in table A-4. At the significance level of 0.05, when the value 1.0 falls between these two limits, the response rate of the category is not measurably different from that of the reference category. The results of the LOGLINK analysis show that schools of 1,000 or more students had lower response rates than other schools, city schools had lower response rates than other schools, schools with less than 5 percent minority enrollment had higher response rates than other schools, and schools with 67 or more full-time-equivalent teaching staff had lower response rates than other schools.

**Table A-3** Comparison of respondents and nonrespondents, SSOCs:2006

Item description		Respondents (percent)	Non- respon- dents	Difference (percent)	Likelihood ratio	<i>p</i> value
<b>Enrollment size</b>	Less than 300	26.5	22.8	3.7	37.92	0. 00*
	300–499	30.1	23.4	6.7		
	500–999	33.6	37.3	-3.7		
	1,000 or more	9.7	16.4	-6.7		
<b>Instructional level</b>	Primary	61.7	55.5	6.2	6.31	0.10
	Middle	18.5	20.3	-1.8		
	High school	14.4	16.8	-2.4		
	Combined	5.5	7.4	-1.9		
<b>Type of locale</b>	City	23.5	33.4	-9.9	24.25	0.00*
	Urban fringe	32.6	35.9	-3.3		
	Town	10.6	6.9	3.7		
	Rural	33.4	23.8	9.6		
<b>Percent minority enrollment</b>	Less than 5	21.3	10.7	10.6	29.78	0.00*
	5 to less than 20	26.4	23.2	3.2		
	20 to less than 50	22.7	26.7	-4.0		
	50 or more	29.5	39.5	-10.0		
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	24.4	24.1	0.3	1.06	0.79
	14 to 17	26.1	23.8	2.3		
	17 to 20	24.4	26.0	-1.6		
	20 or more	25.1	26.1	-1.0		
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	25.2	22.7	2.5	20.41	0.00*
	28 to 43	26.4	20.2	6.2		
	43 to 67	25.2	24.2	1.0		
	67 or more	23.2	32.9	-9.7		
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	24.4	25.1	-0.7	3.90	0.27
	11 to 30	25.5	22.4	3.1		
	30 to 53	25.2	23.1	2.1		
	53 or more	25.0	29.4	-4.4		
<b>Region</b>	Northeast	17.3	23.1	-5.8	8.38	0.04*
	Central	28.3	24.0	4.3		
	Southeast	22.2	20.0	2.2		
	West	32.3	32.8	-0.5		

\* *p* < .05

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCs), 2006.

### Unit Response Propensity

Unit nonresponse bias may be mitigated through statistical adjustments that take advantage of relationships between auxiliary variables and the probability of response. To identify characteristics associated with unit nonresponse, a multivariate analysis was performed using CHAID. Within the levels of a particular characteristic, CHAID identifies the next best predictor(s) of response, 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 dataset into cells that have the greatest discrimination with respect to the unit response rates. In other words, CHAID divides the dataset into groups within which the unit response rate is as constant as possible and between

**Table A-4 Comparison of relative response rates, SSOCs:2006**

Item description		Relative response rate (RRR)	Lower and upper 95 percent limits of RRR	
<b>Enrollment size</b>	Less than 300	Ref.		
	300–499	1.02	0.95	1.08
	500–999	0.95	0.90	1.01
	1,000 or more	0.86	0.80	
<b>Type of locale</b>	City	Ref.		
	Urban fringe	1.06	1.00	
	Town	1.16	1.08	
	Rural	1.15	1.08	
<b>Percent minority enrollment</b>	Less than 5	Ref.		
	5 to less than 20	0.92	0.88	
	20 to less than 50	0.87	0.82	
	50 or more	0.85	0.93*	0.80
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	Ref.		
	28 to 43	1.03	0.96	1.10
	43 to 67	0.99	0.92	1.06
	67 or more	0.91	0.85	
<b>Region</b>	Northeast	Ref.		
	Central	1.10	1.02	
	Southeast	1.09	1.01	
	West	1.06	0.99	1.14

\*  $p < .05$ 

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCs), 2006.

which the unit response rate is as different as possible. These cells are called nonresponse adjustment cells.

In order to adjust for nonresponse, based on findings in the section above, enrollment size, locale, percent minority enrollment, number of full-time-equivalent teaching staff, and region were selected as the auxiliary variables for the CHAID analysis. Because the *number of full-time-equivalent teaching staff* was missing for 8.2 percent of schools, an additional response category was created for the missing cases. Otherwise, the missing cases could not be identified in any one of the subgroups created by enrollment size, locale, percent minority enrollment, number of full-time-equivalent teaching staff, and region, and the missing cases would not be involved in the CHAID analysis. The multiple combinations of enrollment size, locale, percent minority enrollment, number of full-time-equivalent teaching staff, and region were grouped into 13 nonresponse adjustment cells. The response rates for these cells, as well as the sample sizes, are shown in table A-5. The weighted unit response rates vary among adjustment cells from 63.8 to 92.3 percent, and the unweighted response rates vary from 63.2 to 90.8 percent.

**Table A-5 Nonresponse adjustment cells, SSOCS:2006**

Cell	Weighted response rate (percent)	Unweighted response rate (percent)	Number of respondents
1	82.6	81.6	766
2	91.4	88.6	349
3	86.5	87.2	68
4	80.8	72.6	53
5	71.5	69.9	235
6	81.7	84.8	218
7	76.8	76.3	225
8	66.2	63.2	60
9	68.4	66.3	401
10	91.4	90.8	99
11	75.4	72.3	151
12	92.3	90.1	64
13	63.8	67.3	35

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005-06 School Survey on Crime and Safety (SSOCS), 2006.

### **Comparison of Sample (With Base Weight) and Respondents (With Nonresponse-Adjusted Weight)**

Due to time constraints, all eight frame variables described in this appendix were used to create the adjustment cells that the U.S. Census Bureau used to produce the SSOCS:2006 nonresponse-adjusted weights rather than the four shown in table A-3 to have significant differences between respondents and nonrespondents. Thus, the variables level, student-to-FTE teaching staff ratio, percentage of students eligible for free or reduced-price lunch, and region are independent of the response propensities that were included in the CHAID analysis when they did not need to be. In order to evaluate the effect of the Census adjustment, a comparison analysis was conducted of the full sample (3,513 cases with base weights) and the respondents only (2,724 completes with the Census nonresponse-adjusted weights) to look for differences between these two groups. Table A-6 displays the distributions of the full sample and the respondents across the eight variables, the likelihood ratio tests, and their corresponding *p* values. The results indicate that the null hypothesis that the nonresponse-adjusted sample has the same distributions as the full sample is accepted across all eight variables (i.e.,  $p > 0.05$ ). Therefore, the nonresponse adjustment appears to have decreased the effects of nonresponse.

**Table A-6** Comparison of sample (with base weight) and respondents (with nonresponse-adjusted weight), SSOCS:2006

Item description		Full sample (base weight, percent)	Respondents (adjusted weight, percent)	Likelihood ratio	p value
<b>Enrollment size</b>	Less than 300	25.8	26.5	4.70	0.20
	300–499	28.8	30.1		
	500–999	34.4	33.6		
	1,000 or more	11.0	9.7		
<b>Instructional level</b>	Primary	60.5	61.7	0.67	0.88
	Middle	18.8	18.5		
	High school	14.9	14.4		
	Combined	5.8	5.5		
<b>Type of locale</b>	City	25.4	23.5	2.52	0.47
	Urban fringe	33.2	32.6		
	Town	9.9	10.6		
	Rural	31.5	33.4		
<b>Percent minority enrollment</b>	Less than 5	19.3	21.3	2.69	0.44
	5 to less than 20	25.8	26.4		
	20 to less than 50	23.5	22.7		
	50 or more	31.4	29.5		
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	24.4	24.4	0.10	0.99
	14 to 17	25.6	26.1		
	17 to 20	24.7	24.4		
	20 or more	25.3	25.1		
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	24.7	25.2	2.29	0.51
	28 to 43	25.2	26.4		
	43 to 67	25.0	25.2		
	67 or more	25.1	23.2		
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	24.5	24.4	0.38	0.94
	11 to 30	24.9	25.5		
	30 to 53	24.8	25.2		
	53 or more	25.9	25.0		
<b>Region</b>	Northeast	18.4	17.3	0.84	0.84
	Central	27.5	28.3		
	Southeast	21.7	22.2		
	West	32.4	32.3		

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

### Summary

This appendix documents the unit-level nonresponse bias analysis for SSOCS:2006. When first comparing the sample to the population, similar distributions were found across all eight key survey variables and, therefore, no selection bias was found in seven of the eight variables

examined. Next, the differences between the SSOCs:2006 nonrespondents and respondents were examined across the categories of the eight key survey variables. The largest differences in distributions between respondents and nonrespondents on survey characteristics were found for city schools (-9.9 percent), rural schools (9.6 percent), schools with less than 5 percent minority enrollment (10.6 percent), schools with 50 percent or more minority enrollment (-10.0 percent), and schools with 67 or more full-time-equivalent teaching staff (-9.7 percent). After that, an examination of relative response rates among the categories of the eight key survey variables found that schools of 1,000 or more students had lower response rates than other schools, city schools had lower response rates than other schools, schools with less than 5 percent minority enrollment had higher response rates than other schools, and schools with 67 or more full-time-equivalent teaching staff had lower response rates than other schools. Finally, the full sample (with base weight) was compared to the respondents (with the Census nonresponse-adjusted weight) in order to evaluate the effect of the nonresponse weight adjustment. The results indicate that the nonresponse adjustment appears to have decreased the effects of nonresponse.

## **Appendix B:**

### **Analysis of Item Nonresponse Bias, SSOCS:2006**

## **Analysis of Item Nonresponse Bias**

In its statistical standards, the National Center for Education Statistics (NCES) requires that any survey item with a base-weighted<sup>7</sup>(weighted) item response rate of less than 85 percent be evaluated for the potential magnitude of nonresponse bias before the data or any analysis using the data may be released (U.S. Department of Education 2003). This document serves to supplement the unit-level nonresponse bias analysis for the 2005–2006 School Survey on Crime and Safety (SSOCS:2006), summarizing the results of the item-level nonresponse bias analysis.

The SSOCS:2006 sample consists of 3,565 schools, of which 2,724 completed the survey (80.6 percent weighted response rate; 77.5 percent unweighted response rate). As in most surveys, the responses to some items are not obtained for all interviews, which can lead to nonresponse bias. There are numerous reasons for item nonresponse. Some respondents may not know the answer to an item or may not want to respond for other reasons, or the interview may have been interrupted and not completed. Item nonresponse can also occur when inconsistencies are discovered after the interview, and the inconsistencies must be set to missing.

The mean item response rate for SSOCS:2006 is greater than 97 percent and, therefore, there is little potential for item nonresponse bias for most items in the survey. However, for the items with weighted response rates lower than 85 percent, the potential for nonresponse bias exists. This appendix first describes the items that are included in the nonresponse bias analysis. Next, and because item nonresponse bias can be viewed as a function of both the item response rate and the extent to which the item respondents differ from the item nonrespondents, the potential for bias was examined by comparing respondents and nonrespondents using key survey variables. Finally, when item respondents and nonrespondents differed, the values each group gave to associated items were examined.

### **Survey Items in Item-level Nonresponse Analysis**

Since the mean item response rate for SSOCS:2006 survey items was above 97 percent, even if the item nonrespondents differ considerably from the respondents, the item nonresponse bias will be negligible for most items. Per NCES standards, only items with an item response rate less than 85 percent were considered for this analysis.

Over two hundred variables in the SSOCS restricted-use file (RUF) were examined, and thirteen had a weighted item response rate lower than 85 percent. Table E-1 contains the list of variables included in the bias analysis, the number of observations in each, and their unweighted and weighted response rates.<sup>8</sup> Variable C0408 has the lowest weighted response rate (60.2 percent unweighted; 66.3 percent weighted). Unweighted and weighted response rates for all other variables on table E-1 are greater than 70 percent.

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<sup>7</sup> A base weight is calculated as the inverse of a school's sampling probability.

<sup>8</sup> A preliminary data file was used to determine the item response rates shown on table B-1, for purposes of determining which variables necessitated a nonresponse bias analysis. Users may note slight differences between the response rates for the thirteen variables shown on this table and those shown in the Detailed Item Response Rates appendix L.

**Table B-1 Nonresponse bias analysis survey items, SSOCs: 2006**

<b>Variable name</b>	<b>Description</b>	<b>Number of observations</b>	<b>Unweighted response rate (percent)</b>	<b>Base-Weighted response rate (percent)</b>
C0234/R	Number of part-time security guards or security personnel at your school (not law enforcement)	1669	76.2	78.4
C0236/R	Number of full-time school resource officers at your school (include all career law enforcement officers with arrest authority, who have specialized training and are assigned to work in collaboration with school organizations)	1669	87.5	83.0
C0238/R	Number of part-time school resource officers at your school (include all career law enforcement officers with arrest authority, who have specialized training and are assigned to work in collaboration with school organizations)	1669	76.7	80.0
C0242/R	Number of part-time sworn law enforcement officers at your school who are not School Resource Officers	1669	76.3	78.7
C0326	Number of physical attacks with a weapon	2724	85.2	81.9
C0330	Number of physical attacks without a weapon	2724	85.3	81.8
C0406	School allows out-of-school suspension or removal for less than the remainder of the school year with no curriculum/services provided	2724	70.5	79.3
C0408	School used out-of-school suspension or removal for less than the remainder of the school year with no curriculum/services provided	2136	60.2	66.3
C0542/R	Number of paid part-time special education teachers at your school	2724	76.5	76.2
C0546/R	Number of paid part-time special education aides at your school	2724	74.1	73.7
C0550/R	Number of paid part-time regular classroom teachers at your school	2724	75.1	72.2
C0554/R	Number of paid part-time regular classroom teacher aides or paraprofessionals at your school	2724	72.9	72.2
C0558/R	Number of paid part-time counselors or mental health professionals at your school	2724	76.3	76.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

## **Item Nonresponse Bias**

### *Comparison of Item Respondents and Item Nonrespondents Across Known Frame Variables*

The magnitude of item nonresponse bias is partly determined by the level of item response and could be reflected in the differences between respondents and nonrespondents on key survey variables. As with most surveys, data for nonrespondents are not available for all survey items; however, the SSOCS sampling frame has data available for eight key school-level characteristic variables for respondents and nonrespondents. Five categorical variables (size, level, locale, percent minority enrollment, and region) were used directly in the sampling design while the remaining three variables (number of full-time-equivalent teaching staff, student-to-FTE teaching staff ratio, and percent of students eligible for free or reduced-price lunch) were derived from continuous variables available on the sampling frame. The categorical versions were created by dividing the weighted sample distribution into four roughly equal-sized groups (i.e., quartiles), such that approximately one-quarter belong to category 1, one-quarter to category 2, and so on.

As discussed above, potential item nonresponse bias could be reflected in the differences between respondents and nonrespondents on survey characteristics. Attachment tables BA-1 through BA-13 compare item respondents and nonrespondents on the eight key variables for which data are available: size, level, locale, percent minority enrollment, number of full-time-equivalent teaching staff, student-to-FTE teaching staff ratio, percent of students eligible for free or reduced-price lunch, and region. The likelihood-ratio Chi-square test statistic for independence, based on each 2-way comparison in the tables, indicate that the missing cases for variables C0234/R, C0236/R, C0238/R, C0242/R, C0326, C0330, C0542/R, C0546/R, C0554/R, and C0558/R are random because respondents and nonrespondents have similar distributions for nearly all of the variables considered. Therefore, it can be concluded that the potential item nonresponse bias is negligible for these variables.

### *Comparison of Item Respondents across Associated Items*

For variables C0406, C0408, and C0550/R, missing cases do not appear to be random because respondents and nonrespondents have dissimilar distributions for nearly all of the variables considered; further analysis for these three items was necessary to ensure that the items were not biased. Therefore, the distributions of C0406, C0408, and C0550/R for respondents and nonrespondents were examined across items in the questionnaire found to be highly associated with them. Table B-2 contains items that are highly associated<sup>9</sup> with items C0406, C0408, and C0550/R and their base-weighted correlations.

For the purposes of this analysis, continuous items (C0548/R, C0354 and C0478) have been categorized into quartiles, and C0554/R is top-coded at 3 or more part-time regular teacher aides or paraprofessionals. The remaining items are dichotomous and as a result did not need to be collapsed.

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<sup>9</sup> Highly associated items were identified during best-match imputation for items C0406 (table M-1) and C0408 (table M-2) and by manually calculating the associations between C0550/R and the 230 other items on the SSOCS:2006 data file.

Differences in the distributions of respondents and nonrespondents for items C0406, C0408, and C0550/R were again tested within associated items using the likelihood-ratio Chi-square test statistic for independence. Tables B-3 through B-5 contain the results of this comparison. The results in table B-3 indicate that C0406 respondents and nonrespondents have different distributions for C0390, C0394, and C0414. Said another way, C0406 nonrespondents responded differently than C0406 respondents to items C0390 (Likelihood ratio = 5.2;  $p < 0.05$ ), C0414 (Likelihood ratio = 30.9;  $p < 0.05$ ) and C0384 (Likelihood ratio = 4.1;  $p < 0.05$ ). Table B-4 indicates that there is a significant difference between the distributions of C0408 nonrespondents and respondents for items C0420 and C0412 but not for item C0416. Table J5 shows that there are significant differences in the distributions of C0550/R nonrespondents and respondents for items C0354 and C0478 but not for item C0548/R.

**Table B-2** Items associated with potentially biased SSOCS items, SSOCS:2006

Item	Item Description	Base-Weighted Correlation <sup>1</sup>
<b>C0406</b>	<b>Allow for the use of out-of-school suspension or removal for less than the remainder of the school year with no curriculum/services provided</b>	--
C0390	Allow for the use of removal with no continuing school services for at least the remainder of the school year	0.3***
C0414	Allow for the use of in-school suspension for less than the remainder of the school year with no curriculum/service provided	0.3***
C0394	Allow for the use of removal with school-provided tutoring/at-home instruction for at least the remainder of the school year	0.2***
<b>C0408</b>	<b>Use of out-of-school suspension or removal for less than the remainder of the school year with no curriculum/services provided</b>	--
C0416	Used in-school suspension for less than the remainder of the school year with no curriculum/service provided	0.3***
C0420	Used in-school suspension for less than the remainder of the school year with curriculum/services provided	0.2***
C0412	Used out-of-school suspension or removal for less than the remainder of the school year with curriculum/services provided	0.2***
<b>C0550/R</b>	<b>Number of part-time regular classroom teachers</b>	--
C0548/R	Number of full-time regular classroom teachers	0.2***
C0354	Total number of recorded incidents of distribution, possession, or use of illegal drugs	0.2***
C0478	Total students involved in recorded offenses of distribution, possession, or use of illegal drugs	0.2***

<sup>1</sup> Pearson's  $r$  was used as a measure of correlation.

\*\*\*  $p < 0.001$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table B-3 Comparison of item respondents and nonrespondents (C0406), SSOCS:2006**

Student or school characteristic	Respondents (percent)	Non-respondents (percent)	Likelihood Ratio
<b>C0390</b>			5.2*
(1) Yes	50.5	43.8	
(2) No	49.5	56.2	
<b>C0414</b>			30.9*
(1) Yes	23.2	9.7	
(2) No	76.8	90.4	
<b>C0394</b>			4.1*
(1) Yes	56.1	62.0	
(2) No	43.9	38.0	

\*  $p < 0.05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table B-4 Comparison of item respondents and nonrespondents (C0408), SSOCS:2006**

Student or school characteristic	Respondents (percent)	Non-respondents (percent)	Likelihood Ratio
<b>C0416</b>			0.2
(1) Yes	50.6	54.9	
(2) No	49.4	45.1	
<b>C0420</b>			16.0*
(1) Yes	84.5	94.4	
(2) No	15.5	5.6	
<b>C0412</b>			55.2*
(1) Yes	57.3	84.7	
(2) No	42.7	15.3	

\*  $p < 0.05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table B-5 Comparison of item respondents and nonrespondents (C0550/R), SSOCS:2006**

Student or school characteristic	Respondents (percent)	Non-respondents (percent)	Likelihood Ratio
<b>C0548/R</b>			2.7
0-17	25.7	29.0	
18-25	23.9	24.6	
26-38	25.1	24.2	
39 or more	25.3	22.2	
<b>C0354</b>			7.1*
0	73.6	78.9	
1 or more	26.4	21.1	
<b>C0478</b>			7.8*
0	74.3	79.7	
1 or more	25.7	20.3	

\*  $p < 0.05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Summary**

The mean item response rate for SSOCS:2006 was greater than 97 percent. Thirteen out of the 233 variables examined in this analysis had a weighted item response rate lower than 85 percent and were further examined in this analysis per NCES standards. Among these variables, ten (C0234/R, C0236/R, C0238/R, C0242/R, C0326, C0330, C0542/R, C0546/R, C0554/R, and C0558/R) had cases missing at random, and therefore, potential nonresponse bias is likely to be minor. The other three variables (C0406, C0408 and C0550/R) have significant differences in their distributions across most of the key variables used to examine bias. Based on these analyses, it was determined that the increased potential for bias in items C0406, C0408 and C0550/R was not enough to warrant the exclusion of these items from the data file.

**Attachment A:**

**Comparison of Item Respondents and Nonrespondents for the SSOCS:2006  
Items with Response Rates of Less than 85 Percent**

**Table BA-1 Comparison of item respondents and nonrespondents (C0234/R),  
SSOCS:2006**

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	15.5	8.7	10.1*
	300–499	21.5	23.6	
	500–999	41.6	39.0	
	1,000 or more	21.3	28.7	
<b>Instructional level</b>	Primary	38.3	36.3	3.6
	Middle	28.2	29.6	
	High school	25.3	29.6	
	Combined	8.2	4.5	
<b>Type of locale</b>	City	28.2	35.2	4.9
	Urban Fringe	33.9	34.0	
	Town	11.2	8.1	
	Rural	26.7	22.6	
<b>Percent minority enrollment</b>	Less than 5	14.4	12.2	5.4
	5 to less than 20	26.0	21.5	
	20 to less than 50	23.2	21.0	
	50 or more	36.4	45.3	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	19.8	15.4	5.4
	14 to 17	24.0	31.1	
	17 to 20	27.6	23.0	
	20 or more	28.6	30.5	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	14.5	8.8	5.7
	28 to 43	17.8	17.5	
	43 to 67	24.3	21.0	
	67 or more	43.3	52.7	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	22.4	29.4	5.5
	11 to 30	25.6	24.2	
	30 to 53	24.8	19.9	
	53 or more	27.2	26.5	
<b>Region</b>	Northeast	16.2	24.0	6.5
	Central	23.7	19.7	
	Southeast	30.6	27.8	
	West	29.5	28.5	

\*  $p < 0.05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-2 Comparison of item respondents and nonrespondents (C0236/R),  
SSOCS:2006**

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	13.2	18.3	7.8
	300–499	20.7	28.7	
	500–999	41.1	40.7	
	1,000 or more	25.0	12.2	
<b>Instructional level</b>	Primary	35.0	52.5	14.9*
	Middle	28.1	30.6	
	High school	29.3	10.9	
	Combined	7.6	6.1	
<b>Type of locale</b>	City	31.2	22.3	6.0
	Urban Fringe	33.8	34.6	
	Town	9.6	15.3	
	Rural	25.4	27.9	
<b>Percent minority enrollment</b>	Less than 5	11.4	27.0	6.1
	5 to less than 20	25.9	20.6	
	20 to less than 50	24.1	15.9	
	50 or more	38.7	36.5	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	18.5	20.4	1.7
	14 to 17	25.2	26.9	
	17 to 20	27.5	22.2	
	20 or more	28.8	30.5	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	13.5	12.1	6.4
	28 to 43	16.0	26.3	
	43 to 67	22.6	28.6	
	67 or more	48.0	33.0	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	25.4	16.6	7.6
	11 to 30	25.7	23.4	
	30 to 53	23.6	24.3	
	53 or more	25.3	35.7	
<b>Region</b>	Northeast	17.9	17.5	6.0
	Central	21.2	31.4	
	Southeast	31.1	24.4	
	West	29.8	26.8	

\*  $p < 0.05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-3 Comparison of item respondents and nonrespondents (C0238/R),  
SSOCS:2006**

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	15.3	9.0	7.2
	300–499	22.7	19.2	
	500–999	40.8	42.1	
	1,000 or more	21.1	29.8	
<b>Instructional level</b>	Primary	39.2	32.5	5.3
	Middle	28.2	29.6	
	High school	24.5	33.1	
	Combined	8.0	4.8	
<b>Type of locale</b>	City	27.6	38.3	6.8
	Urban Fringe	34.9	30.2	
	Town	10.8	9.3	
	Rural	26.7	22.1	
<b>Percent minority enrollment</b>	Less than 5	15.2	8.9	7.3
	5 to less than 20	25.9	21.6	
	20 to less than 50	23.0	21.6	
	50 or more	35.8	47.9	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	19.1	17.8	0.4
	14 to 17	25.2	26.7	
	17 to 20	26.7	26.1	
	20 or more	29.0	29.5	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	14.6	7.7	7.2
	28 to 43	17.9	17.1	
	43 to 67	24.2	20.9	
	67 or more	43.3	54.2	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	21.9	31.8	8.8*
	11 to 30	25.7	23.8	
	30 to 53	24.6	20.6	
	53 or more	27.8	23.7	
<b>Region</b>	Northeast	16.4	23.6	5.1
	Central	23.4	20.7	
	Southeast	30.5	28.1	
	West	29.7	27.6	

\*  $p < 0.05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-4 Comparison of item respondents and nonrespondents (C0242/R),  
SSOCS:2006**

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	15.1	10.3	7.6
	300–499	22.0	22.2	
	500–999	41.5	39.3	
	1,000 or more	21.4	28.3	
<b>Instructional level</b>	Primary	38.7	35.0	5.2
	Middle	28.2	29.7	
	High school	25.0	30.8	
	Combined	8.2	4.5	
<b>Type of locale</b>	City	28.6	34.2	2.5
	Urban Fringe	34.5	32.1	
	Town	10.8	9.3	
	Rural	26.2	24.4	
<b>Percent minority enrollment</b>	Less than 5	14.4	12.5	6.1
	5 to less than 20	25.2	24.2	
	20 to less than 50	24.0	18.3	
	50 or more	36.5	45.0	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	19.5	16.4	4.8
	14 to 17	23.8	31.8	
	17 to 20	27.4	23.4	
	20 or more	29.2	28.4	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	14.3	9.4	4.7
	28 to 43	17.6	18.3	
	43 to 67	24.5	20.4	
	67 or more	43.6	51.9	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	22.1	30.4	6.5
	11 to 30	25.4	25.0	
	30 to 53	24.6	20.8	
	53 or more	27.9	23.8	
<b>Region</b>	Northeast	16.5	22.9	4.2
	Central	23.2	21.7	
	Southeast	30.5	28.3	
	West	29.9	27.1	

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-5 Comparison of item respondents and nonrespondents (C0326),  
SSOCS:2006**

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	26.5	23.9	7.0
	300–499	28.1	31.6	
	500–999	33.7	37.0	
	1,000 or more	11.7	7.5	
<b>Instructional level</b>	Primary	57.6	72.0	35.5**
	Middle	20.1	14.2	
	High school	16.3	8.7	
	Combined	6.0	5.1	
<b>Type of locale</b>	City	24.7	27.8	6.7
	Urban Fringe	32.3	37.0	
	Town	9.7	10.7	
	Rural	33.4	24.4	
<b>Percent minority enrollment</b>	Less than 5	21.0	16.3	7.4
	5 to less than 20	25.8	27.4	
	20 to less than 50	23.5	18.9	
	50 or more	29.7	37.4	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	24.7	21.6	1.1
	14 to 17	24.5	25.3	
	17 to 20	25.2	26.3	
	20 or more	25.5	26.9	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	24.8	24.0	0.9
	28 to 43	24.3	25.6	
	43 to 67	24.7	26.4	
	67 or more	26.2	24.0	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	24.9	22.5	7.7
	11 to 30	25.4	24.3	
	30 to 53	25.8	21.0	
	53 or more	23.9	32.2	
<b>Region</b>	Northeast	18.1	14.9	2.7
	Central	28.0	26.3	
	Southeast	22.0	22.7	
	West	32.0	36.1	

\*\*  $p < 0.01$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-6 Comparison of item respondents and nonrespondents (C0330),**

## SSOCS:2006

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	26.5	24.1	7.8*
	300–499	28.1	31.8	
	500–999	33.7	37.1	
	1,000 or more	11.8	7.1	
<b>Instructional level</b>	Primary	57.5	72.5	20.2**
	Middle	20.1	14.1	
	High school	16.4	8.3	
	Combined	6.0	5.1	
<b>Type of locale</b>	City	24.5	28.4	5.8
	Urban Fringe	32.5	36.1	
	Town	9.7	10.5	
	Rural	33.3	25.0	
<b>Percent minority enrollment</b>	Less than 5	21.1	16.1	6.7
	5 to less than 20	25.9	27.0	
	20 to less than 50	23.5	18.8	
	50 or more	29.5	38.2	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	24.8	21.3	1.5
	14 to 17	24.4	26.0	
	17 to 20	25.1	26.7	
	20 or more	25.7	26.0	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	24.8	24.1	1.3
	28 to 43	24.4	25.0	
	43 to 67	24.5	27.2	
	67 or more	26.3	23.8	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	25.1	21.8	7.7
	11 to 30	25.6	23.4	
	30 to 53	25.6	21.6	
	53 or more	23.6	33.2	
<b>Region</b>	Northeast	18.0	15.2	2.7
	Central	28.1	25.7	
	Southeast	21.9	23.1	
	West	32.0	36.0	

\*  $p < 0.05$ \*\*  $p < 0.01$ 

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-7 Comparison of item respondents and nonrespondents (C0406),  
SSOCS:2006**

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	28.5	17.0	66.5**
	300–499	30.1	23.5	
	500–999	32.5	40.9	
	1,000 or more	8.9	18.6	
<b>Instructional level</b>	Primary	65.1	42.0	78.3**
	Middle	16.0	30.2	
	High school	12.7	23.0	
	Combined	6.1	4.8	
<b>Type of locale</b>	City	23.1	33.1	19.2**
	Urban Fringe	32.8	34.6	
	Town	10.3	8.3	
	Rural	33.9	24.0	
<b>Percent minority enrollment</b>	Less than 5	21.4	15.6	30.2**
	5 to less than 20	27.8	19.9	
	20 to less than 50	22.7	22.5	
	50 or more	28.1	42.0	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	25.0	20.6	5.4
	14 to 17	24.4	25.6	
	17 to 20	25.9	23.7	
	20 or more	24.7	30.1	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	27.1	14.9	43.9**
	28 to 43	25.6	20.3	
	43 to 67	24.5	27.0	
	67 or more	22.7	37.8	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	25.1	22.2	11.1*
	11 to 30	25.4	24.6	
	30 to 53	25.9	21.2	
	53 or more	23.5	32.0	
<b>Region</b>	Northeast	15.9	23.3	12.5*
	Central	28.9	23.2	
	Southeast	22.1	22.4	
	West	33.2	31.1	

\*  $p < 0.05$

\*\*  $p < 0.01$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-8 Comparison of Item Respondents and Nonrespondents (C0408),**

## SSOCS:2006

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	26.4	17.6	21.8**
	300–499	28.1	24.7	
	500–999	33.7	40.2	
	1,000 or more	11.7	17.5	
<b>Instructional level</b>	Primary	56.0	43.3	30.8**
	Middle	19.0	29.5	
	High school	17.3	21.9	
	Combined	7.7	5.2	
<b>Type of locale</b>	City	21.2	33.2	24.1**
	Urban Fringe	32.3	33.6	
	Town	10.8	8.3	
	Rural	35.7	24.9	
<b>Percent minority enrollment</b>	Less than 5	22.0	16.6	32.1**
	5 to less than 20	27.5	19.1	
	20 to less than 50	24.3	22.7	
	50 or more	26.2	41.5	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	23.0	21.3	1.8
	14 to 17	25.8	25.5	
	17 to 20	25.9	24.4	
	20 or more	25.3	28.8	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	25.3	15.3	20.2**
	28 to 43	25.0	21.1	
	43 to 67	23.2	27.6	
	67 or more	26.5	36.0	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	22.3	22.2	14.1**
	11 to 30	26.6	23.9	
	30 to 53	28.1	21.0	
	53 or more	23.1	32.9	
<b>Region</b>	Northeast	10.8	22.4	29.7**
	Central	30.7	24.3	
	Southeast	26.7	23.1	
	West	31.9	30.1	

\*\*  $p < 0.01$ 

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-9 Comparison of Item Respondents and Nonrespondents (C0542/R),  
SSOCS:2006**

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	27.2	22.3	5.3
	300–499	27.7	32.1	
	500–999	33.9	35.7	
	1,000 or more	11.2	9.9	
<b>Instructional level</b>	Primary	59.6	62.2	5.5
	Middle	18.6	20.1	
	High school	15.4	13.4	
	Combined	6.4	4.2	
<b>Type of locale</b>	City	24.0	29.4	5.9
	Urban Fringe	33.9	30.6	
	Town	10.4	8.2	
	Rural	31.7	31.8	
<b>Percent minority enrollment</b>	Less than 5	19.9	21.2	8.8
	5 to less than 20	27.9	20.3	
	20 to less than 50	22.3	23.9	
	50 or more	30.0	34.5	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	24.2	23.6	3.9
	14 to 17	23.5	28.5	
	17 to 20	25.7	24.7	
	20 or more	26.6	23.3	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	26.5	18.8	10.0*
	28 to 43	22.7	30.5	
	43 to 67	24.8	25.7	
	67 or more	26.0	25.0	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	25.0	22.9	6.7
	11 to 30	26.5	21.2	
	30 to 53	24.1	27.6	
	53 or more	24.5	28.3	
<b>Region</b>	Northeast	17.3	18.2	0.8
	Central	28.2	26.1	
	Southeast	22.2	21.8	
	West	32.3	33.9	

\*  $p < 0.05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-10 Comparison of Item Respondents and Nonrespondents (C0546/R),  
SSOCS:2006**

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	27.0	23.3	3.5
	300–499	28.2	30.2	
	500–999	33.5	36.5	
	1,000 or more	11.2	10.1	
<b>Instructional level</b>	Primary	59.3	62.8	10.5*
	Middle	18.5	20.3	
	High school	15.7	12.6	
	Combined	6.4	4.3	
<b>Type of locale</b>	City	23.1	31.3	11.2*
	Urban Fringe	34.3	29.8	
	Town	10.0	9.4	
	Rural	32.6	29.4	
<b>Percent minority enrollment</b>	Less than 5	20.1	20.4	2.6
	5 to less than 20	27.0	23.4	
	20 to less than 50	22.6	22.8	
	50 or more	30.2	33.5	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	24.5	23.0	7.4
	14 to 17	22.8	30.0	
	17 to 20	25.4	25.4	
	20 or more	27.2	21.7	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	26.5	19.3	6.1
	28 to 43	23.3	27.9	
	43 to 67	24.7	25.9	
	67 or more	25.4	26.9	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	24.7	23.9	7.3
	11 to 30	26.6	21.3	
	30 to 53	24.9	24.9	
	53 or more	23.8	29.9	
<b>Region</b>	Northeast	16.9	19.1	2.4
	Central	27.9	27.0	
	Southeast	21.6	23.6	
	West	33.6	30.4	

\*  $p < 0.05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-11 Comparison of Item Respondents and Nonrespondents (C0550/R),**

## SSOCS:2006

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	25.8	26.7	10.2*
	300–499	27.5	31.9	
	500–999	34.9	32.7	
	1,000 or more	11.8	8.7	
<b>Instructional level</b>	Primary	57.4	67.6	23.9**
	Middle	19.4	18.0	
	High school	16.4	11.2	
	Combined	6.8	3.3	
<b>Type of locale</b>	City	23.2	30.5	9.5*
	Urban Fringe	34.4	29.9	
	Town	10.3	8.7	
	Rural	32.1	30.9	
<b>Percent minority enrollment</b>	Less than 5	19.3	22.5	9.7*
	5 to less than 20	28.1	20.7	
	20 to less than 50	22.8	22.3	
	50 or more	29.8	34.5	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	23.4	26.1	11.7*
	14 to 17	23.1	28.9	
	17 to 20	25.6	25.0	
	20 or more	28.0	20.1	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	24.5	24.9	2.0
	28 to 43	23.8	26.4	
	43 to 67	25.1	25.0	
	67 or more	26.6	23.7	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	25.3	22.5	5.3
	11 to 30	25.9	23.3	
	30 to 53	25.0	24.6	
	53 or more	23.8	29.6	
<b>Region</b>	Northeast	16.6	19.9	2.5
	Central	28.2	26.3	
	Southeast	22.1	22.2	
	West	33.1	31.6	

\*  $p < 0.05$ \*\*  $p < 0.01$ 

<sup>1</sup> While the number of part-time regular classroom teachers (C0550/R) contributes to the calculation of student-to-FTE teaching staff ratio and number of full-time equivalent (FTE) teaching staff, the comparisons in this table are still valid because part-time regular classroom teachers account for only 1.5 percent of all FTE teaching staff.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-12 Comparison of Item Respondents and Nonrespondents (C0554/R),**

## SSOCS:2006

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	26.6	24.7	2.1
	300–499	28.3	29.9	
	500–999	33.9	35.3	
	1,000 or more	11.3	10.0	
<b>Instructional level</b>	Primary	59.3	62.7	7.5
	Middle	18.6	20.1	
	High school	15.8	12.7	
	Combined	6.3	4.6	
<b>Type of locale</b>	City	23.6	29.6	10.3*
	Urban Fringe	35.1	28.0	
	Town	10.0	9.5	
	Rural	31.3	32.9	
<b>Percent minority enrollment</b>	Less than 5	18.8	23.7	7.7
	5 to less than 20	27.8	21.6	
	20 to less than 50	23.1	21.4	
	50 or more	30.2	33.3	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	23.6	25.4	12.0
	14 to 17	22.9	29.5	
	17 to 20	25.7	24.7	
	20 or more	27.8	20.4	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	26.5	19.7	5.4
	28 to 43	23.6	27.1	
	43 to 67	24.2	27.2	
	67 or more	25.7	26.0	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	24.3	24.9	2.3
	11 to 30	26.0	23.1	
	30 to 53	25.1	24.2	
	53 or more	24.5	27.7	
<b>Region</b>	Northeast	16.6	19.7	5.9
	Central	27.7	27.6	
	Southeast	21.4	24.1	
	West	34.3	28.5	

\*  $p < 0.05$ 

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Table BA-13 Comparison of Item Respondents and Nonrespondents (C0558/R),  
SSOCS:2006**

Frame variable		Respondents (percent)	Nonrespondents (percent)	Likelihood ratio
<b>Enrollment size</b>	Less than 300	27.4	21.6	3.7
	300–499	28.1	30.7	
	500–999	33.5	36.7	
	1,000 or more	10.9	11.0	
<b>Instructional level</b>	Primary	59.9	61.5	2.5
	Middle	18.8	19.8	
	High school	15.3	13.8	
	Combined	6.1	4.9	
<b>Type of locale</b>	City	23.2	31.9	14.7**
	Urban Fringe	34.9	27.4	
	Town	10.0	9.2	
	Rural	31.8	31.5	
<b>Percent minority enrollment</b>	Less than 5	19.6	22.0	5.1
	5 to less than 20	27.2	22.3	
	20 to less than 50	23.0	21.5	
	50 or more	30.1	34.2	
<b>Student-to-FTE teaching staff ratio</b>	Less than 14	23.6	25.6	6.9
	14 to 17	23.6	28.2	
	17 to 20	25.2	26.3	
	20 or more	27.6	19.8	
<b>Number of full-time-equivalent teaching staff</b>	Less than 28	27.0	17.0	7.7
	28 to 43	23.6	27.6	
	43 to 67	24.3	27.5	
	67 or more	25.2	27.9	
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 11	24.9	23.3	4.8
	11 to 30	26.3	21.8	
	30 to 53	24.6	25.9	
	53 or more	24.3	29.0	
<b>Region</b>	Northeast	17.2	18.2	5.7
	Central	28.2	25.9	
	Southeast	20.9	26.2	
	West	33.6	29.7	

\*\*  $p < 0.01$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2005–06 School Survey on Crime and Safety (SSOCS), 2006.

**Appendix C:**

**Analysis of Unit Nonresponse Bias, SSOCS:2008**

## **Analysis of Unit nonresponse Bias**

In its statistical standards, the National Center for Education Statistics (NCES) requires that any survey stage of data collection with a base-weighted (weighted) unit response rate of less than 85 percent be evaluated for the potential magnitude of nonresponse bias before the data or any analysis using the data may be released (U.S. Department of Education 2003). This appendix summarizes the results of the unit-level nonresponse bias analysis performed on the 2007–08 School Survey on Crime and Safety (SSOCS:2008).

Nonresponse can greatly affect the strength and application of survey data by leading to an increase in variance as a result of a reduction in the actual size of the sample. It can also produce bias if the nonrespondents have characteristics of interest that are different from those of the respondents (Statistics Canada 2003). There are two types of nonresponse: unit and item nonresponse. Unit nonresponse refers to sampled units, schools in this instance, who do not have completed interviews. The SSOCS:2008 sample consists of 3,484 schools, of which 52 were ineligible for the survey and 2,560 completed the survey. Item nonresponse refers to survey questions with missing responses for interviewed schools. Item nonresponse bias can occur when responses for items are not obtained for all interviews.

In this appendix, unit response rates by different school characteristics are presented, followed by a comparison of the distributions of the SSOCS sample and the target population across eight school-level variables,<sup>10</sup> and a comparison of respondent and nonrespondent distributions on these eight key survey characteristics. For the school characteristics with different distributions between respondents and nonrespondents, further examination of the differences in response propensity is conducted using chi-square automatic interaction detection (CHAID), which identifies the school characteristics that are the best predictors of response. Finally, the full sample (using base weights) and respondents (using final weights adjusted for nonresponse) are compared.

### **Comparison of the Sample and Population**

Before examining nonresponse to the SSOCS survey, the appropriateness of the SSOCS sample design in representing the target population is examined. This is done by comparing distributions across the selected key variables in the SSOCS sample to the corresponding distributions on the sampling frame. The sampling frame for SSOCS:2008 was constructed from the public school universe file created for the 2007–08 Schools and Staffing Survey (SASS). The SASS frame was derived from the 2005–06 Common Core of Data (CCD) Public Elementary/Secondary School Universe data File. The SSOCS sample was chosen by stratifying the subset of schools from the CCD population by enrollment size, instructional level, and type of locale. Within each stratum, the schools were first sorted by region and percentage minority enrollment and a simple random systematic sample was drawn.

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<sup>10</sup> Five variables were used in the sampling design (enrollment size, level, locale, percentage minority enrollment, and region) and the other three variables were derived from continuous variables available on the sampling frame (number of FTE teaching staff, student-to-FTE teaching staff ratio, and percentage of students eligible for free or reduced-price lunch).

Table C-1 displays the distributions of the SSOCS:2008 sample (excluding the ineligible schools) and compares it to the target population (which is a subset of the CCD that includes all U.S. public schools that are eligible for the SSOCS sample) across the selected eight key variables. A chi-square likelihood ratio test, which tests for independence between two distributions, was used to examine whether there were any differences between the distribution of the selected sample and the target population based on the key variable examined. Independence of the row and column variables implies that the distributions across row variable subgroups will be the same across the SSOCS sample and target population columns. For example, when examining free and reduced-price lunch, the SSOCS sample and target population distributions were compared to see if they were independent of free and reduced-price lunch. If they were, it could be argued that the distribution of the sample is the same as the target population across the categories of free and reduced-price lunch. The larger the chi-square statistic the less likely the two distributions are independent of the key statistic examined.

The results show, with 95 percent confidence, that the SSOCS sample and the target population are independent across the eight frame variables examined (i.e.  $p$  values are greater than 0.05). This means that for all frame variables examined, the sample has the same distribution as the target population, and there is no potential selection bias in the sample selection design.

**Table C-1. Comparison of eligible sample and target population, SSOCS:2008**

<b>Item description</b>		<b>SSOCS Sample (percent)</b>	<b>Target Populatio n (percent)</b>	<b>Likeliho od ratio</b>	<b>p value</b>
<b>Enrollment size</b>	Less than 300	23.10	24.26	0.38	0.7709
	300-499	29.28	29.20		
	500-999	36.41	35.57		
	1,000 or more	11.21	10.97		
<b>Instructional level</b>	Primary	59.18	59.43	0.12	0.9459
	Middle	18.45	18.62		
	High School	14.40	14.38		
	Combined	7.96	7.57		
<b>Type of locale</b>	City	25.66	26.39	0.21	0.8929
	Suburb	28.82	28.76		
	Town	14.17	14.23		
	Rural	31.35	30.62		
<b>Percent minority enrollment</b>	Less than 5	16.12	15.42	1.70	0.1647
	5 to < 20	25.84	24.19		
	20 to < 50	24.03	24.00		
	50 or more	34.01	36.39		
<b>Student-to-FTE teaching staff ratio</b>	Less than 12	12.48	13.75	1.20	0.3096
	12 thru 16	43.62	41.44		
	> 16 to < 20	30.28	30.89		
	20 or more	13.62	13.92		
<b>Number of FTE teaching staff</b>	Less than 29	45.22	47.17	0.83	0.4764
	29 to < 45	30.65	29.20		
	45 to < 70	16.05	15.70		
	70 or more	8.09	7.92		
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 10	12.40	13.65	1.79	0.1475
	10 thru 20	12.75	11.34		
	21 thru 50	34.32	35.01		
	More than 50	40.53	40.01		
<b>Region</b>	Northeast	16.43	16.79	0.83	0.4762
	Midwest	26.85	28.23		
	South	34.04	32.50		
	West	22.68	22.48		

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

## **Response Rate**

The first component of nonresponse bias is the response rate, which measures the percentage of responding units out of the total units sampled in each study. Unit response rates can be either unweighted or base-weighted. The unweighted rate, computed by dividing the raw number of respondents by the eligible sample size, provides a useful description of the success of the operational aspects of the survey. The base-weighted response rate, computed by summing the base weights for the respondents and dividing by the sum of base weights for all eligible sample schools, gives a better description of the success of the survey with respect to the population sampled. This is because the base weights allow for inference of the sample data (including response status) to the population level. For the SSOCS:2008 unit nonresponse bias analysis, the base weight was used, which is the inverse of the selection probability.

The magnitude of unit nonresponse bias is determined by the level of response and can be reflected in the differences between respondents and nonrespondents on key survey variables. As with most surveys, the values of key survey variables are not known for the nonrespondents. However, the SSOCS sampling frame does have eight school-level characteristic variables for responding and nonresponding schools. Five variables (enrollment size, level, locale, percentage minority enrollment, and region) were used in the sampling design and the other three variables (number of FTE teaching staff, student-to-FTE teaching staff ratio, and percentage of students eligible for free or reduced-price lunch) were derived from continuous variables available on the sampling frame. For SSOCS:2008, continuous variables student-to-teacher ratio and the percentage eligible for free or reduced-price lunch were collapsed into the categories in which they are typically presented in NCES tables. Since there were no corresponding table stubs for the number of FTE teachers, the categorical definitions were kept consistent with those used for the SSOCS:2006 nonresponse bias analysis.

The overall base-weighted response rate was 77.2 percent and the overall unweighted response rate was 74.6 percent. Table C-2 provides descriptive statistics on the base-weighted and unweighted response rates for key school characteristics. In general, larger schools, city schools, schools with large minority populations, schools with high student-to-teacher ratios, and Northeastern schools were less likely to respond to the SSOCS:2008 survey. Whether these differing response rates are statistically significant is examined in the next section.

**Table C-2. Response rates, SSOCS:2008**

Item description		Response Rate (percent)	
		Weighted	Unweighted
<b>Overall</b>		77.2	74.6
<b>Enrollment size</b>	Less than 300	83.3	82.6
	300-499	76.7	78.8
	500-999	76.2	75.9
	1,000 or more	68.6	68.5
<b>Instructional level</b>	Primary	77.0	75.6
	Middle	77.0	75.1
	High School	76.2	73.0
	Combined	80.8	79.6
<b>Type of locale</b>	City	69.4	67.0
	Suburb	73.1	71.2
	Town	84.6	84.8
	Rural	83.8	83.1
<b>Percent minority enrollment</b>	Less than 5	84.3	83.5
	5 to < 20	80.8	79.6
	20 to < 50	76.7	74.0
	50 or more	71.4	68.4
<b>Student-to-FTE teaching staff ratio</b>	Missing	77.0	75.6
	Less than 12	82.0	79.1
	12 thru 16	78.2	74.8
	> 16 to < 20	74.4	73.8
	20 or more	73.0	72.9
<b>Number of FTE teaching staff</b>	Less than 29	78.9	79.6
	29 to < 45	78.1	77.8
	45 to < 70	74.9	74.0
	70 or more	68.0	67.1
<b>Percent of students eligible for free or reduced price lunch</b>	Missing	74.7	75.5
	Less than 10	78.8	72.4
	10 thru 20	69.4	72.8
	21 thru 50	78.4	76.2
	More than 50	78.2	74.4
<b>Region</b>	Northeast	69.5	67.9
	Midwest	80.8	79.4
	South	79.7	75.8
	West	74.6	72.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on

### **Comparison of Respondents and Nonrespondents**

The second component of nonresponse bias relates to the differences between respondents and nonrespondents on survey characteristics. Table C-3 compares respondents and nonrespondents on the eight key variables for which data are available from the sampling frame. Base-weighted distributions and the differences in the distributions between respondents and nonrespondents are shown.

The largest differences in distributions were found for schools with less than 300 students (8.1 percent), city schools (-11.2 percent), rural schools (11.9 percent), schools with 50 percent or more minority enrollment (-11.2 percent), and schools in the Northeast (-7.1 percent).<sup>1</sup> The likelihood-ratio test statistic for independence in each two-way table is shown in table C-3, along with its *p* value. The null hypothesis that the response propensity is independent of the school characteristic is rejected for enrollment size, locale, percentage minority enrollment, number of FTE teaching staff, percentage of students eligible for free or reduced-price lunch, and region. Therefore, there is a statistically significant relationship between each of these five school characteristic variables and the likelihood of responding to the SSOCS:2008 survey.

### **Comparison of Response Rates**

In order to compare response rates between different subpopulations for enrollment size, locale, percentage minority enrollment, number of FTE teaching staff, percentage of students eligible for free or reduced-price lunch, and region, a logistic model was used to identify the categories within each school characteristic variable where significant differences in response propensity exist. PROC RLOGIST in SUDAAN (Research Triangle Institute 2001) was used to perform a logistic regression of the odds of responding to the SSOCS:2008 survey given a school's characteristic. For this analysis, the dependent variable was defined as whether the school responded to the survey (yes/no). The first category of each variable was taken as the reference group.

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<sup>1</sup> These differences represent only some of the statistically significant relationships that resulted from this analysis. This paragraph discusses differences greater than the absolute value of seven, and arbitrarily so, to avoid unnecessarily reporting too much detail. Refer to table 3 for a complete list of the significant coefficients.

**Table C-3. Comparison of respondents and nonrespondents, SSOCS:2008**

Item description		Respondents (percent)	Non-respondents (percent)	Difference (percent)	Likelihood Ratio	<i>p</i> value
<b>Enrollment size</b>	Less than 300	24.9	16.9	8.1	9.04	0.000 0 *
	300-499	29.1	29.8	-0.7		
	500-999	36.0	37.9	-1.9		
	1,000 or more	10.0	15.4	-5.4		
<b>Instructional level</b>	Primary	59.0	59.7	-0.7	0.42	0.738 0
	Middle	18.4	18.6	-0.2		
	High School	14.2	15.0	-0.8		
	Combined	8.3	6.7	1.7		
<b>Type of locale</b>	City	23.1	34.3	-11.2	12.97	0.000 0 *
	Suburb	27.3	34.0	-6.7		
	Town	15.5	9.5	6.0		
	Rural	34.1	22.2	11.9		
<b>Percent minority enrollment</b>	Less than 5	17.6	11.1	6.5	7.22	0.000 1 *
	5 to < 20	27.0	21.8	5.3		
	20 to < 50	23.9	24.5	-0.7		
	50 or more	31.5	42.6	-11.2		
<b>Student-to- FTE teaching staff ratio</b>	Less than 12	13.3	9.9	3.4	2.34	0.071 3
	12 thru 16	53.0	49.8	3.2		
	> 16 to < 20	20.9	24.2	-3.3		
	20 or more	12.9	16.1	-3.2		
<b>Number of FTE teaching staff</b>	Less than 29	46.3	41.7	4.6	8.01	0.000 0 *
	29 to < 45	31.0	29.3	1.7		
	45 to < 70	15.6	17.7	-2.1		
	70 or more	7.1	11.3	-4.2		
<b>Percent of students eligible for</b>	Less than 10	12.7	11.5	1.1		
	10 thru 20	11.5	17.1	-5.7		
	21 thru 50	34.8	32.5	2.3		

	More than 50	41.0	38.8	2.2	2.94	0.032 0 *
<b>Region</b>	Northeast	14.8	21.9	-7.1		0.000 8 *
	Midwest	28.1	22.6	5.5		
	South	35.2	30.2	4.9		
	West	21.9	25.2	-3.3	5.59	

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

In table C-4, the odds of responding given a particular characteristic are reported. For example, the odds ratio estimate for *town* schools is 2.4, which means *town* schools have 2.4 times the odds of responding than *city* schools (the reference category). An odds ratio of “1.0” indicates that there is no difference in response propensities between the characteristic category being examined and the reference category and an odds ratio of less than “1.0” indicates that the schools with the characteristic of interest are less likely to respond than the schools in the reference category. To determine if a coefficient is significantly different from the reference category, the lower and upper 95 percent confidence limits of the odds ratio were examined and are also reported in table C-4. At the significance level of 0.05, when the value 1.0 falls between these two limits, the response rate of the school characteristic category is not significantly different from that of the reference category.

The results of the RLOGIST analysis confirm and elaborate on the relationships observed in the prior section. Schools with less than 300 students have statistically significant higher response rates than schools with 300 or more students and the likelihood of responding appears to decrease as school size increases. Similar to the results observed in the chi-square likelihood ratio test results in table C-3, no significant differences were found in response propensity of suburban schools compared to city schools; however, town and rural schools are significantly more likely to respond than city schools. Additionally, schools with less than 5 percent minority enrollment had higher odds of responding than schools with 20 percent or more minority students enrolled. Schools with student-to-teacher ratios of 20 or more were less likely to respond than schools with smaller student-to-teacher ratios. Schools’ with 70 or more FTE teachers were less likely to respond than schools with less than 29 FTE teachers. Schools with 10–20 percent of their student population eligible for free or reduced-price lunch were less likely to respond than schools with less than 10 percent of students eligible for the lunch subsidy.

Finally, Midwest and Southern schools' odds of responding were statistically significant and higher than Northeastern schools.

**Table C-4. Comparison of relative response rates, SSOCS:2008**

Item description		Odds Ratio	Lower 95% Confidence Limit of Odds Ratio	Upper 95% Confidence Limit of Odds Ratio
		<i>Reference Group</i>		
<b>Enrollment size</b>	Less than 300			
	300-499	0.66	0.44	0.98 *
	500-999	0.64	0.45	0.92 *
	1,000 or more	0.44	0.30	0.63 *
<b>Instructional level</b>	Primary	<i>Reference Group</i>		
	Middle	1.00	0.80	1.24
	High School	0.96	0.77	1.19
	Combined	1.26	0.77	2.07
<b>Type of locale</b>	City	<i>Reference Group</i>		
	Suburb	1.20	0.92	1.55
	Town	2.42	1.62	3.60 *
	Rural	2.28	1.67	3.13 *
<b>Percent minority enrollment</b>	Less than 5	<i>Reference Group</i>		
	5 to < 20	0.78	0.51	1.20
	20 to < 50	0.61	0.40	0.93 *
	50 or more	0.46	0.31	0.69 *
<b>Student-to-FTE teaching staff ratio</b>	Less than 12	<i>Reference Group</i>		
	12 thru 16	0.95	0.72	1.26
	> 16 to < 20	0.79	0.60	1.05
	20 or more	0.57	0.44	0.73 *
<b>Number of FTE teaching staff</b>	Less than 29	<i>Reference Group</i>		
	29 to < 45	0.79	0.52	1.21
	45 to < 70	0.64	0.41	1.01
	70 or more	0.60	0.37	0.96 *
<b>Percent of students eligible for free or</b>	Less than 10	<i>Reference Group</i>		
	10 thru 20	0.61	0.40	0.92 *

	21 thru 50	0.98	0.68	1.40
	More than 50	0.96	0.68	1.37
	Northeast	<i>Reference Group</i>		
	Midwest	1.84	1.30	2.61 *
	South	1.72	1.26	2.35 *
<b>Region</b>	West	1.29	0.92	1.80

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

### Unit Response Propensity

Unit nonresponse bias may be mitigated through statistical adjustments that take advantage of relationships between auxiliary variables and the probability of response. To identify characteristics associated with unit nonresponse, a multivariate analysis was performed using CHAID. Within the levels of a particular characteristic, CHAID identifies the next best predictor(s) of response, 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 dataset into cells that have the greatest discrimination with respect to the unit response rates. In other words, CHAID divides the dataset into groups within which the unit response rate is as constant as possible and between which the unit response rate is as different as possible. These cells are called nonresponse adjustment cells.

Several school characteristics were found to be related to the propensity to respond in earlier sections. These include enrollment size, locale, percentage minority enrollment, student-to-FTE teaching staff ratio, number of FTE teaching staff, percentage eligible for free or reduced-price lunch, and region. These were selected as the auxiliary variables for the CHAID analysis. Because the variable *percentage eligible for free or reduced-price lunch* was missing for 3.16 percent of schools, an additional response category was created for the missing cases so that all schools were accounted for in one of the adjustment cells.<sup>1</sup> Otherwise, the missing cases could not be identified in any one of the subgroups created by the auxiliary variables and the missing cases would not be included in the CHAID analysis.

In CHAID analysis, the multiple combinations of the auxiliary variables were grouped into 15 nonresponse adjustment cells, which minimize the variance in response rates within a cell and maximize the variance in response rates between cells. In the end, enrollment size and student-to-teacher ratio were found unimportant in determining the most efficient adjustment cells; that is, these variables were no longer significant predictors of response propensity when controlling for the other variables in the model.

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<sup>1</sup> Missing cases were defined as “.”

The response rates for these cells, as well as the sample sizes, are shown in table C-5. The weighted unit response rates vary among adjustment cells from 65.5 to 95.6 percent, and the unweighted response rates vary from 65.3 to 95.4 percent. The resulting cell definitions from the CHAID analysis were used to create the adjustment cells that the U.S. Census Bureau used to produce the SSOCS:2008 nonresponse-adjusted weights.

**Table C-5: Nonresponse adjustment cells, SSOCS:2008**

Cell	Response rate (percent)		Number of Respondents
	Weighted	Unweighted	
1	81.4	80.1	218
2	82.5	82.8	216
3	83.8	82.9	107
4	95.6	95.4	103
5	88.3	89.6	172
6	86.9	90.3	84
7	79.1	81.6	62
8	86.1	86.7	39
9	66.0	66.7	66
10	65.5	65.3	261
11	70.8	70.7	306
12	82.9	84.0	168
13	73.5	71.8	79
14	75.3	78.7	85
15	68.8	65.6	594

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

### **Comparison of Eligible Sample (with base weights) and Respondents (with final weights adjusted for nonresponse)**

In order to evaluate the effect of the Census adjustment, a comparison analysis was conducted of the eligible sample (3,432 cases with sample selection base weights) and the respondents only (2,560 completed questionnaires with the final Census weight adjusted for nonresponse) to look for differences between these two groups. Table C-6 displays the distributions of the full sample and the respondents across the eight school characteristic variables, the chi-square likelihood ratio tests, and their corresponding *p* values. The results indicate that the null hypothesis that the nonresponse-adjusted sample has the same distributions as the full sample is accepted across all eight school characteristics examined ( $p > 0.05$ ). This suggests that, when using the final adjusted weights, the respondent sample is representative of the eligible sample, when examining the eight school characteristics.

**Table C-6.** Comparison of sample (with base weight) and respondents (with final weight),

**SSOCS:2008**

<b>Item description</b>	<b>Eligible Sample (percent)</b>	<b>Respondents (percent)</b>	<b>Likelihood Ratio</b>	<b>p value</b>
<b>Enrollment size</b>	Less than 300	23.10	23.13	
	300-499	29.28	29.30	
	500-999	36.41	36.38	
	1,000 or more	11.21	11.20	0.00
<b>Instructional level</b>	Primary	59.18	59.24	
	Middle	18.45	18.43	
	High School	14.40	14.36	
	Combined	7.96	7.96	0.00
<b>Type of locale</b>	City	25.66	25.64	
	Suburb	28.82	28.81	
	Town	14.17	14.19	
	Rural	31.35	31.37	0.00
<b>Percent minority enrollment</b>	Less than 5	16.12	16.50	
	5 to <20	25.84	25.74	
	20 to <50	24.03	24.47	
	50 or more	34.01	33.29	0.08
<b>Student-to-FTE teaching staff ratio</b>	Less than 12	12.48	12.71	
	12 thru 16	43.62	44.08	
	>16 to <20	30.28	30.05	
	20 or more	13.62	13.16	0.07
<b>Number of FTE teaching staff</b>	Less than 29	45.22	44.44	
	29 to <45	30.65	31.12	
	45 to <70	16.05	16.30	
	70 or more	8.09	8.14	0.06
<b>Percent of students</b>	Less than 10	12.40	12.94	
	10 thru 20	12.75	11.62	

	21 thru 50	34.32	34.19		
	More than 50	40.53	41.25	0.36	0.783 1
<b>Region</b>	Northeast	16.43	16.11		
	Midwest	26.85	26.81		
	South	34.04	34.72		
	West	22.68	22.36	0.06	0.978 9

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

### Summary

This appendix documents the unit-level nonresponse bias analysis for SSOCS:2008. When first comparing the sample to the target population, similar distributions were found across all eight key survey variables and, therefore, no selection bias was found in the survey sample design. Next, the differences between the SSOCS:2008 nonrespondents and respondents were examined across the categories of the eight key survey variables. The largest differences in distributions were found for schools with less than 300 students (8.1 percent), city schools (-11.2 percent), rural schools (11.9 percent), schools with 50 percent or more minority enrollment (-11.2 percent), and schools in the Northeast (-7.1 percent). An examination of the odds of responding among the categories of the eight key survey variables yielded similar results. As school size increased response rates decreased; town and rural schools were more likely to respond than city schools; as percentage minority enrollment increased the odds of responding declined; student-to-teacher ratios of 20 or more were associated with lower odds of responding; schools with 70 or more FTE teaching staff had lower response rates; schools with 10–20 percent of their students eligible for a free or reduced-price lunch were less likely to respond than schools with less than 10 percent; and Northeastern schools were less likely to respond than schools located in the Midwest and South. Finally, the full sample (with base weights) was compared to the respondents (with the Census final weights) in order to evaluate the effectiveness of the nonresponse weight adjustment. The results indicate that the eligible sample is no different than the responding sample when adjusting for nonresponse.

## **Appendix D:**

### **Analysis of Item Nonresponse Bias**

## **Analysis of Item Nonresponse**

In its statistical standards, the National Center for Education Statistics (NCES) requires that any survey item with a base-weighted<sup>1</sup> (weighted) item response rate of less than 85 percent be evaluated for potential nonresponse bias before the data or any analysis using the data may be released (U.S. Department of Education 2003). This appendix serves to supplement the unit-level nonresponse bias analysis for the 2007–08 School Survey on Crime and Safety (SSOCS:2008), summarizing the results of the item-level nonresponse bias analysis.

The SSOCS:2008 sample consists of 3,484 schools, of which 52 were ineligible for the survey and 2,560 completed the survey (77.2 percent weighted response rate; 74.6 percent unweighted response rate). Analysis of the unit-level nonresponse found that adjustments to the weights of the sample yielded distributions statistically similar to the eligible sample. As in most surveys, responses to some items on the SSOCS:2008 questionnaire were not obtained for all interviewed respondents, which can lead to nonresponse bias at an item-level. There are numerous reasons for item nonresponse. Some respondents may not know the answer to an item or may not want to respond for other reasons, or the interview may have been interrupted and not completed. Item nonresponse can also occur when inconsistencies are discovered after the interview, and the inconsistencies must be set to missing where values for the item are then imputed.

The majority of items in SSOCS:2008 had high response rates. The mean item response rate for SSOCS:2008 is 97 percent and, therefore, there is little potential for item nonresponse bias for most items in the survey. However, for the items with weighted response rates lower than 85 percent, the potential for nonresponse bias must be examined. There were 13 such items in SSOCS:2008. This appendix first describes the 13 items that were included in the nonresponse bias analysis and then examines the sensitivity of the items to potential bias by imposing extreme assumptions on the item nonrespondents. Of those determined to be sensitive to potential bias, further analysis was performed by comparing the distributions of item respondents and nonrespondents across key frame variables to determine whether cases are missing at random. The potential for item nonresponse bias was deemed negligible if the nonrespondents are not statistically different from respondents. For items with statistically different distributions, it was then examined whether respondents' answers differed across the key frame variables. In such situations, response propensity to specific survey items that were hypothesized to be highly correlated with the key survey items of interest was examined.

### **Survey Items in the Item-level Nonresponse Bias Analysis**

Since the mean item response rate for SSOCS:2008 survey items was 97 percent, even if the item nonrespondents differ considerably from the respondents, the item nonresponse bias will be negligible for most items. Per NCES standards, only items with a response rate of less than 85 percent were considered for this analysis.

Over two hundred variables in the SSOCS restricted-use file were examined, and 13 had a weighted item response rate lower than 85 percent. Table D-1 contains the list of variables included in the bias analysis, the number of observations in each, and their unweighted and weighted response rates. Weighted results are shown both with base weights and final weights

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<sup>1</sup>A base weight is calculated as the inverse of a school's sampling probability.

adjusted for unit nonresponse. Base-weighted item-level response rates range from 72.0 percent for item C0554 to 84.3 percent for item C0330. Final weighted item-level response rates were nearly identical to based-weighted response rates. Final weights were used for the analyses in this appendix to most accurately reflect the item responses of respondents.

**Table D-1. Items with response rates less than 85 percent, SSOCS:2008**

Variable name	Variable description	Item-level response rate (percent)			
		Number of eligible respondents	Weighted with final weights	Weighted with base weights	Unweighted
C0234	Number of part-time security guards	1,699	75.2	75.7	74.5
C0236	Number of full-time school resource officers	1,699	80.3	79.8	85.8
C0238	Number of part-time school resource officers	1,699	76.7	77.3	74.4
C0240	Number of full-time sworn law enforcement officers - not SROs	1,699	82.2	81.7	87.3
C0242	Number of part-time sworn law enforcement officers - not SROs	1,699	76.5	77.0	75.0
C0326	Number of attacks with weapon - total	2,560	84.	84.3	87.2
C0330	Number of attacks without weapon - total	2,560	84.1	84.3	87.1
C0408	Outside suspensions/no services available - action used	1,511	81.8	82.2	80.1
C0542	Number of paid part-time special education teachers	2,560	75.9	76.1	76.5
C0546	Number of paid part-time special education aides	2,560	73.5	73.8	73.8
C0550	Number of paid part-time regular classroom teachers	2,560	72.5	72.5	75.7
C0554	Number of paid part-time regular classroom aides/paraprofessionals	2,560	71.9	72.0	73.4
C0558	Number of paid part-time counselors	2,560	75.8	75.9	76.6

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

### **Using Extreme Assumptions to Assess the Potential for Item Nonresponse Bias**

In order to assess possible nonresponse bias, sets of imputed values were generated by imposing extreme assumptions on the item nonrespondents. Two new sets of imputed values, one based on a ‘low’ assumption and one based on a ‘high’ assumption, were created for each variable. For the continuous items,<sup>2</sup> a ‘low’ imputed value variable was created by resetting imputed values to the value at the 5<sup>th</sup> percentile of the original distribution; a ‘high’ imputed value variable was created by resetting imputed values to the value at the 95<sup>th</sup> percentile of the original distribution. For the dichotomous item, C0408, a ‘low’ imputed value variable was created by resetting all imputed values to ‘1’, and a ‘high’ imputed value variable was created by resetting all imputed values to “2”. Both the ‘low’ imputed value variable distributions and the ‘high’ imputed value variable distributions were compared to the original distributions (table D-2).

There were no measurable differences found in the comparisons of the low and original distribution estimates and the comparisons of the high and original distribution estimates of C0326, C0408, C0542, C0546, C0550, C0554, and C0558 at significance level 0.05 (see table 1 for item descriptions). Additionally, there were no differences found in the comparisons of the original and low distribution estimates of C0240 and C0242. For items C0234, C0236, C0238 and C0330, the potential for bias exists for both low and high imputed values. In other words, if the missing responses tend to be low values for these items, then the SSOCS:2008 item estimate will be biased upwards, whereas, if the missing responses tend to high values for these items, then the SSOCS:2008 item estimate will be biased downwards.

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<sup>2</sup> C0234, C0236, C0238, C0240, C0242, C0326, C0330, C0542, C0546, C0550, C0554, C0558.

**Table D-2. Comparison of original and extreme imputed value item estimates, SSOCS:2008**

Variable	Low imputed value estimate	Standard Error	Original estimate	Standard error	High imputed value estimate	Standard error
C0234	0.29 *	0.0260	0.38	0.0333	0.78 *	0.0323
C0236	0.53 *	0.0505	0.66	0.0599	0.93 *	0.0498
C0238	0.47 *	0.0284	0.61	0.0365	0.94 *	0.0343
C0240	0.10	0.0126	0.13	0.0151	0.28 *	0.0205
C0242	0.19	0.0233	0.24	0.0300	0.42 *	0.0255
C0326	0.15	0.0469	0.18	0.0558	0.15	0.0469
C0330	7.87 *	0.4825	9.36	0.5673	14.69 *	0.6141
C0408	1.23	0.0200	1.28	0.0228	1.41	0.0188
C0542	0.45	0.0351	0.59	0.0443	0.93	0.0363
C0546	0.67	0.0530	0.90	0.0710	1.99	0.0743
C0550	1.21	0.1119	1.67	0.1462	3.14	0.1195
C0554	0.85	0.0728	1.18	0.0960	2.81	0.0934
C0558	0.45	0.0240	0.59	0.0321	0.93	0.0316

\* p < .05

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

When analyzing the results in table D-2, it was determined that because most of the items are highly skewed towards low values, the extreme assumptions for ‘high’ imputed values are likely to be unrealistic. For example, C0240, the number of full-time sworn law enforcement officers who are not SROs, is highly skewed towards a response of ‘0.’ Therefore, ‘high’ value extreme imputation may not be realistic because a significant difference is almost guaranteed. Thus, a propensity analysis comparing respondents and nonrespondents was performed. This analysis is described in the next section.

### **Item Nonresponse Bias**

#### *Comparison of Item Respondents and Item Nonrespondents across Known Frame Variables*

Measuring the magnitude of nonresponse bias on an item level can be problematic, since it is not known how item nonrespondents’ answers differ from item respondents. However, how the level of item response differs across key survey variables can be examined, which indicates whether item respondents differ from item nonrespondents. The SSOCS sampling frame has data available for eight key school-level characteristic variables for the entire sample. Five categorical variables (size, level, locale, percentage minority enrollment, and region) were used directly in the sampling design while the remaining three variables (number of full-time equivalent (FTE) teaching staff, student-to-FTE teaching staff ratio, and percentage of students eligible for free or reduced-price lunch) were derived from continuous variables available on the sampling frame. For SSOCS:2008, the categorical definitions for the student-to-teacher ratio and the percentage eligible for free or reduced-price lunch variables were collapsed into the categories used in

NCES table stubs. Since there were no corresponding table stubs for the number of FTE teachers, the categorical definitions were kept consistent with those used for the SSOCS:2006 nonresponse bias analysis.

Number of part-time security guards

As discussed above, potential item nonresponse bias could be reflected in the differences between respondents and nonrespondents on survey characteristics. Item respondents and nonrespondents to item C0234 were compared on the eight key variables for which data are available: size, level, locale, percentage minority enrollment, number of FTE teaching staff, student-to-FTE teaching staff ratio, percentage of students eligible for free or reduced-price lunch, and region (table D-3).

**Table D-3. Comparison of item respondents and nonrespondents (C0234), SSOCS:2008**

Item description		Respondents (percent) n=1,266	Non- respondents (percent) n=443	Difference (percent)	Likelihood ratio	<i>p</i> value
<b>Enrollment size</b>	Less than 300	13.5	14.6	-1.1	1.08	0.37
	300-499	23.2	21.9	1.3		
	500-999	42.5	38.3	4.2		
	1,000 or more	20.8	25.3	-4.5		
<b>Instructional level</b>	Primary	41.8	44.1	-2.3	1.20	0.32
	Middle	27.0	23.4	3.6		
	High School	24.1	26.6	-2.5		
	Combined	7.2	6.0	1.2		
<b>Type of locale</b>	City	27.3	45.3	-18.1	9.90	0.00 *
	Suburb	29.2	25.4	3.8		
	Town	17.8	9.2	8.6		
	Rural	25.8	20.1	5.7		
<b>Percent minority enrollment</b>	Less than 5	14.2	8.1	6.1	11.38	0.00 *
	5 to <20	26.1	17.1	9.0		
	20 to <50	24.3	21.5	2.8		
	50 or more	35.4	53.2	-17.8		
<b>Student-to-FTE teaching staff ratio</b>	Less than 12	9.4	12.8	-3.4	2.43	0.08
	12 thru 16	52.6	54.1	-1.5		
	>16 to <20	22.2	22.8	-0.6		
	20 or more	15.8	10.4	5.5		
<b>Number of FTE teaching staff</b>	Less than 29	29.0	25.0	4.0	0.83	0.48
	29 to <45	30.4	32.6	-2.2		
	45 to <70	24.7	23.4	1.3		
	70 or more	15.9	19.0	-3.0		
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 10	11.4	10.1	1.3	2.31	0.09
	10 thru 20	13.0	10.3	2.7		
	21 thru 50	34.8	29.6	5.2		
	More than 50	40.8	50.0	-9.2		
<b>Region</b>	Northeast	17.7	19.9	-2.2	2.92	0.04 *
	Midwest	23.6	20.8	2.9		
	South	37.9	45.2	-7.3		
	West	20.7	14.1	6.6		

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

The results of the likelihood-ratio Chi-square test for independence in table D-3 indicate that for item C0234 (number of part-time security guards) the propensity to respond is not independent of type of school locale, percentage minority enrollment, and region. City schools, schools with 50 percent or more minority enrollment, and Southern schools were less likely to respond to item C0234. Further analysis of these frame variables is warranted. This item (C0234), however, has highly skewed responses. Seventy-seven percent of responses are zero and over 90 percent of the responses are either zero or one. If there is no discernable difference in the way schools are responding to item C0234 across the key school characteristics, then there is no reason to suspect bias in SSOCS estimates for item C0234.

Item C0234 is further examined by calculating median values by the school characteristics found to be significant in the prior analysis. Due to the skewed nature of the responses, medians are examined rather than means to avoid sensitivity to outliers. As table D-4 shows, though there are differences in the distributions across these key frame variables, there are no significant differences in the responses by the frame variable categories. The median response for the number of part-time security guards is zero. This does not differ by location, percentage minority enrollment, or region. These results suggest that estimates for item C0234 have negligible potential for bias.

**Table D-4. Comparison of medians for item respondents (C0234), SSOCS:2008**

<b>Item description</b>	<b>Sample size</b>	<b>Median of responses</b>	<b>Lower 95% confidence limit</b>	<b>Upper 95% confidence limit</b>
<b>Type of locale</b>	City	369	0	0
	Suburb	409	0	0
	Town	198	0	0
	Rural	290	0	0
<b>Percent minority enrollment</b>	Less than 5	143	0	0
	5 to <20	356	0	0
	20 to <50	332	0	0
	50 or more	435	0	0
<b>Region</b>	Northeast	206	0	0
	Midwest	292	0	0
	South	475	0	0
	West	293	0	0

\* p < .05

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

#### Number of full-time school resource officers

Next, item C0236 (number of full-time SROs) is examined (table D-5). For item C0236, the likelihood-ratio Chi-square test results indicate that schools with less than 1,000 students enrolled, primary schools, and schools with less than 45 FTE teachers are less likely to respond to item C0236. This item, however, has highly skewed responses. Over 91 percent of the responses are either zero or one. If there are no discernable differences in the way schools are

responding to item C0236 across the key school characteristics, then there is no reason to suspect bias in the responses.

**Table D-5. Comparison of item respondents and nonrespondents (C0236), SSOCS:2008**

Item description		Respondents (percent) n=1,458	Non- respondents (percent) n=241	Difference (percent)	Likelihood ratio	<i>p</i> value
<b>Enrollment size</b>	Less than 300	12.3	19.8	-7.5	6.61	0.00 *
	300-499	22.1	25.8	-3.7		
	500-999	40.9	43.7	-2.8		
	1,000 or more	24.7	10.7	14.0		
<b>Instructional level</b>	Primary	38.7	57.4	-18.7	11.87	0.00 *
	Middle	26.8	23.4	3.4		
	High School	27.5	13.2	14.3		
	Combined	7.0	6.1	1.0		
<b>Type of locale</b>	City	32.1	30.4	1.7	0.97	0.41
	Suburb	29.2	24.5	4.7		
	Town	14.8	19.0	-4.1		
	Rural	23.9	26.2	-2.3		
<b>Percent minority enrollment</b>	Less than 5	12.3	14.1	-1.8	0.63	0.60
	5 to <20	23.3	26.3	-3.1		
	20 to <50	23.4	24.3	-0.8		
	50 or more	41.0	35.3	5.7		
<b>Student-to-FTE teaching staff ratio</b>	Less than 12	10.2	10.5	-0.2	1.42	0.25
	12 thru 16	51.2	59.8	-8.6		
	>16 to <20	23.1	19.4	3.7		
	20 or more	15.5	10.4	5.1		
<b>Number of FTE teaching staff</b>	Less than 29	26.2	35.3	-9.1	5.66	0.00 *
	29 to <45	29.4	37.2	-7.8		
	45 to <70	25.5	20.0	5.5		
	70 or more	18.9	7.6	11.3		
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 10	10.2	14.5	-4.4	0.90	0.45
	10 thru 20	12.3	12.4	-0.1		
	21 thru 50	34.5	29.4	5.1		
	More than 50	43.0	43.6	-0.6		
<b>Region</b>	Northeast	19.8	12.2	7.6	1.80	0.16
	Midwest	23.5	20.7	2.7		
	South	38.0	46.9	-8.8		
	West	18.8	20.2	-1.5		

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

Next, item C0236 is further examined by calculating median values by the school characteristics that were found to be significant in the prior analysis. The median response for item C0236 ranges from zero to one, increasing slightly as enrollment size and number of FTE teachers increase (table D-6). Additionally, high schools have slightly larger numbers of full-time SROs than primary or middle schools. Though these differences are statistically significant, they are substantively inconsequential. These results suggest that estimates for item C0236 have negligible potential for bias.

**Table D-6. Comparison of medians for item respondents (C0236), SSOCS:2008**

Item description		Sample size	Median of responses	Lower 95% confidence limit	Upper 95% confidence limit
<b>Enrollment size</b>	Less than 300	71	0	0	0
	300-499	173	0	0	0
	500-999	518	0	0	0
	1,000 or more	696	1	1	1
<b>Instructional level</b>	Primary	157	0	0	0
	Middle	515	0	0	1
	High School	741	1	1	1
	Combined	45	0	0	1
<b>Number of FTE teaching staff</b>	Less than 29	198	0	0	0
	29 to <45	299	0	0	0
	45 to <70	443	1	0	1
	70 or more	518	1	1	1

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

#### Number of part-time school resource officers

Next, item C0238 (number of part-time SROs) is examined (table D-7). For item C0238, the results of the likelihood-ratio Chi-square test indicate that the propensity to respond is not independent of enrollment size, instructional level, type of locale, percentage minority enrollment, number of FTE teaching staff, and region. That is, schools with 1,000 or more students enrolled, 50 percent or more minority enrollment, high schools, city schools, schools with 70 or more FTE teaching staff, and Southern schools are less likely to respond to survey item C0238. These differences are of no consequence, however, if the values for C0238 do not differ across categories.

**Table D-7. Comparison of item respondents and nonrespondents (C0238), SSOCS:2008**

Item description		Respondents (percent) n=1,264	Non- respondents (percent) n=435	Difference (percent)	Likelihood ratio	<i>p</i> value
<b>Enrollment size</b>	Less than 300	14.0	13.2	0.8	5.81	0.00 *
	300-499	23.2	21.7	1.5		
	500-999	43.3	35.1	8.2		
	1,000 or more	19.5	30.0	-10.5		
<b>Instructional level</b>	Primary	43.3	39.3	4.0	4.80	0.01 *
	Middle	27.1	22.7	4.4		
	High School	22.9	30.6	-7.7		
	Combined	6.7	7.3	-0.6		
<b>Type of locale</b>	City	29.3	39.8	-10.5	7.38	0.00 *
	Suburb	28.2	28.4	-0.2		
	Town	17.5	9.4	8.1		
	Rural	25.0	22.4	2.6		
<b>Percent minority enrollment</b>	Less than 5	13.9	8.7	5.2	8.48	0.00 *
	5 to <20	25.5	18.5	7.0		
	20 to <50	24.7	20.1	4.6		
	50 or more	35.9	52.7	-16.8		
<b>Student-to-FTE teaching staff ratio</b>	Less than 12	9.5	12.8	-3.2	1.09	0.36
	12 thru 16	52.4	54.6	-2.2		
	>16 to <20	22.8	20.8	2.0		
	20 or more	15.2	11.8	3.4		
<b>Number of FTE teaching staff</b>	Less than 29	29.4	23.3	6.1	3.90	0.01 *
	29 to <45	31.1	30.3	0.8		
	45 to <70	24.8	23.1	1.7		
	70 or more	14.7	23.3	-8.6		
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 10	11.3	10.4	0.9	0.25	0.86
	10 thru 20	12.6	11.5	1.2		
	21 thru 50	33.7	32.9	0.7		
	More than 50	42.5	45.2	-2.8		
<b>Region</b>	Northeast	17.6	20.7	-3.1	3.98	0.01 *
	Midwest	23.8	20.1	3.7		
	South	38.1	45.2	-7.1		
	West	20.6	14.0	6.5		

\* *p* < .05

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

This item has highly skewed response values. Over 89 percent of responses are equal to zero and over 95 percent are equal to zero or one. For these reasons, the median values for item C0238 are examined by the key school characteristics. Again, median values are reported to determine the extent of differing item response across the key school characteristics. As with item C0236, the median response for item C0238 ranges from 0 to 1 (table D-8). Though these differences may be statistically significant, they are substantively small, and therefore do not warrant further examination as there is no potential substantive impact of item nonresponse.

**Table D-8. Comparison of median values for item respondents (C0238), SSOCS:2008**

Item description		Sample size	Median of responses	Lower 95% confidence limit	Upper 95% confidence limit
<b>Enrollment size</b>	Less than 300	76	1	0	1
	300-499	173	1	1	1
	500-999	506	0	0	1
	1,000 or more	509	0	0	0
<b>Instructional level</b>	Primary	170	1	1	1
	Middle	489	0	0	1
	High School	568	0	0	0
	Combined	37	0	0	0
<b>Type of locale</b>	City	381	0	0	0
	Suburb	399	0	0	0
	Town	199	1	1	1
	Rural	285	1	1	1
<b>Percent minority enrollment</b>	Less than 5	144	1	1	1
	5 to <20	352	1	0	1
	20 to <50	338	0	0	0
	50 or more	430	0	0	0
<b>Number of FTE teaching staff</b>	Less than 29	209	1	1	1
	29 to <45	296	1	1	1
	45 to <70	387	0	0	0
	70 or more	372	0	0	0
<b>Region</b>	Northeast	203	0	0	0
	Midwest	296	0	0	1
	South	477	0	0	0
	West	288	1	1	1

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

Number of full-time sworn law enforcement officers—not SROs

Item C0240 (number of full-time sworn law enforcement officers-not SROs) is examined next (table D-9). For item C0240, the likelihood-ratio Chi-square test statistics indicate that the propensity to respond is not independent of enrollment size, instructional level, type of locale, and number of FTE teaching staff. The results show that schools with 1,000 or more students enrolled and schools with 45 or more FTE teaching staff are more likely to respond to item C0240. Instructional level and type of locale are also associated with the propensity to respond. High schools and middle schools are more likely to respond to item C0240 than primary or combined schools and urban and suburban schools are more likely to respond than town or rural schools. Again, these differences are of little concern if there are no differences in type of responses given to item C0240 across the key school characteristics examined.

**Table D-9. Comparison of item respondents and nonrespondents (C0240), SSOCS:2008**

Item description		Respondents (percent) n=1,483	Non- respondents (percent) n=216	Difference (percent)	Likelihood ratio	<i>p</i> value
<b>Enrollment size</b>	Less than 300	12.7	19.0	-6.3	6.05	0.00 *
	300-499	22.6	24.0	-1.4		
	500-999	40.6	45.0	-4.4		
	1,000 or more	24.1	11.9	12.1		
<b>Instructional level</b>	Primary	38.5	60.2	-21.7	7.56	0.00 *
	Middle	27.8	18.1	9.7		
	High School	26.7	15.6	11.1		
	Combined	7.0	6.1	0.9		
<b>Type of locale</b>	City	32.6	27.8	4.8	3.00	0.04 *
	Suburb	29.2	23.7	5.5		
	Town	14.7	20.2	-5.5		
	Rural	23.5	28.4	-4.9		
<b>Percent minority enrollment</b>	Less than 5	12.2	15.1	-2.9	0.46	0.71
	5 to <20	23.4	25.9	-2.5		
	20 to <50	24.0	21.9	2.0		
	50 or more	40.4	37.0	3.4		
<b>Student-to- FTE teaching staff ratio</b>	Less than 12	10.3	10.1	0.2	0.56	0.64
	12 thru 16	52.0	57.1	-5.1		
	>16 to <20	22.7	21.0	1.7		
	20 or more	15.0	11.8	3.2		
<b>Number of FTE teaching staff</b>	Less than 29	26.4	35.4	-9.0	6.35	0.00 *
	29 to <45	29.9	35.5	-5.5		
	45 to <70	25.1	21.3	3.8		
	70 or more	18.6	7.9	10.7		
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 10	10.8	12.4	-1.7	0.11	0.96
	10 thru 20	12.3	12.6	-0.3		
	21 thru 50	33.8	31.9	1.9		
	More than 50	43.1	43.1	0.1		
<b>Region</b>	Northeast	19.7	11.9	7.7	1.67	0.18
	Midwest	23.4	20.8	2.5		
	South	38.1	47.4	-9.3		
	West	18.9	19.8	-0.9		

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

This item, as those prior, has highly skewed response values. Over 89 percent of responses are equal to zero and almost 96 percent are equal to zero or one. For these reasons, the median values for item C0240 are examined by the school characteristics above found to be statistically significant. As table D-10 shows, though there are measurable differences in the distributions across the key frame variables, there are no statistically significant differences in the responses by the frame variable categories. The median response for the number of full-time sworn law enforcement officers who are not SROs is zero. This does not differ by enrollment size, instructional level, type of locale, or number of FTE teaching staff. These results suggest that estimates for item C0240 have negligible potential for bias.

**Table D-10. Comparison of median values for item respondents (C0240), SSOCS:2008**

Item description		Sample size	Median of responses	Lower 95% confidence limit	Upper 95% confidence limit
<b>Enrollment size</b>	Less than 300	75	0	0	0
	300-499	185	0	0	0
	500-999	533	0	0	0
	1,000 or more	690	0	0	0
<b>Instructional level</b>	Primary	161	0	0	0
	Middle	543	0	0	0
	High School	733	0	0	0
	Combined	46	0	0	0
<b>Type of locale</b>	City	476	0	0	0
	Suburb	472	0	0	0
	Town	209	0	0	0
	Rural	326	0	0	0
<b>Number of FTE teaching staff</b>	Less than 29	209	0	0	0
	29 to <45	314	0	0	0
	45 to <70	447	0	0	0
	70 or more	513	0	0	0

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

Number of part-time sworn law enforcement officers—not SROs

Next item C0242 (number of part-time sworn law enforcement officers who are not SROs) is examined (table D-11). For item C0242, the likelihood-ratio Chi-square test results indicate that the propensity to respond is not independent of enrollment size, type of locale, and percentage minority enrollment. The results show that schools with 1,000 or more students enrolled and schools with 50 percent or more minority enrollment are less likely to respond to survey item C0242. Rural and town schools are more likely to respond to item C0242 than city schools. Further analysis of these frame variables is warranted.

This item has highly skewed responses. Over 85 percent of the responses are equal to zero and almost 96 percent of the responses are either zero or one. If there is no discernable differences in the way schools are responding to item C0242 across the key school characteristics, then there is no reason to suspect bias in the responses to C0242.

**Table D-11. Comparison of item respondents and nonrespondents (C0242), SSOCS:2008**

Item description		Respondents (percent) n=1,275	Non- respondents (percent) n=424	Difference (percent)	Likelihood ratio	<i>p</i> value
<b>Enrollment size</b>	Less than 300	13.5	14.5	-1.0	4.17	0.01 *
	300-499	23.3	21.6	1.6		
	500-999	43.1	35.9	7.2		
	1,000 or more	20.1	27.9	-7.8		
<b>Instructional level</b>	Primary	42.0	43.6	-1.7	1.78	0.16
	Middle	26.8	23.7	3.1		
	High School	23.7	27.8	-4.1		
	Combined	7.5	4.8	2.6		
<b>Type of locale</b>	City	28.2	43.1	-14.9	6.39	0.00 *
	Suburb	28.3	28.1	0.2		
	Town	17.7	9.1	8.6		
	Rural	25.8	19.7	6.1		
<b>Percent minority enrollment</b>	Less than 5	14.2	7.9	6.3	6.23	0.00 *
	5 to <20	25.2	19.4	5.8		
	20 to <50	24.6	20.4	4.3		
	50 or more	36.0	52.4	-16.4		
<b>Student-to- FTE teaching staff ratio</b>	Less than 12	9.9	11.6	-1.7	1.61	0.20
	12 thru 16	51.2	58.5	-7.3		
	>16 to <20	23.6	18.3	5.3		
	20 or more	15.3	11.6	3.7		
<b>Number of FTE teaching staff</b>	Less than 29	29.1	24.4	4.6	1.94	0.14
	29 to <45	30.8	31.4	-0.6		
	45 to <70	24.8	23.1	1.7		
	70 or more	15.3	21.1	-5.8		
<b>Percent of students eligible for free or reduced- price lunch</b>	Less than 10	11.1	10.9	0.2	0.70	0.56
	10 thru 20	12.8	10.8	2.1		
	21 thru 50	33.9	32.0	1.9		
	More than 50	42.1	46.3	-4.2		
<b>Region</b>	Northeast	17.5	20.9	-3.4	2.72	0.05
	Midwest	23.7	20.5	3.2		
	South	38.3	44.3	-6.0		
	West	20.5	14.3	6.2		

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

Item C0242 is further examined by calculating median values by the key school characteristics. As table D-12 shows, though there are differences in the distributions across these key frame variables, there are no significant differences in the responses by the frame variable categories. The median response for the number of part-time sworn law enforcement officers who are not SROs is zero. This does not differ by enrollment size, type of locale, or percentage minority enrollment. These results suggest that estimates for item C0242 have negligible potential for bias.

**Table D-12. Comparison of median values for item respondents (C0242), SSOCS:2008**

<b>Item description</b>	<b>Sample size</b>	<b>Median of responses</b>	<b>Lower 95% confidence limit</b>	<b>Upper 95% confidence limit</b>
<b>Enrollment size</b>	Less than 300	74	0	0
	300-499	174	0	0
	500-999	504	0	0
	1,000 or more	523	0	0
<b>Type of locale</b>	City	372	0	0
	Suburb	406	0	0
	Town	203	0	0
	Rural	294	0	0
<b>Percent minority enrollment</b>	Less than 5	142	0	0
	5 to <20	355	0	0
	20 to <50	336	0	0
	50 or more	442	0	0

SOURCE: U.S. Department of Education, National Center for Education Statistics, School Survey on Crime and Safety (SSOCS), 2008.

Number of physical attacks/fights without a weapon

The last item under analysis is survey item C0330 (total number of attacks without a weapon) (table D-13). For item C0330, the likelihood-ratio Chi-square test results show that the propensity to respond is not independent of enrollment size, instructional level, type of school locale, percentage minority enrollment, student-to-FTE teaching staff ratio, and number of FTE teaching staff.

**Table D-13. Comparison of item respondents and nonrespondents (C0330), SSOCS:2008**

Item description		Respondents (percent) n=2,230	Non- respondents (percent) n=330	Difference (percent)	Likelihood ratio	<i>p</i> value
<b>Enrollment size</b>	Less than 300	23.7	20.2	3.5	4.99	0.00 *
	300-499	29.4	28.6	0.8		
	500-999	35.1	43.3	-8.3		
	1,000 or more	11.8	7.8	4.0		
<b>Instructional level</b>	Primary	56.9	71.8	-14.9	16.73	0.00 *
	Middle	18.8	16.7	2.1		
	High School	15.9	6.3	9.6		
	Combined	8.5	5.2	3.3		
<b>Type of locale</b>	City	25.0	28.8	-3.8	3.81	0.02 *
	Suburb	27.6	35.2	-7.6		
	Town	14.8	11.0	3.7		
	Rural	32.6	24.9	7.6		
<b>Percent minority enrollment</b>	Less than 5	17.8	9.4	8.5	5.00	0.00 *
	5 to <20	26.0	24.3	1.8		
	20 to <50	23.1	31.8	-8.7		
	50 or more	33.0	34.6	-1.5		
<b>Student-to-FTE teaching staff ratio</b>	Less than 12	14.1	5.4	8.7	6.46	0.00 *
	12 thru 16	51.0	62.9	-11.9		
	>16 to <20	21.9	17.3	4.6		
	20 or more	12.9	14.4	-1.5		
<b>Number of FTE teaching staff</b>	Less than 29	44.3	44.9	-0.6	4.42	0.01 *
	29 to <45	30.8	32.8	-2.0		
	45 to <70	16.1	17.3	-1.2		
	70 or more	8.8	4.9	3.9		
<b>Percent of students eligible for free or reduced-price lunch</b>	Less than 10%	12.6	14.9	-2.4	1.60	0.20
	10 thru 20%	12.4	7.5	4.9		
	21 thru 50%	33.8	36.4	-2.6		
	More than 50%	41.3	41.2	0.0		
<b>Region</b>	Northeast	16.8	12.5	4.3	1.30	0.29
	Midwest	27.1	25.2	1.9		
	South	33.9	39.0	-5.1		
	West	22.2	23.3	-1.1		

\*  $p < .05$

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

Next the median responses of item C0330 are examined by these school characteristics to determine if there are any differences in actual responses across categories. As shown in table D-14, the median responses differ by categories of enrollment size, instructional level, locale, percentage minority enrollment, student-to-FTE teaching staff ratio, and number of FTE teaching staff. The potential for bias for item C0330 cannot be refuted.

**Table D-14. Comparison of median values for item respondents (C0330), SSOCS:2008**

Item description		Respondents			
		Sample size	Median of responses	Lower 95% confidence limit	Upper 95% confidence limit
<b>Enrollment size</b>	Less than 300	246	1	0	1
	300-499	421	2	1	2
	500-999	843	5	4	5
	1,000 or more	720	15	13	15
<b>Instructional level</b>	Primary	494	1	1	1
	Middle	768	8	7	8
	High School	869	7	6	7
	Combined	99	2	2	2
<b>Type of locale</b>	City	591	5	5	5
	Suburb	702	2	2	2
	Town	341	3	3	4
	Rural	596	2	2	2
<b>Percent minority enrollment</b>	Less than 5	317	2	2	2
	5 to <20	621	2	2	2
	20 to <50	549	4	3	4
	50 or more	743	5	4	5
<b>Student-to-FTE teaching staff ratio</b>	Less than 12	197	1	1	1
	12 thru 16	1,039	3	3	3
	>16 to <20	540	4	4	4
	20 or more	402	5	4	5
<b>Number of FTE teaching staff</b>	Less than 29	574	1	1	1
	29 to <45	580	3	2	3
	45 to <70	555	6	5	6
	70 or more	521	15	13	15

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

*Comparison of C0330 Item Respondents across Associated Items*

For item C0330 missing cases do not appear to be random because respondents and nonrespondents have dissimilar distributions for nearly all of the school characteristics examined. Additionally, distinctly different responses to C0330 exist across the school characteristic categories, which could lead to bias in estimates. Further analysis of this item is

necessary to assess the potential bias. The distributions of C0330 for respondents and nonrespondents were examined across items in the questionnaire found to be highly associated with C0330. Table D-15 contains items that are highly associated with item C0330 and their final-weighted correlations.

**Table D-15. Items associated with potential biased SSOCS items, SSOCS:2008**

<b>Item name</b>	<b>Item description</b>	<b>Eligible respondents</b>	<b>Final weighted correlation<sup>1</sup></b>
<b>C0330</b>	<b>Number of attacks without weapon - total</b>	<b>2,560</b>	<b>--</b>
C0332	Number of attacks without a weapon reported to police	2,090	0.37 **
C0338	Number of threats of attack without a weapon - total	2,162	0.33 **
C0504	Number of suspensions for attacks/fights	2,146	0.32 **
C0506	Number of other actions for attacks/fights	2,119	0.61 **

\*\* p < 0.0001

<sup>1</sup>Pearson's r used as a measure of correlation.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

As expected, items regarding police reports on the number of attacks, threats of physical violence, and suspensions or other actions taken as a result of physical violence are highly correlated to C0330. For the purposes of this analysis, continuous items have been categorized into quartiles when possible. Equally-sized categories were not always possible, however, since the data responses were so highly skewed towards zero.

Differences in the distributions of respondents and all eligible respondents for items C0330 were tested within associated items using the likelihood-ratio Chi-square test statistic for independence. In this section, all eligible item respondents are defined as all respondents to the correlated item of interest.<sup>3</sup> Table D-16 contains the results of this comparison. They indicate that C0330 respondents and eligible respondents have significantly different distributions for C0332, C0338, and C0506. That is, C0330 item eligible respondents were more likely to report zero attacks without a weapon reported to police, more likely to report zero threats of attack without a weapon, and less likely to report zero other actions for attacks or fights.

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<sup>3</sup> This analysis excludes respondents with imputed values in the table 15 stub variable. For example, when looking at the distribution of C0330 respondents and eligible respondents by item c0332, only respondents with no imputed values for c0332 were included.

**Table D-16. Comparison item respondent and nonrespondent distributions (C0330), SSOCS:2008**

School characteristics	Percent distribution of respondents (n=2,230)	Percent distribution of eligible respondents (n=2,560)	Difference (percent)	Statistics (likelihood ratio)	p value
<b>C0332 (number of attacks/fights without weapon reported to police)</b>					
0 attacks	71.35	74.05	-2.7	67.11	0.0000 *
1 to 4 attacks	16.49	15.01	1.48		
5 or more attacks	12.15	10.94	1.21		
<i>Item Response Sample Size</i>	2,090	1,130			
<b>C0338 (total number of threats of attack without a weapon)</b>					
0 threats	50.27	52.17	-1.9	8.57	0.0001 *
1 to 2 threats	11.46	11.75	-0.29		
3 to 10 threats	24.18	22.93	1.25		
11 or more threats	14.09	13.15	0.94		
<i>Item Response Sample Size</i>	2,162	2,451			
<b>C0504 (number of suspension for attacks/fights)</b>					
0 suspensions	76.74	77.37	-0.63	3.16	0.0511
1 to 5 suspensions	11.72	11.84	-0.12		
6 or more suspensions	11.54	10.79	0.75		
<i>Item Response Sample Size</i>	2,146	2,452			
<b>C0506 (number of other actions for attacks/fights)</b>					
0 other actions	47.93	43.72	4.21	18.39	0.0000 *
1 to 3 actions	14.47	16.96	-2.49		
4 to 10 actions	21.43	22.66	-1.23		
11 or more actions	16.18	16.66	-0.48		
<i>Item Response Sample Size</i>	2,119	2,421			

\* = reject null hypothesis of independence at 0.05 significance level.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

These results are problematic if missing values of C0330 are not imputed to reflect these differences in distributions. The next step of analysis compares the values of the C0330 item respondents with all the values (imputed and actual) for item C0330 across the highly correlated items examined in table D-15. In table D-17, the results indicate that, though the distribution of C0330 respondents and C0330 eligibles across item C0332, C0338, and C0506 may differ, mean values for item C0330 are not significantly different. Though there appears to be nonresponse bias in who answers item C0330, the addition of imputed values for C0330 maintains the same

relationships between item C0330 values and the highly correlated characteristics, leading to the conclusion that the potential for bias in item C0330 is not enough to warrant its exclusion from the data file.

**Table D-17. Comparison of item respondents and nonrespondents mean values and confidence interval limits (C0330), SSOCS:2008**

<b>Student or school characteristics</b>	<b>Percent distribution of respondents (n=2,230)</b>	<b>Percent distribution of Eligible respondents (n=2,560)</b>	<b>Difference (percent)</b>
<b>C0332 (number of attacks without weapon reported to police)</b>			
0 attacks	5.25 (4.07 to 6.42)	5.99 (4.93 to 7.06)	-0.74
1 to 4 attacks	10.55 (8.26 to 12.84)	10.52 (8.27 to 12.78)	0.03
5 or more attacks	27.07 (22.62 to 31.52)	27.11 (22.67 to 31.55)	-0.04
<i>Item Response Sample Size</i>	2,090	1,130	
<b>C0338 (total number of threats of attack without a weapon)</b>			
0 threats	4.00 (2.86 to 5.15)	5.32 (4.19 to 6.46)	-1.32
1 to 2 threats	7.73 (5.69 to 9.77)	7.77 ( 5.93 to 9.61)	-0.04
3 to 10 threats	10.49 (9.39 to 11.59)	10.12 ( 9.10 to 11.15)	0.37
11 or more threats	27.19 (21.35 to 33.03)	26.45( 21.05 to 31.85)	0.74
<i>Item Response Sample Size</i>	2,162	2,451	
<b>C0504 (number of suspension for attacks/fights)</b>			
0 suspensions	6.37 (4.98 to 7.76)	7.45 (6.11 to 8.78)	-1.08
1 to 5 suspensions	10.76 (8.63 to 12.88)	10.12 (8.34 to 11.90)	0.64
6 or more suspensions	24.44 (22.11 to 26.76)	23.29 (21.13 to 25.45)	1.15
<i>Item Response Sample Size</i>	2,146	2,452	
<b>C0506 (number of other actions for attacks/fights)</b>			
0 other actions	3.55 ( 2.99 to 4.11)	3.90 (3.36 to 4.45)	-0.35
1 to 3 actions	3.53 (2.89 to 4.16)	3.58 (3.09 to 4.07)	-0.05
4 to 10 actions	7.15 (6.60 to 7.70)	7.06 (6.95 to 8.25)	0.09
11 or more actions	32.29 (26.27 to 38.31)	31.91 (26.38 to 37.430)	0.38
<i>Item Response Sample Size</i>	2,119	2,421	

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 School Survey on Crime and Safety (SSOCS), 2008.

### Summary

The mean item response rate for SSOCS:2008 was greater than 97 percent. Thirteen out of the 241 survey items examined in this analysis had a weighted item response rate lower than 85 percent and were further examined for potential bias per NCES standards. Among these variables, only six (C0234, C0236, C0238, C0240, C0242, C0330) were sensitive to the potential effects of nonresponse bias. Analyses showed these items to have significant differences in their distributions for some to most of the key school characteristics examined. Based on analyses of median values by the key school characteristics it was determined that only C0330 differed in

response values across the key school characteristics. Further analyses of item C0330 examined the relationship between item C0330 and highly correlated survey items. It was revealed that the relationship between C0330 and these highly correlated survey items was not significantly changed with the addition of imputed values for item C0330. Based on these analyses, it was determined that the increased potential for bias in items C0330 was not enough to warrant the exclusion of this item from the data file.