CHARACTERISTICS OF NONRESPONDENTS TO THE 1990-91 SCHOOLS AND STAFFING SURVEY

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KEY WORDS: Hierarchical response patterns; Design effects; Unit nonresponse

The 1990-91 Schools and Staffing Survey (SASS), conducted by the Bureau of the Census for the National Center for Education Statistics, has nine interrelated components which collected data from public, private, and Indian schools, from public and private school administrators, from public and private school teachers, from public school districts (the teacher demand and shortage questionnaire), and also included a teacher followup survey one year after the main survey. This paper presents an analysis of the patterns of nonresponse (by school districts, schools, principals, and teachers) exhibited in the 1990-91 SASS, utilizing available prior information to characterize the nonresponding schools and districts and, within schools, the nonresponding teachers or administrators, and comparing the characteristics of nonrespondents with those of the respondents.

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1. Overview

In the mid 1980s, the National Center for Education Statistics (NCES) conducted a number of surveys concerning schools and school personnel. In 1985, NCES undertook a critical review and redesign of its elementary and secondary data system, identifying gaps in content and inadequacies in design. As a result of this review, NCES, working with the Rand Corporation, designed a unified set of surveys that facilitates comparison between public and private schools and allows linkages of teacher, school, school district, and administrator data. This integrated set of surveys is called the Schools and Staffing Survey (SASS).

The SASS consists of four separate surveys administered simultaneously to linked samples of respondents. These surveys are the Teacher Demand and Shortage Survey, the School Administrator Survey, the School Survey, and the Teacher Survey. The SASS was designed to collect information on teacher supply and demand, the composition of the administrator and teacher workforce, and the status of teaching and schooling generally. The Teacher Survey was designed to obtain data on education and training, current assignment, job mobility, workplace conditions, and career choices of teachers. The Teacher Followup survey (TFS), conducted a year after the SASS, follows up on information obtained through the Teacher Survey and provides additional information about job mobility within the teaching profession, as well as between teaching and other careers.

In this paper, we address the issue of possible characteristics of nonrespondents in the nine components of SASS. Section 2 describes the SASS surveys in general. Section 3 presents the methodology of statistical tests we will use to test the differences. Section 4 presents the results and Section 5 gives our conclusions.

2. General Survey Description

The 1991 Schools and Staffing Survey consists of a school, a teacher, and for public schools a Local Education Agency or school district survey. The public school sampling frame was based on the 1988-89 school year Common Core of data or CCD. This CCD was matched to the previous SASS public school sampling frame. Non-matches from the previous frame were included with the CCD to make up the public school sampling frame for 1991. Public schools were first stratified by three types of schools: (A) Native American schools, (B) schools in Delaware, Nevada and West Virginia, and (C) all other schools. For the second level of stratification, the type A schools were stratified by Arizona, North Dakota, Oklahoma and all other states, the type B schools were stratified first by state and then by LEA and, the type C schools were stratified by 47 states and the District of Columbia. Within each second level there were three grade level strata: elementary, secondary, and combined schools.

The private schools were selected from a list frame, constructed by matching multiple lists obtained from private school organizations, State Departments of Education, and a private vendor. This frame is thought to include 80-90% of private schools. To increase the coverage of the survey, an area frame was constructed by selecting 120 PSUs, consisting of counties or groups of counties. Within these sample counties, lists of schools were obtained from local sources, such as yellow pages, churches and fire marshals. These lists were unduplicated with the list frame. The remaining schools, not matching to the list frame, make up the area frame. For list frame private schools, the frame was partitioned into an initial set of 216 cells. The first level of stratification was school association membership

(18). Within each association membership, schools were stratified by grade level (elementary, secondary, and combined). In some cases, when the grade level is unknown, it was imputed.

Once schools were selected, districts associated with these schools were in sample as well. Hence the district sample consisted of the set of districts that were associated with the SASS public school sample. This provided the linkage between the district and the school. This portion of the district sample represented the set of districts associated with schools. Sample size for districts with schools was 5,380. Some districts were not associated with schools. Such districts may hire teachers who teach in schools of other districts. Sample size for districts without schools was 135 units.

The selected schools (public and private) were asked to provide teacher lists for their schools. From the lists, 56,051 public and 9,166 private teachers are selected. Ten percent of the in-scope private schools and five percent of the in-scope public schools did not provide teacher lists. Within each selected school, teachers were stratified into one of five teacher types in the following hierarchical order: (A) Asian or Pacific Islander; (B) American Indian or Aleutian or Eskimo; (C) Bilingual; (D) New; and (E) Experienced. Within each teacher stratum, teachers were sorted by primary field of teaching.

3. Response Rates

The greater the nonresponse, the more one has reason to worry about its harmful effects on the survey estimates. The bias often increases with the rate of nonresponse. It is hard to get objective measures of the bias, but its relatively simple to quantify the extent of nonresponse.

A simple measure of the unit response is

$$p_r = \frac{n_r}{n_s}$$

where n_r is the number of respondents and n_s is the sample size. The unit nonresponse is consequently measured by $1 - p_r$. Here p_r measures how well the survey has succeeded in obtaining at least partial response from the elements in the selected sample. Alternative measures are obtained by sample-weighted quantities.

The sample-weighted measure of unit response is

where r and s denote the set of respondents and the sample respectively and Q_k is the probability of

$$pw_r = \frac{\sum_r (\frac{1}{Q_k})}{\sum_s (\frac{1}{Q_k})}$$

selection of the kth unit.

pw_r can be interpreted as an estimated average response probability in the population. Unweighted- and weighted-measures may differ considerably. The basic weight is simply the inverse of the probability of selection, $(1/Q_k)$, as of the time of sampling.

We derived the unweighted response rates by dividing the number of interviews by the number of eligible cases (the number of sample cases minus out-of-scope cases; for example, school closed, no elementary or secondary teachers, teacher retired). The weighted response rates were derived by dividing the sum of the basic weights for the interview cases by the sum of the basic weights for the eligible cases. Since prior information on quantitative variables are not available, our response rates are based only on counts. When quantitative variables are available, the calculation of value-weighted rates may be an attractive alternative (pp562, Sarndel et al.,1992).

Characteristics of nonrespondents are compared with those of respondents, to help answer the question, "What is known about the nonrespondents to SASS?". For each component, we quantify the response rates across a number of dimensions-sampling stratum, state or private school association, school level, and other stratification variables-both weighted and unweighted. The hierarchical response patterns are also studied.

We also conducted significance tests of independence between response and the stratification variables of interest. The usual Pearson Chi-Square test produced in SAS by PROC FREQ may not be appropriate for this analysis due to the complex sample design. WESVAR is used to test for the independence of the two classification variables. The modified chi-square statistics all rely on modifying the Pearson chi-square statistic using an estimated "design effect". The Fellegi method is based on Felligi (1980), while the other three were suggested by Rao and Scott(1981 and 1984). Design effects were obtained based on the estimated variance using 48 pseudo-replicates.

4. Results

Tables A-1 through A-10 present response rates for selected subgroups. Note that this analysis is

conditioned on the sample that was selected in 1991, so no standard errors are used.

As Table A-1 reveals, public schools have a overall higher response rate compared with private schools. These are the national response rates by questionnaire type. Response rates for public schools by primary cluster grouping are given in Table A-2. If the school has at least 25% American Indian students, it is classified in the "High percentage Native American" group. Otherwise, if it is located in Delaware, Nevada, or West Virginia, the school falls into the second group. The remaining cases are combined into the "all other" group.

Response rates for public schools by state are given in Table A-3. There does not seem to be a difference between weighted and unweighted response rates for public schools by state. Maryland has the lowest response rate (81%) for public schools and Indiana has the highest response rate (more than 99%).

Table A-4 shows response rates for public schools by school level. Elementary level is any school with no grade higher than the eighth grade; secondary level is a school with at least some grades higher than the ninth grade, while a combined level is any school with grade ranges below the sixth grade and above the eighth grade. For example, a kindergarten through eighth grade range is an elementary, while a school with fourth grade through twelveth grade is a combined level. There is no significant difference in response rates among the school levels. Table A-5 shows the response rates for public schools by percent minority. This reveals a slight decline in response rates for schools that have higher percentage of minority students. Table A-6 presents response rates for public schools by school enrollment. This also shows a slight decline in response rates for schools that have higher school enrollment.

Table A-7 presents the response rates for private schools by type of frame. The frame type is the source for sampling the private schools; The list frame is developed from an association membership list, such as the National Association of Independent Schools, or the prior response to the Private School Survey; while the area frame is developed from a search of selected areas' schools that do not appear on any list. The area frame was conducted in selected areas to supplement the known undercoverage of the list frames. An area frame supplements the list frame in the Private School Survey as well as in SASS. Area frame cases may be more difficult to followup - as in the case of Amish schools without telephones. The area frame cases have a much lower response rates.

Table A-8 lists the response rates for private schools by list frame association membership. The area frame cases presented in this table are for comparative purposes only. The list frame associations in this table are the ones used in stratifying the file. The response rates for some associations are below publishable standards, and the NCES is taking steps in the next SASS to ameliorate the reluctance of schools in those groups.

Table A-9 presents the response rates for private schools in the association list frame by school level. Combined schools have a lower response rate than either elementary or secondary level schools. Table A-10 presents the response rates for private schools in the area frame by school level. All area frame schools have lower response rates overall than the list frame schools, but area frame schools follow similar response rate patterns by level as the list frame schools. Combined schools have the lowest response rates, and there are more of them proportionately in the area frame than are found in the list frame.

Table A-11(1) presents the hierarchical response rates for the school survey and the district survey. There are 8397 schools that have responded to the school survey with the corresponding districts that have responded to the district survey. There are 487 schools that have responded even though their corresponding districts have not responded. Table A-11(2) shows the percentile distribution of school nonresponse at the district level. Of those districts that have responded 89.53% have 100% school response and of those districts that have not responded 78.68% have 100% school response. This shows that there is no correlation between school nonresponse and district nonresponse. A forthcoming technical report prepared for NCES will also present detailed analysis of response rates for all the surveys.

5. Conclusion
Response rates are generally good for the SASS surveys, but we believe there is room for improvement. We have identified some subgroups for which the response rate is relatively poor, specifically for large city public schools, and for specific affiliations of private schools. Combined schools have a lower response rate than either elementary or secondary level schools. Through cognitive interview research, NCES has found that small combined schools have more difficulty knowing which grades to report data for on

the SASS public or private school questionnaire. The difficulty of this task may persuade some schools not to participate. Dillman (1991) suggests methods for improving mail response rates, such as questionnaire design, use of reminders, and length of the questionnaire. Also, establishment of better contact with the specific school organizations mentioned should help to improve response rates. NCES has taken number of steps to improve the response rates: the questionnaire will be designed more clearly (with the school name and expected grade range clearly marked); NCES has asked all sampled schools with questions about school identifications to call them on an 800 number if confused; Also NCES intend to meet with public representatives about the combined school problem (which should elicit strategies that work with private schools as well).

6. References

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TABLE A-1
TOTAL SURVEY RESPONSE RATES FOR SASS, 1990-91

SECTOR	WEIGHTED RESPONSE RATE	UNWEIGHTED RESPONSE RATE
PUBLIC SCH	95.30	95.10
PRIVATE SCH	83.95	85.10

TABLE A-2
RESPONSE RATES FOR PUBLIC SCHOOLS BY CLUSTER GROUP

	WEIGHTED RESP RATE	UNWEIGHTED RESPONSE RATE
HIGH % NAT AMR	97.46	97.47
DE, NV, OR WV	97.22	96.05
OTHER SCHOOLS	95.24	94.97

TABLE A-4
RESPONSE RATES FOR PUBLIC SCHOOLS BY SCHOOL LEVEL

LEVEL	WEIGHTED RESPONSE RATE	UNWEIGHTED RESPONSE RATE
ELEMENTARY	95.31	95.48
SECONDARY	95.51	95.20
COMBINED	94.12	93.03

TABLE A-5
RESPONSE RATES FOR PUBLIC SCHOOLS BY PERCENT MINORITY

PERCENT MIN	WEIGHTED RESPONSE RATE	UNWEIGHTED RESPONSE RATE
00 TO 05%	97.09	96.63
06 TO 20%	94.58	94.19
21 TO 50%	94.39	93.52
51 OR MORE	92.41	93.05

TABLE A-3
RESPONSE RATES FOR PUBLIC SCHOOLS BY STATE

STATE	WEIGHTED RESPONSE RATE	UNWEIGHTED RESPONSE RATE
ALABAMA	95.91	95.58
ALASKA	91.99	91.08
ARIZONA	94.81	96.50
ARKANSAS	97.74	97.56
CALIFORNIA	94.61	93.08
COLORADO	95.87	96.24
CONNECTICUT	93.10	92.02
DELAWARE	93.31	93.06
D.C.	86.26	86.96
FLORIDA	93.94	93.05
GEORGIA	96.65	96.81
HAWAII	98.67	98.91
IDAHO	98.62	98.11
ILLINOIS	98.71	97.17
INDIANA	99.61	99.47
IOWA	96.47	97.79
KANSAS	97.99	97.52
KENTUCKY	98.06	97.80
LOUISIANA	93.87	93.06
MAINE	94.65	96.53
MARYLAND	80.99	80.68
MASSACHUSETTS	91.13	92.98
MICHIGAN	97.11	94.44
MINNESOTA	97.39	96.50
MISSISSIPPI	97.17	96.05
MISSOURI	98.01	97.60
MONTANA	97.81	98.15
NEBRASKA	98.69	97.55
NEVADA	96.14	95.76
NEW HAMPSHIRE	96.33	93.97
NEW JERSEY	88.31	85.79
NEW MEXICO	96.01	95.14
NEW YORK	87.62	88.04
N. CAROLINA	92.63	94.12
NORTH DAKOTA	98.37	97.47
OHIO	97.00	97.03
OKLAHOMA	96.27	95.97
OREGON	95.27	95.40
PENNSYLVANIA	96.06	94.09
RHODE ISLAND	96.49	96.23
S. CAROLINA	96.55	96.15
SOUTH DAKOTA	98.52	97.89
TENNESSEE	98.06	96.45
TEXAS	97.40	96.88
UTAH	98.40	97.75
VERMONT	98.48	98.10
VIRGINIA	92.21	92.31
WASHINGTON	92.58	93.44
WEST VIRGINIA	98.20	97.59
WISCONSIN	94.57	94.08
WYOMING	97.69	97.62

TABLE A-6
RESPONSE RATES FOR PUBLIC SCHOOLS BY SCHOOL ENROLLMENT

ENROLLMENT	WEIGHTED RESPONSE RATE	UNWEIGHTED RESPONSE RATE
1 TO 299 STUDENTS	96.55	96.42
300 TO 599 STUDENTS	95.31	95.71
> 600 STUDENTS	93.92	93.47

TABLE A-7
RESPONSE RATES FOR PRIVATE SCHOOLS BY TYPE OF FRAME

FRAME	WEIGHTED RESPONSE RATE	UNWEIGHTED RESPONSE RATE
LIST FRAME	86.58	86.77
AREA FRAME	74.03	76.92

TABLE A-8
RESPONSE RATES FOR PRIVATE SCHOOLS BY ASSOCIATION MEMBERSHIP LIST

ASSOCIATION	WEIGHTED RESPONSE RATE	UNWEIGHTED RESPONSE RATE
AREA FRAME	74.03	76.92
MILITARY	90.91	90.91
CATHOLIC	90.92	90.24
FRIENDS	90.63	90.62
EPISCOPAL	89.39	84.95
HEBREW DAY	70.76	73.03
SOLOMAN SCHECHTER	85.11	85.11
OTHER JEWISH	70.36	63.14
LUTH.-MISSOURI SYN.	96.07	95.70
LUTH.-WISCONSI.SYN	97.89	97.87
EVAN. LUTH. CH. AM.	95.51	95.51
OTHER LUTHERAN	94.17	93.41
7TH-DAY ADVENTIST	93.91	94.90
CHRISTIAN SCHOOLS I	93.68	91.00
ASSOC. OF CHRISTIAN SCHOOLS INTL.	59.03	70.00
EXCEPTIONAL CHILD.	86.49	88.00
MONTESSORI	85.46	85.56
NATIONAL ASSOCIAT. INDEPENDENT SCHOOLS	84.60	84.51
ALL ELSE	81.12	82.71

TABLE A-9
RESPONSE RATES FOR PRIVATE SCHOOLS
BY SCHOOL LEVEL ASSOCIATION LIST FRAME

LEVEL	WEIGHTED RESPONSE RATE	UNWEIGHTED RESPONSE RATE
ELEMENTARY	89.94	89.25
SECONDARY	90.29	90.05
COMBINED	78.22	81.43

TABLE A-10
RESPONSE RATES FOR PRIVATE SCHOOLS BY
SCHOOL LEVEL ASSOCIATION AREA FRAME

LEVEL	WEIGHTED RESPONSE RATE	UNWEIGHTED RESPONSE RATE
ELEMENTARY	77.19	78.31
SECONDARY	85.50	86.11
COMBINED	69.16	73.78

TABLE A-11(1)
HIERARCHICAL RESPONSE RATES

School Survey and District Survey

Response at the School level	Response at the district level	
	Respondent	Nonrespondent
Out of Scope	272	28
Respondent	8397	487
Nonrespondent	380	77

TABLE A-11(2)

Percentile distribution of nonresponse

Response at the District level	Percentage		
	no response	some response	100% response
Respondent	4.06	6.41	89.53
Nonrespondent	10.98	10.34	78.68