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U.S. 2001 PIRLS NONRESPONSE BIAS ANALYSIS

Working Paper No. 2003-21

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1. INTRODUCTION

The Progress in International Reading Literacy Study (PIRLS) is a large international comparative study of the reading literacy of young students. The student population for the U.S. 2001 PIRLS (hereafter simply referred to as PIRLS) was the set of all fourth-graders in the United States, corresponding to the grade in which the highest proportion of nine-year-olds are enrolled. The PIRLS school sample consisted of 200 schools (150 public and 50 private) containing a fourth grade, selected with probability proportionate to the school's enrollment of fourth-graders. One classroom was sampled from each selected school.

PIRLS was conducted in April and May 2001. For the original sample, the unweighted response rate at the school level was 62.5 percent, with 125 out of 200 schools responding. Through the use of replacements, the unweighted response rate was improved to 87 percent, with 174 out of 200 schools responding. However, as the response rate from the original sample was below 85 percent, NCES requested that Westat investigate the potential magnitude of nonresponse bias at the school level. The methodology and results of this investigation follow.

2. METHODOLOGY

There are at least two possible ways to analyze nonresponse bias given that replacement schools were used as substitutes for schools from the original sample that did not respond. One method is to base the analysis exclusively on the original sample of 200 schools and to treat all those that were substituted as nonrespondents. A second method is to base the analysis on the final sample of 200 schools (including replacements) and to treat as nonrespondents those schools from whom a final response was not received. The results of the first method are presented in section 3.1 of this report, while the results of the second method are contained in section 3.2.

In order to compare PIRLS respondents and nonrespondents it was necessary to match the sample of schools back to the sample frame to pick up as many characteristics as possible that might provide information about the presence of nonresponse bias. Comparing frame characteristics for respondents and nonrespondents is not always a good measure of nonresponse bias if the characteristics

are unrelated or weakly related to more substantive items in the survey, however this is often the only approach available. Frame characteristics were taken from the 1997–98 Common Core of Data (CCD) for public schools, and from the 1997–98 Private School Survey (PSS) for private schools. For categorical variables, response rates by characteristic were calculated. The hypothesis of independence between the characteristic and response status was tested using a Rao-Scott modified Chi-square statistic. For continuous variables, summary means were calculated. The 95 percent confidence interval for the difference between the mean for respondents and the mean for nonrespondents was tested to see whether or not it included zero. In addition to these tests, logistic regression models were set up to identify whether any of the frame characteristics were significant in predicting response status. All analyses were performed using WesVar and replicate weights to properly account for the complex sample design. The base weights used did not include a nonresponse adjustment factor. Due to the lack of primary sampling unit (PSU) information on the files received from the school sampling contractor, it was necessary to create replicate weights in WesVar assuming a two-stage design (schools, and classrooms within schools). The JK2 method was used, and the RS3 statistic was used for the Chi-square tests.

3. RESULTS

3.1 Original Sample

The following nonresponse bias analysis is based exclusively on the original sample of 200 schools. All schools that were substituted by a replacement were treated as nonrespondents, as were any nonresponding original schools that were not substituted. Standard errors are given throughout in parentheses.

Of initial interest was the relationship between response status and whether the school was public or private. Table 1 shows the relevant response rates. The test of independence gives $RS3 = 0.403$, with a p-value of 0.526. This indicates that there is no significant relationship between response status and public/private at the 5 percent level.

Table 1. Original sample school response rate, by public/private and overall

Category	Response rate	
	Estimate (%)	Standard error (%)
Total	61.20	(6.302)
Public	64.31	(4.973)
Private	53.49	(14.698)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

3.1.1 Categorical Variables

The following characteristics were available for both public and private schools.

- Community type
- Public/religious affiliation
- Census region

Table 2 shows school response rates by community type. The test of independence gives $RS3 = 0.523$, with a p-value of 0.649. This indicates that there is no significant relationship between response status and community type at the 5 percent level.

Table 2. Original sample school response rate, by community type

Category	Response rate	
	Estimate (%)	Standard error (%)
Central city	68.84	(6.518)
Urban fringe or large town	56.86	(7.619)
Rural or small town	61.00	(11.393)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

Table 3 shows school response rates by public/religious affiliation. The test of independence gives $RS3 = 4.823$, with a p-value of 0.072, however this must be interpreted with caution due to the presence of a cell with less than five observations. There is some evidence that Catholic schools were more likely to respond than others, but it is not significant at the 5 percent level.

Table 3. Original sample school response rate, by public/religious affiliation

Category	Response rate	
	Estimate (%)	Standard error (%)
Public	64.31	(4.973)
Private—Catholic	90.09	(6.974)
Private—Other religious	20.54	(14.063)
Private—Non-sectarian	78.88	(39.113)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

Table 4 shows school response rates by census region. The test of independence gives $RS3 = 1.063$, with a p-value of 0.624. This indicates that there is no significant relationship between response status and census region at the 5 percent level.

Table 4. Original sample school response rate, by census region

Category	Response rate	
	Estimate (%)	Standard error (%)
Northeast	58.98	(9.708)
Midwest	73.67	(8.308)
South	58.04	(11.549)
West	59.60	(7.549)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

3.1.2 Continuous Variables

The following characteristics were available for both public and private schools.

- Number of students enrolled in grade 4
- Total number of students
- Percentage Asian or Pacific Islander students
- Percentage Black, non-Hispanic students
- Percentage Hispanic students
- Percentage American Indian or Alaska Native students

- Percentage White, non-Hispanic students
- Ratio of total students to full-time equivalent (FTE) teachers

Table 5 shows the mean number of grade 4 students and the mean total number of students for responding and nonresponding schools.

Table 5. Mean grade 4 enrollment and total students for original sample schools, by response status

Category	Responding		Nonresponding	
	Estimate	Standard error	Estimate	Standard error
Total number of students	415.17	(26.850)	386.32	(65.155)
Students enrolled in grade 4	60.78	(4.754)	58.93	(10.794)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

The difference in the mean grade 4 enrollment is 1.85, with a 95 percent confidence interval of (-22.23, 25.92). The confidence interval includes zero, therefore there is no evidence that the mean grade 4 enrollment of responding and nonresponding schools is significantly different at the 5 percent level.

The difference in the mean total students is 28.86, with a 95 percent confidence interval of (-115.64, 173.35). The confidence interval includes zero, therefore there is no evidence that the mean total enrollment of responding and nonresponding schools is significantly different at the 5 percent level.

Table 6 shows the mean race/ethnicity percentages for responding and nonresponding schools.

The difference in the mean percentage of Asian or Pacific Islander students is -0.35 percent, with a 95 percent confidence interval of (-2.31 percent, 1.60 percent). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean percentage of Asian or Pacific Islander students at the 5 percent level.

The difference in the mean percentage of Black, non-Hispanic students is 0.82 percent, with a 95 percent confidence interval of (-8.98 percent, 10.61 percent). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean percentage of Black, non-Hispanic students at the 5 percent level.

Table 6. Mean race/ethnicity percentages for original sample schools, by response status

Category	Responding		Nonresponding	
	Estimate (%)	Standard error (%)	Estimate (%)	Standard error (%)
Asian or Pacific Islander students	2.68	(0.640)	3.03	(0.759)
Black, Non-Hispanic students	13.60	(3.342)	12.79	(3.497)
Hispanic students	9.72	(1.915)	8.87	(2.063)
American Indian or Alaska Native students	2.89	(2.211)	0.52	(0.175)
White, Non-Hispanic students	71.06	(4.299)	74.74	(5.290)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

The difference in the mean percentage of Hispanic students is 0.85 percent, with a 95 percent confidence interval of (-4.80 percent, 6.50 percent). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean percentage of Hispanic students at the 5 percent level.

The mean percentage of American Indian or Alaska Native students is 2.37 percent, with a 95 percent confidence interval of (-2.02 percent, 6.75 percent). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean percentage of American Indian or Alaska Native students at the 5 percent level.

The mean percentage of White, non-Hispanic students is -3.68 percent, with a 95 percent confidence interval of (-17.38 percent, 10.01 percent). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean percentage of White, non-Hispanic students at the 5 percent level.

Table 7 shows the mean ratio of total students to FTE teachers for responding and nonresponding schools. The difference in means is 2.94, with a 95 percent confidence interval of (-0.19, 6.06). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean ratio of total students to FTE teachers for responding and nonresponding schools, at the 5 percent level.

Table 7. Mean ratio of total students to FTE teachers for original sample schools, by response status

Category	Responding		Nonresponding	
	Estimate	Standard error	Estimate	Standard error
Ratio of total students to FTE teachers	16.15	(0.750)	13.21	(1.346)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

For public schools only, another characteristic was available.

- Percentage of students eligible to participate in Free Lunch Program under the National School Lunch Act

Table 8 shows the mean percentage of students eligible for the Free Lunch Program for responding and nonresponding public schools. The difference in means is -6.66 percent, with a 95 percent confidence interval of (-18.53 percent, 5.21 percent). The confidence interval includes zero, however this must be interpreted with caution because the “free lunch” variable itself is missing for 35 out of the 150 public schools. The result suggests that the mean percentage of students eligible for the Free Lunch Program is not significantly different for responding and nonresponding public schools, at the 5 percent level.

Table 8. Mean percentage of students eligible for Free Lunch Program for original sample schools, by response status: Public schools only

Category	Responding		Nonresponding	
	Estimate (%)	Standard error (%)	Estimate (%)	Standard error (%)
Students eligible for Free Lunch Program	34.10	(4.053)	40.76	(4.673)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

For private schools only, the following characteristics were available.

- Number of FTE teachers
- Percent male students

Table 9 shows the mean number of FTE teachers responding and nonresponding private schools. The difference in means is -3.27, with a 95 percent confidence interval of (-14.31, 7.78). The

confidence interval includes zero, therefore there is no evidence of a significant difference in the mean number of FTE teachers at the 5 percent level.

Table 9. Mean number of FTE teachers for original sample schools, by response status: Private schools only

Category	Responding		Nonresponding	
	Estimate	Standard error	Estimate	Standard error
FTE teachers	13.76	(2.116)	17.02	(5.141)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

Table 10 shows the mean percentage of male students for responding and nonresponding private schools. The difference in means is -8.06 percent, with a 95 percent confidence interval of (-13.71 percent, -2.41 percent). The confidence interval does not include zero, therefore there is evidence that the mean percentage of male students is lower for responding private schools at the 5 percent level of significance.

Table 10. Mean percentage of male students for original sample schools, by response status: Private schools only

Category	Responding		Nonresponding	
	Estimate (%)	Standard error (%)	Estimate (%)	Standard error (%)
Male students	50.42	(1.614)	58.48	(2.277)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

This result indicates a potential source of bias in the PIRLS survey results for private schools, related to gender composition of school. Unfortunately this characteristic was not available for analysis for public schools.

3.1.3 Logistic Regression Model

A logistic regression model was set up treating response status as the binary dependent variable and frame characteristics as the predictor variables. Response was treated as “success” and nonresponse as “failure.”

Public and private schools were modeled together using the following 11 variables.

- Community type
- Public/religious affiliation
- Census region
- Number of students enrolled in grade 4
- Total number of students
- Percentage Asian or Pacific Islander students
- Percentage Black, non-Hispanic students
- Percentage Hispanic students
- Percentage American Indian or Alaska Native students
- Percentage White, non-Hispanic students
- Ratio of total students to FTE teachers

Initial model fitting was performed in SAS in order to make use of the stepwise model selection option. The only predictor variable to make it into the final model was public/religious affiliation. This model was refitted using WesVar to take proper account of the complex sample design and confirmed to be the most parsimonious model. The final estimated model was as follows.

$$\log\left(\frac{P(\text{Response})}{P(\text{Non - response})}\right) = 1.318 - 0.729 * \text{Public} + 0.890 * \text{Catholic} - 2.671 * \text{Other Religious}$$

In the above equation, “Public,” “Catholic,” and “Other Religious” are mutually exclusive indicator variables of the implied school characteristics. The negative “Public” and “Other Religious” parameter estimates indicate that public and other religious schools were less likely to respond to PIRLS. The positive “Catholic” parameter estimate indicates that Catholic schools were more likely to respond to PIRLS. Standard errors and tests of hypotheses for the model parameter estimates are presented in table 11.

Table 11. Final model parameters for original sample schools

Parameter	Estimate	Standard error	Test for H0: Parameter = 0	P-value
Intercept	1.318	1.7674	0.7457	0.4576
Public	-0.729	1.7806	-0.4095	0.6831
Catholic	0.890	1.9936	0.4463	0.6564
Other religious	-2.671	2.0857	-1.2805	0.2033

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

When the model is fit in WesVar using correct standard error estimates, the p-values above indicate that there is no significant difference between the effect of the (omitted) reference category, private–non-sectarian, and any of the other three categories. However, the F-value measuring the overall fit of the model is 5.1684, with a p-value of 0.0023. This indicates that the public/religious affiliation characteristic is a significant predictor of the response status of schools at the 5 percent level of significance. This apparent contradiction is easily explained away by looking at an alternative parameterization of the model, where Catholic is treated as the reference category. Such an analysis shows that there is a significant difference in effect when Catholic is compared to public, or to private–other religious.

3.2 Final Sample

The following nonresponse bias analysis is based on the final sample of 200 schools, including replacements. All schools from whom a final response was not received were treated as nonrespondents. Through the use of replacements, the unweighted response rate was improved to 87 percent, with 174 out of 200 schools responding. Standard errors are given throughout in parentheses.

Of initial interest was the relationship between response status and whether the school was public or private. Table 12 shows the relevant response rates. The test of independence gives $RS3 = 1.865$, with a p-value of 0.172. This indicates that there is no significant relationship between response status and public/private at the 5 percent level.

Table 12. Final sample school response rate, by public/private and overall

Category	Response rate	
	Estimate (%)	Standard error (%)
Total	91.97	(1.883)
Public	90.42	(2.313)
Private	95.64	(2.677)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

3.2.1 Categorical Variables

The following characteristics were available for both public and private schools.

- Community type
- Public/religious affiliation
- Census region

Table 13 shows school response rates by community type. The test of independence gives $RS3 = 3.369$, with a p-value of 0.180. This indicates that there is no significant relationship between response status and community type at the 5 percent level.

Table 13. Final sample school response rate, by community type

Category	Response rate	
	Estimate (%)	Standard error (%)
Central city	87.85	(4.416)
Urban fringe or large town	88.35	(4.043)
Rural or small town	95.40	(2.238)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

Table 14 shows school response rates by public/religious affiliation. The RS3 test statistic cannot be computed because the table contains a cell with zero observations. The ordinary Pearson Chi-square test statistic (that does not take into account the complex sample design) equals 1.716, with a p-value of 0.633. This must also be interpreted with caution due to the presence of a cell with less than

five observations, however it would suggest that there is no significant relationship between response status and public/religious affiliation at the 5 percent level.

Table 14. Final sample school response rate, by public/religious affiliation

Category	Response rate	
	Estimate (%)	Standard error (%)
Public	90.42	(2.313)
Private—Catholic	95.72	(4.096)
Private—Other religious	94.81	(3.581)
Private—Non-sectarian	100.0	(0.0)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

Table 15 shows school response rates by census region. The test of independence gives $RS3 = 2.348$, with a p-value of 0.485. This must be interpreted with caution due to the presence of a cell with less than five observations, however it would suggest that there is no significant relationship between response status and census region at the 5 percent level.

Table 15. Final sample school response rate, by census region

Category	Response rate	
	Estimate (%)	Standard error (%)
Northeast	91.39	(4.079)
Midwest	93.61	(4.401)
South	94.14	(2.316)
West	86.18	(5.176)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

3.2.2 Continuous Variables

The following characteristics were available for both public and private schools.

- Number of students enrolled in grade 4
- Total number of students
- Percentage Asian or Pacific Islander students

- Percentage Black, non-Hispanic students
- Percentage Hispanic students
- Percentage American Indian or Alaska Native students
- Percentage White, non-Hispanic students
- Ratio of total students to FTE teachers

Table 16 shows the mean number of grade 4 students and the mean total number of students for responding and nonresponding schools.

Table 16. Mean grade 4 enrollment and total students for final sample schools, by response status

Category	Responding		Nonresponding	
	Estimate	Standard error	Estimate	Standard error
Total number of students	385.27	(31.822)	605.36	(40.449)
Students enrolled in grade 4	55.19	(5.162)	98.02	(7.916)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

The difference in the mean grade 4 enrollment is -42.83, with a 95 percent confidence interval of (-62.38, -23.28). The confidence interval does not include zero, therefore there is evidence that the mean grade 4 enrollment is lower for responding schools at the 5 percent level of significance.

The difference in the mean total students is -220.09, with a 95 percent confidence interval of (-328.05, -112.13). This confidence interval also excludes zero, therefore there is evidence that the mean total enrollment is lower for responding schools at the 5 percent level of significance.

These results indicate a potential source of bias in the PIRLS survey results, related to size of school.

Table 17 shows the mean race/ethnicity percentages for responding and nonresponding schools.

Table 17. Mean race/ethnicity percentages for final sample schools, by response status

Category	Responding		Nonresponding	
	Estimate (%)	Standard error (%)	Estimate (%)	Standard error (%)
Asian or Pacific Islander students	2.86	(0.501)	4.32	(1.492)
Black, Non-Hispanic students	14.22	(2.336)	13.57	(4.147)
Hispanic students	10.27	(1.779)	12.90	(4.057)
American Indian or Alaska Native students	1.94	(1.468)	1.26	(0.775)
White, Non-Hispanic students	70.67	(3.128)	67.95	(6.439)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

The difference in the mean percentage of Asian or Pacific Islander students is -1.46 percent, with a 95 percent confidence interval of (-4.62 percent, 1.71 percent). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean percentage of Asian or Pacific Islander students at the 5 percent level.

The difference in the mean percentage of Black, non-Hispanic students is 0.65 percent, with a 95 percent confidence interval of (-9.19 percent, 10.50 percent). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean percentage of Black, non-Hispanic students at the 5 percent level.

The difference in the mean percentage of Hispanic students is -2.63 percent, with a 95 percent confidence interval of (-11.58 percent, 6.32 percent). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean percentage of Hispanic students at the 5 percent level.

The difference in the mean percentage of American Indian or Alaska Native students is 0.68 percent, with a 95 percent confidence interval of (-2.41 percent, 3.78 percent). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean percentage of American Indian or Alaska Native students at the 5 percent level.

The difference in the mean percentage of White, non-Hispanic students is 2.72 percent, with a 95 percent confidence interval of (-11.07 percent, 16.51 percent). The confidence interval includes zero,

therefore there is no evidence of a significant difference in the mean percentage of White, non-Hispanic students at the 5 percent level.

Table 18 shows the mean ratio of total students to FTE teachers for responding and nonresponding schools. The difference in means is -2.39, with a 95 percent confidence interval of (-5.47, 0.68). The confidence interval includes zero, therefore there is no evidence of a significant difference in the mean ratio of total students to FTE teachers for responding and nonresponding schools, at the 5 percent level.

Table 18. Mean ratio of total students to FTE teachers for final sample schools, by response status

Category	Responding		Nonresponding	
	Estimate	Standard error	Estimate	Standard error
Ratio of total students to FTE teachers	15.69	(0.674)	18.08	(1.231)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

For public schools only, another characteristic was available.

- Percentage of students eligible to participate in Free Lunch Program under the National School Lunch Act

Table 19 shows the mean percentage of students eligible for the Free Lunch Program for responding and nonresponding public schools. The difference in means is -9.66 percent, with a 95 percent confidence interval of (-19.66 percent, 0.34 percent). The confidence interval only just includes zero, however this must be interpreted with caution because the “free lunch” variable itself is missing for 35 out of the 150 public schools. The result suggests that the mean percentage of students eligible for the Free Lunch Program is not significantly different for responding and nonresponding public schools, at the 5 percent level.

Table 19. Mean percentage of students eligible for Free Lunch Program for final sample schools, by response status: Public schools only

Category	Responding		Nonresponding	
	Estimate (%)	Standard error (%)	Estimate (%)	Standard error (%)
Students eligible for Free Lunch Program	37.97	(3.136)	47.63	(3.741)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

For private schools only, the following characteristics were available.

- Number of FTE teachers
- Percentage of male students

Table 20 shows the mean number of FTE teachers responding and nonresponding private schools. The difference in means is -22.18, with a 95 percent confidence interval of (-45.44, 1.08). The confidence interval only just includes zero. There is some evidence that the mean number of FTE teachers is lower for responding private schools, though it is not significant at the 5 percent level.

Table 20. Mean number of FTE teachers for final sample schools, by response status: Private schools only

Category	Responding		Nonresponding	
	Estimate	Standard error	Estimate	Standard error
FTE teachers	11.96	(2.018)	34.14	(11.547)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

Table 21 shows the mean percentage of male students for responding and nonresponding private schools. The difference in means is 3.23 percent, with a 95 percent confidence interval of (0.16 percent, 6.31 percent). The confidence interval does not include zero, therefore there is evidence that the mean percentage of male students is lower for responding private schools at the 5 percent level of significance.

Table 21. Mean percentage of male students for final sample schools, by response status: Private schools only

Category	Responding		Nonresponding	
	Estimate (%)	Standard error (%)	Estimate (%)	Standard error (%)
Male students	50.42	(1.095)	47.18	(1.206)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

This result indicates a potential source of bias in the PIRLS survey results for private schools, related to gender composition of school. Unfortunately this characteristic was not available for analysis for public schools.

3.2.3 Logistic Regression Model

A logistic regression model was set up treating response status as the binary dependent variable and frame characteristics as the predictor variables. Response was treated as “success” and nonresponse as “failure.”

Public and private schools were modeled together using the following 11 variables.

- Community type
- Public/religious affiliation
- Census region
- Number of students enrolled in grade 4
- Total number of students
- Percentage Asian or Pacific Islander students
- Percentage Black, non-Hispanic students
- Percentage Hispanic students
- Percentage American Indian or Alaska Native students
- Percentage White, non-Hispanic students

- Ratio of total students to FTE teachers

Initial model fitting was performed in SAS in order to make use of the stepwise model selection option. The only predictor variable to make it into the final model was grade 4 enrollment. This model was refitted using WesVar to take proper account of the complex sample design and confirmed to be the most parsimonious model. The final estimated model was as follows.

$$\log\left(\frac{P(\text{Response})}{P(\text{Nonresponse})}\right) = 3.822 - 0.019 * \text{Number of students enrolled in grade 4}$$

The negative “Number of students enrolled in grade 4” estimate indicates that schools with a higher number of students in grade 4 were less likely to respond to PIRLS. Standard errors and tests of hypotheses for the model parameter estimates are presented in table 22.

Table 22. Final model parameters for final sample schools

Parameter	Estimate	Standard error	Test for H0: Parameter = 0	P-value
Intercept	3.822	0.4420	8.6471	< 0.0001
Number of students enrolled in grade 4	-0.019	0.0037	-5.0338	< 0.0001

SOURCE: U.S. Department of Education, National Center for Education Statistics, Progress in International Reading Literacy Study, 2001.

The F-value measuring the overall fit of the model is 25.34, with a p-value < 0.0001. This indicates that the number of students enrolled in grade 4 is a significant predictor of the response status of schools, even at the 1 percent level of significance. This finding is consistent with the statistically significant difference in mean grade 4 enrollment by response status, considered previously.

3.2.4 Size of School and Reading Literacy

Given the findings presented earlier, it is important to question whether the substantive results of the survey differ according to size of school. (Obviously this relationship can only be analyzed for respondents.) If they do not, then there is less cause for concern over nonresponse bias. To this end, reading test scores were regressed against total school enrollment obtained from the PIRLS questionnaire. There was a statistically significant linear relationship, with the school enrollment parameter estimate

having a p-value of 0.0039. A quadratic relationship was also tested, but the higher order term was not significant. The value of the school enrollment parameter estimate in the linear model was -0.043, indicating a negative relationship between reading test scores and school size. Combining the facts that responding schools tended to be smaller in size than nonresponding schools, and that smaller schools seemed to do better in the reading literacy tests, it is possible that the PIRLS results overestimate students' reading abilities.

4. CONCLUSIONS

Westat's investigation into nonresponse bias at the school level for PIRLS has shown that there is no statistically significant relationship between response status and the majority of school characteristics that were available for analysis.

However, for the original sample of 200 schools, whether the school was public, private—Catholic, private—other religious, or private—non-sectarian, was a significant predictor of response status. Catholic schools were the most likely to respond, and private—other religious schools the least likely. Once replacements were used, this association was no longer apparent for the final sample of 200 schools.

The use of replacement schools did however seem to introduce a nonresponse bias that was not present in the original sample of schools. For the final sample, the number of students enrolled in grade 4 at the school was negatively related to response propensity. That is, schools with a higher number of students in grade 4 were less likely to respond. This effect may have been introduced if it was easier to get replacements to respond for smaller schools than it was for larger schools.

It is difficult to assess the amount of any bias that may have been introduced into the survey results as a result of the association just described. However, investigations into the association between reading test scores and school size indicated that smaller schools tended to do statistically significantly better than larger schools, leaving the possibility that school nonresponse has resulted in an upward bias in results.

One way of approximately quantifying this is as follows. After replacements, the nonresponding schools make up 8 percent of the population (table 12). On average they have an enrollment that is 220 students higher than responding schools (table 16). The regression model indicates that each extra student is associated with a decrease of 0.043 in mean achievement score. Together these imply that the score for students from nonresponding schools might be about 9.5 points lower than for students from responding schools, so that the school nonresponse bias might be in the order of 0.8 scale score points. This is before any mitigating effects of nonresponse bias adjustments. Thus even though there is a statistically significant relationship between school size and response status in the final sample, it seems very likely to have had a negligible impact on overall study results.

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Listing of NCES Working Papers by Program Area

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Baccalaureate and Beyond (B&B)		
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2001-15	Baccalaureate and Beyond Longitudinal Study: 2000/01 Follow-Up Field Test Methodology Report	Andrew G. Malizio
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
Beginning Postsecondary Students (BPS) Longitudinal Study		
98-11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96-98) Field Test Report	Aurora D'Amico
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
1999-15	Projected Postsecondary Outcomes of 1992 High School Graduates	Aurora D'Amico
2001-04	Beginning Postsecondary Students Longitudinal Study: 1996-2001 (BPS:1996/2001) Field Test Methodology Report	Paula Knepper
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
Common Core of Data (CCD)		
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97-15	Customer Service Survey: Common Core of Data Coordinators	Lee Hoffman
97-43	Measuring Inflation in Public School Costs	William J. Fowler, Jr.
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
1999-03	Evaluation of the 1996-97 Nonfiscal Common Core of Data Surveys Data Collection, Processing, and Editing Cycle	Beth Young
2000-12	Coverage Evaluation of the 1994-95 Common Core of Data: Public Elementary/Secondary School Universe Survey	Beth Young
2000-13	Non-professional Staff in the Schools and Staffing Survey (SASS) and Common Core of Data (CCD)	Kerry Gruber
2002-02	School Locale Codes 1987 - 2000	Frank Johnson
Data Development		
2000-16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
2000-16b	Lifelong Learning NCES Task Force: Final Report Volume II	Lisa Hudson
Decennial Census School District Project		
95-12	Rural Education Data User's Guide	Samuel Peng
96-04	Census Mapping Project/School District Data Book	Tai Phan
98-07	Decennial Census School District Project Planning Report	Tai Phan

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Early Childhood Longitudinal Study (ECLS)		
96-08	How Accurate are Teacher Judgments of Students' Academic Performance?	Jerry West
96-18	Assessment of Social Competence, Adaptive Behaviors, and Approaches to Learning with Young Children	Jerry West
97-24	Formulating a Design for the ECLS: A Review of Longitudinal Studies	Jerry West
97-36	Measuring the Quality of Program Environments in Head Start and Other Early Childhood Programs: A Review and Recommendations for Future Research	Jerry West
1999-01	A Birth Cohort Study: Conceptual and Design Considerations and Rationale	Jerry West
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2001-03	Measures of Socio-Emotional Development in Middle Childhood	Elvira Hausken
2001-06	Papers from the Early Childhood Longitudinal Studies Program: Presented at the 2001 AERA and SRCD Meetings	Jerry West
2002-05	Early Childhood Longitudinal Study-Kindergarten Class of 1998-99 (ECLS-K), Psychometric Report for Kindergarten Through First Grade	Elvira Hausken
Education Finance Statistics Center (EDFIN)		
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Education Longitudinal Study: 2002 (ELS:2002)		
2003-03	Education Longitudinal Study: 2002 (ELS: 2002) Field Test Report	Jeffrey Owings
High School and Beyond (HS&B)		
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1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
HS Transcript Studies		
1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
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National Assessment of Adult Literacy (NAAL)		
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96-07	Should SASS Measure Instructional Processes and Teacher Effectiveness?	Dan Kasprzyk
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97-23	Further Cognitive Research on the Schools and Staffing Survey (SASS) Teacher Listing Form	Dan Kasprzyk
97-41	Selected Papers on the Schools and Staffing Survey: Papers Presented at the 1997 Meeting of the American Statistical Association	Steve Kaufman
97-42	Improving the Measurement of Staffing Resources at the School Level: The Development of Recommendations for NCES for the Schools and Staffing Survey (SASS)	Mary Rollefson
97-44	Development of a SASS 1993-94 School-Level Student Achievement Subfile: Using State Assessments and State NAEP, Feasibility Study	Michael Ross
98-01	Collection of Public School Expenditure Data: Development of a Questionnaire	Stephen Broughman
98-02	Response Variance in the 1993-94 Schools and Staffing Survey: A Reinterview Report	Steven Kaufman
98-04	Geographic Variations in Public Schools' Costs	William J. Fowler, Jr.
98-05	SASS Documentation: 1993-94 SASS Student Sampling Problems; Solutions for Determining the Numerators for the SASS Private School (3B) Second-Stage Factors	Steven Kaufman
98-08	The Redesign of the Schools and Staffing Survey for 1999-2000: A Position Paper	Dan Kasprzyk
98-12	A Bootstrap Variance Estimator for Systematic PPS Sampling	Steven Kaufman
98-13	Response Variance in the 1994-95 Teacher Follow-up Survey	Steven Kaufman
98-14	Variance Estimation of Imputed Survey Data	Steven Kaufman
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
98-16	A Feasibility Study of Longitudinal Design for Schools and Staffing Survey	Stephen Broughman
1999-02	Tracking Secondary Use of the Schools and Staffing Survey Data: Preliminary Results	Dan Kasprzyk
1999-04	Measuring Teacher Qualifications	Dan Kasprzyk
1999-07	Collection of Resource and Expenditure Data on the Schools and Staffing Survey	Stephen Broughman
1999-08	Measuring Classroom Instructional Processes: Using Survey and Case Study Fieldtest Results to Improve Item Construction	Dan Kasprzyk
1999-10	What Users Say About Schools and Staffing Survey Publications	Dan Kasprzyk

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1999–12	1993–94 Schools and Staffing Survey: Data File User’s Manual, Volume III: Public-Use Codebook	Kerry Gruber
1999–13	1993–94 Schools and Staffing Survey: Data File User’s Manual, Volume IV: Bureau of Indian Affairs (BIA) Restricted-Use Codebook	Kerry Gruber
1999–14	1994–95 Teacher Followup Survey: Data File User’s Manual, Restricted-Use Codebook	Kerry Gruber
1999–17	Secondary Use of the Schools and Staffing Survey Data	Susan Wiley
2000–04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
2000–10	A Research Agenda for the 1999–2000 Schools and Staffing Survey	Dan Kasprzyk
2000–13	Non-professional Staff in the Schools and Staffing Survey (SASS) and Common Core of Data (CCD)	Kerry Gruber
2000–18	Feasibility Report: School-Level Finance Pretest, Public School District Questionnaire	Stephen Broughman
2002–04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
Third International Mathematics and Science Study (TIMSS)		
2001–01	Cross-National Variation in Educational Preparation for Adulthood: From Early Adolescence to Young Adulthood	Elvira Hausken
2001–05	Using TIMSS to Analyze Correlates of Performance Variation in Mathematics	Patrick Gonzales
2001–07	A Comparison of the National Assessment of Educational Progress (NAEP), the Third International Mathematics and Science Study Repeat (TIMSS-R), and the Programme for International Student Assessment (PISA)	Arnold Goldstein
2002–01	Legal and Ethical Issues in the Use of Video in Education Research	Patrick Gonzales

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No.	Title	NCES contact
Achievement (student) - mathematics		
2001–05	Using TIMSS to Analyze Correlates of Performance Variation in Mathematics	Patrick Gonzales
Adult education		
96–14	The 1995 National Household Education Survey: Reinterview Results for the Adult Education Component	Steven Kaufman
96–20	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler
96–22	1995 National Household Education Survey (NHES:95) Questionnaires: Screener, Early Childhood Program Participation, and Adult Education	Kathryn Chandler
98–03	Adult Education in the 1990s: A Report on the 1991 National Household Education Survey	Peter Stowe
98–10	Adult Education Participation Decisions and Barriers: Review of Conceptual Frameworks and Empirical Studies	Peter Stowe
1999–11	Data Sources on Lifelong Learning Available from the National Center for Education Statistics	Lisa Hudson
2000–16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
2000–16b	Lifelong Learning NCES Task Force: Final Report Volume II	Lisa Hudson
Adult literacy—see Literacy of adults		
American Indian – education		
1999–13	1993–94 Schools and Staffing Survey: Data File User’s Manual, Volume IV: Bureau of Indian Affairs (BIA) Restricted-Use Codebook	Kerry Gruber
Assessment/achievement		
95–12	Rural Education Data User’s Guide	Samuel Peng
95–13	Assessing Students with Disabilities and Limited English Proficiency	James Houser
97–29	Can State Assessment Data be Used to Reduce State NAEP Sample Sizes?	Larry Ogle
97–30	ACT’s NAEP Redesign Project: Assessment Design is the Key to Useful and Stable Assessment Results	Larry Ogle
97–31	NAEP Reconfigured: An Integrated Redesign of the National Assessment of Educational Progress	Larry Ogle
97–32	Innovative Solutions to Intractable Large Scale Assessment (Problem 2: Background Questions)	Larry Ogle
97–37	Optimal Rating Procedures and Methodology for NAEP Open-ended Items	Larry Ogle
97–44	Development of a SASS 1993–94 School-Level Student Achievement Subfile: Using State Assessments and State NAEP, Feasibility Study	Michael Ross
98–09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
2001–07	A Comparison of the National Assessment of Educational Progress (NAEP), the Third International Mathematics and Science Study Repeat (TIMSS-R), and the Programme for International Student Assessment (PISA)	Arnold Goldstein
2001–11	Impact of Selected Background Variables on Students’ NAEP Math Performance	Arnold Goldstein
2001–13	The Effects of Accommodations on the Assessment of LEP Students in NAEP	Arnold Goldstein

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2001-19	The Measurement of Home Background Indicators: Cognitive Laboratory Investigations of the Responses of Fourth and Eighth Graders to Questionnaire Items and Parental Assessment of the Invasiveness of These Items	Arnold Goldstein
2002-05	Early Childhood Longitudinal Study-Kindergarten Class of 1998-99 (ECLS-K), Psychometric Report for Kindergarten Through First Grade	Elvira Hausken
2002-06	The Measurement of Instructional Background Indicators: Cognitive Laboratory Investigations of the Responses of Fourth and Eighth Grade Students and Teachers to Questionnaire Items	Arnold Goldstein
2003-19	NAEP Quality Assurance Checks of the 2002 Reading Assessment Results of Delaware	Janis Brown
Beginning students in postsecondary education		
98-11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96-98) Field Test Report	Aurora D'Amico
2001-04	Beginning Postsecondary Students Longitudinal Study: 1996-2001 (BPS:1996/2001) Field Test Methodology Report	Paula Knepper
Civic participation		
97-25	1996 National Household Education Survey (NHES:96) Questionnaires: Screener/Household and Library, Parent and Family Involvement in Education and Civic Involvement, Youth Civic Involvement, and Adult Civic Involvement	Kathryn Chandler
Climate of schools		
95-14	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
Cost of education indices		
94-05	Cost-of-Education Differentials Across the States	William J. Fowler, Jr.
Course-taking		
95-12	Rural Education Data User's Guide	Samuel Peng
98-09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
2003-01	Mathematics, Foreign Language, and Science Coursetaking and the NELS:88 Transcript Data	Jeffrey Owings
2003-02	English Coursetaking and the NELS:88 Transcript Data	Jeffrey Owings
Crime		
97-09	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman
Curriculum		
95-11	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
98-09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
Customer service		

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1999–10	What Users Say About Schools and Staffing Survey Publications	Dan Kasprzyk
2000–02	Coordinating NCES Surveys: Options, Issues, Challenges, and Next Steps	Valena Plisko
2000–04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
Data quality		
97–13	Improving Data Quality in NCES: Database-to-Report Process	Susan Ahmed
2001–11	Impact of Selected Background Variables on Students' NAEP Math Performance	Arnold Goldstein
2001–13	The Effects of Accommodations on the Assessment of LEP Students in NAEP	Arnold Goldstein
2001–19	The Measurement of Home Background Indicators: Cognitive Laboratory Investigations of the Responses of Fourth and Eighth Graders to Questionnaire Items and Parental Assessment of the Invasiveness of These Items	Arnold Goldstein
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2003-19	NAEP Quality Assurance Checks of the 2002 Reading Assessment Results of Delaware	Janis Brown
Data warehouse		
2000–04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
Design effects		
2000–03	Strengths and Limitations of Using SUDAAN, Stata, and WesVarPC for Computing Variances from NCES Data Sets	Ralph Lee
Dropout rates, high school		
95–07	National Education Longitudinal Study of 1988: Conducting Trend Analyses HS&B and NELS:88 Sophomore Cohort Dropouts	Jeffrey Owings
Early childhood education		
96–20	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler
96–22	1995 National Household Education Survey (NHES:95) Questionnaires: Screener, Early Childhood Program Participation, and Adult Education	Kathryn Chandler
97–24	Formulating a Design for the ECLS: A Review of Longitudinal Studies	Jerry West
97–36	Measuring the Quality of Program Environments in Head Start and Other Early Childhood Programs: A Review and Recommendations for Future Research	Jerry West
1999–01	A Birth Cohort Study: Conceptual and Design Considerations and Rationale	Jerry West
2001–02	Measuring Father Involvement in Young Children's Lives: Recommendations for a Fatherhood Module for the ECLS-B	Jerry West
2001–03	Measures of Socio-Emotional Development in Middle School	Elvira Hausken
2001–06	Papers from the Early Childhood Longitudinal Studies Program: Presented at the 2001 AERA and SRCD Meetings	Jerry West
2002-05	Early Childhood Longitudinal Study-Kindergarten Class of 1998–99 (ECLS-K), Psychometric Report for Kindergarten Through First Grade	Elvira Hausken
Educational attainment		
98–11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico

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2001-15	Baccalaureate and Beyond Longitudinal Study: 2000/01 Follow-Up Field Test Methodology Report	Andrew G. Malizio
Educational research		
2000-02	Coordinating NCES Surveys: Options, Issues, Challenges, and Next Steps	Valena Plisko
2002-01	Legal and Ethical Issues in the Use of Video in Education Research	Patrick Gonzales
Eighth-graders		
2001-05	Using TIMSS to Analyze Correlates of Performance Variation in Mathematics	Patrick Gonzales
Employment		
96-03	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings
98-11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96-98) Field Test Report	Aurora D'Amico
2000-16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
2000-16b	Lifelong Learning NCES Task Force: Final Report Volume II	Lisa Hudson
2001-01	Cross-National Variation in Educational Preparation for Adulthood: From Early Adolescence to Young Adulthood	Elvira Hausken
Employment – after college		
2001-15	Baccalaureate and Beyond Longitudinal Study: 2000/01 Follow-Up Field Test Methodology Report	Andrew G. Malizio
Engineering		
2000-11	Financial Aid Profile of Graduate Students in Science and Engineering	Aurora D'Amico
Enrollment – after college		
2001-15	Baccalaureate and Beyond Longitudinal Study: 2000/01 Follow-Up Field Test Methodology Report	Andrew G. Malizio
Faculty – higher education		
97-26	Strategies for Improving Accuracy of Postsecondary Faculty Lists	Linda Zimbler
2000-01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler
2002-08	A Profile of Part-time Faculty: Fall 1998	Linda Zimbler
Fathers – role in education		
2001-02	Measuring Father Involvement in Young Children's Lives: Recommendations for a Fatherhood Module for the ECLS-B	Jerry West
Finance – elementary and secondary schools		
94-05	Cost-of-Education Differentials Across the States	William J. Fowler, Jr.
96-19	Assessment and Analysis of School-Level Expenditures	William J. Fowler, Jr.
98-01	Collection of Public School Expenditure Data: Development of a Questionnaire	Stephen Broughman
1999-07	Collection of Resource and Expenditure Data on the Schools and Staffing Survey	Stephen Broughman
1999-16	Measuring Resources in Education: From Accounting to the Resource Cost Model Approach	William J. Fowler, Jr.
2000-18	Feasibility Report: School-Level Finance Pretest, Public School District Questionnaire	Stephen Broughman
Finance – postsecondary		
97-27	Pilot Test of IPEDS Finance Survey	Peter Stowe

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2000-14	IPEDS Finance Data Comparisons Under the 1997 Financial Accounting Standards for Private, Not-for-Profit Institutes: A Concept Paper	Peter Stowe
Finance – private schools		
95-17	Estimates of Expenditures for Private K-12 Schools	Stephen Broughman
96-16	Strategies for Collecting Finance Data from Private Schools	Stephen Broughman
97-07	The Determinants of Per-Pupil Expenditures in Private Elementary and Secondary Schools: An Exploratory Analysis	Stephen Broughman
97-22	Collection of Private School Finance Data: Development of a Questionnaire	Stephen Broughman
1999-07	Collection of Resource and Expenditure Data on the Schools and Staffing Survey	Stephen Broughman
2000-15	Feasibility Report: School-Level Finance Pretest, Private School Questionnaire	Stephen Broughman
Geography		
98-04	Geographic Variations in Public Schools' Costs	William J. Fowler, Jr.
Graduate students		
2000-11	Financial Aid Profile of Graduate Students in Science and Engineering	Aurora D'Amico
Graduates of postsecondary education		
2001-15	Baccalaureate and Beyond Longitudinal Study: 2000/01 Follow-Up Field Test Methodology Report	Andrew G. Malizio
Imputation		
2000-04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meeting	Dan Kasprzyk
2001-10	Comparison of Proc Impute and Schafer's Multiple Imputation Software	Sam Peng
2001-16	Imputation of Test Scores in the National Education Longitudinal Study of 1988	Ralph Lee
2001-17	A Study of Imputation Algorithms	Ralph Lee
2001-18	A Study of Variance Estimation Methods	Ralph Lee
2003-20	Imputation Methodology for the National Postsecondary Student Aid Study: 2004	James Griffith
Inflation		
97-43	Measuring Inflation in Public School Costs	William J. Fowler, Jr.
Institution data		
2000-01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler
Instructional resources and practices		
95-11	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
1999-08	Measuring Classroom Instructional Processes: Using Survey and Case Study Field Test Results to Improve Item Construction	Dan Kasprzyk
International comparisons		
97-11	International Comparisons of Inservice Professional Development	Dan Kasprzyk
97-16	International Education Expenditure Comparability Study: Final Report, Volume I	Shelley Burns

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97-17	International Education Expenditure Comparability Study: Final Report, Volume II, Quantitative Analysis of Expenditure Comparability	Shelley Burns
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2001-07	A Comparison of the National Assessment of Educational Progress (NAEP), the Third International Mathematics and Science Study Repeat (TIMSS-R), and the Programme for International Student Assessment (PISA)	Arnold Goldstein
International comparisons – math and science achievement		
2001-05	Using TIMSS to Analyze Correlates of Performance Variation in Mathematics	Patrick Gonzales
Libraries		
94-07	Data Comparability and Public Policy: New Interest in Public Library Data Papers Presented at Meetings of the American Statistical Association	Carrol Kindel
97-25	1996 National Household Education Survey (NHES:96) Questionnaires: Screener/Household and Library, Parent and Family Involvement in Education and Civic Involvement, Youth Civic Involvement, and Adult Civic Involvement	Kathryn Chandler
Limited English Proficiency		
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2001-11	Impact of Selected Background Variables on Students' NAEP Math Performance	Arnold Goldstein
2001-13	The Effects of Accommodations on the Assessment of LEP Students in NAEP	Arnold Goldstein
Literacy of adults		
98-17	Developing the National Assessment of Adult Literacy: Recommendations from Stakeholders	Sheida White
1999-09a	1992 National Adult Literacy Survey: An Overview	Alex Sedlacek
1999-09b	1992 National Adult Literacy Survey: Sample Design	Alex Sedlacek
1999-09c	1992 National Adult Literacy Survey: Weighting and Population Estimates	Alex Sedlacek
1999-09d	1992 National Adult Literacy Survey: Development of the Survey Instruments	Alex Sedlacek
1999-09e	1992 National Adult Literacy Survey: Scaling and Proficiency Estimates	Alex Sedlacek
1999-09f	1992 National Adult Literacy Survey: Interpreting the Adult Literacy Scales and Literacy Levels	Alex Sedlacek
1999-09g	1992 National Adult Literacy Survey: Literacy Levels and the Response Probability Convention	Alex Sedlacek
1999-11	Data Sources on Lifelong Learning Available from the National Center for Education Statistics	Lisa Hudson
2000-05	Secondary Statistical Modeling With the National Assessment of Adult Literacy: Implications for the Design of the Background Questionnaire	Sheida White
2000-06	Using Telephone and Mail Surveys as a Supplement or Alternative to Door-to-Door Surveys in the Assessment of Adult Literacy	Sheida White
2000-07	“How Much Literacy is Enough?” Issues in Defining and Reporting Performance Standards for the National Assessment of Adult Literacy	Sheida White
2000-08	Evaluation of the 1992 NALS Background Survey Questionnaire: An Analysis of Uses with Recommendations for Revisions	Sheida White
2000-09	Demographic Changes and Literacy Development in a Decade	Sheida White
2001-08	Assessing the Lexile Framework: Results of a Panel Meeting	Sheida White
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97-33	Adult Literacy: An International Perspective	Marilyn Binkley

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1999–08	Measuring Classroom Instructional Processes: Using Survey and Case Study Field Test Results to Improve Item Construction	Dan Kasprzyk
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2001–07	A Comparison of the National Assessment of Educational Progress (NAEP), the Third International Mathematics and Science Study Repeat (TIMSS-R), and the Programme for International Student Assessment (PISA)	Arnold Goldstein
2001–11	Impact of Selected Background Variables on Students' NAEP Math Performance	Arnold Goldstein
2002–06	The Measurement of Instructional Background Indicators: Cognitive Laboratory Investigations of the Responses of Fourth and Eighth Grade Students and Teachers to Questionnaire Items	
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97–25	1996 National Household Education Survey (NHES:96) Questionnaires: Screener/Household and Library, Parent and Family Involvement in Education and Civic Involvement, Youth Civic Involvement, and Adult Civic Involvement	Kathryn Chandler
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Postsecondary education		
1999–11	Data Sources on Lifelong Learning Available from the National Center for Education Statistics	Lisa Hudson
2000–16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
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2003–20	Imputation Methodology for the National Postsecondary Student Aid Study: 2004	James Griffith
Postsecondary education – persistence and attainment		
98–11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico
1999–15	Projected Postsecondary Outcomes of 1992 High School Graduates	Aurora D'Amico
Postsecondary education – staff		
97–26	Strategies for Improving Accuracy of Postsecondary Faculty Lists	Linda Zimpler
2000–01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimpler

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2002–08	A Profile of Part-time Faculty: Fall 1998	Linda Zimbler
Principals		
2000–10	A Research Agenda for the 1999–2000 Schools and Staffing Survey	Dan Kasprzyk
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96–16	Strategies for Collecting Finance Data from Private Schools	Stephen Broughman
97–07	The Determinants of Per-Pupil Expenditures in Private Elementary and Secondary Schools: An Exploratory Analysis	Stephen Broughman
97–22	Collection of Private School Finance Data: Development of a Questionnaire	Stephen Broughman
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Projections of education statistics		
1999–15	Projected Postsecondary Outcomes of 1992 High School Graduates	Aurora D'Amico
Public school finance		
1999–16	Measuring Resources in Education: From Accounting to the Resource Cost Model Approach	William J. Fowler, Jr.
2000–18	Feasibility Report: School-Level Finance Pretest, Public School District Questionnaire	Stephen Broughman
Public schools		
97–43	Measuring Inflation in Public School Costs	William J. Fowler, Jr.
98–01	Collection of Public School Expenditure Data: Development of a Questionnaire	Stephen Broughman
98–04	Geographic Variations in Public Schools' Costs	William J. Fowler, Jr.
1999–02	Tracking Secondary Use of the Schools and Staffing Survey Data: Preliminary Results	Dan Kasprzyk
2000–12	Coverage Evaluation of the 1994–95 Public Elementary/Secondary School Universe Survey	Beth Young
2000–13	Non-professional Staff in the Schools and Staffing Survey (SASS) and Common Core of Data (CCD)	Kerry Gruber
2002–02	Locale Codes 1987 - 2000	Frank Johnson
Public schools – secondary		
98–09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
Reform, educational		
96–03	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings
Response rates		
98–02	Response Variance in the 1993–94 Schools and Staffing Survey: A Reinterview Report	Steven Kaufman
School districts		
2000–10	A Research Agenda for the 1999–2000 Schools and Staffing Survey	Dan Kasprzyk
School districts, public		
98–07	Decennial Census School District Project Planning Report	Tai Phan

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1999-03	Evaluation of the 1996-97 Nonfiscal Common Core of Data Surveys Data Collection, Processing, and Editing Cycle	Beth Young
School districts, public – demographics of		
96-04	Census Mapping Project/School District Data Book	Tai Phan
Schools		
97-42	Improving the Measurement of Staffing Resources at the School Level: The Development of Recommendations for NCES for the Schools and Staffing Survey (SASS)	Mary Rollefson
98-08	The Redesign of the Schools and Staffing Survey for 1999-2000: A Position Paper	Dan Kasprzyk
1999-03	Evaluation of the 1996-97 Nonfiscal Common Core of Data Surveys Data Collection, Processing, and Editing Cycle	Beth Young
2000-10	A Research Agenda for the 1999-2000 Schools and Staffing Survey	Dan Kasprzyk
2002-02	Locale Codes 1987 – 2000	Frank Johnson
Schools – safety and discipline		
97-09	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman
Science		
2000-11	Financial Aid Profile of Graduate Students in Science and Engineering	Aurora D’Amico
2001-07	A Comparison of the National Assessment of Educational Progress (NAEP), the Third International Mathematics and Science Study Repeat (TIMSS-R), and the Programme for International Student Assessment (PISA)	Arnold Goldstein
Software evaluation		
2000-03	Strengths and Limitations of Using SUDAAN, Stata, and WesVarPC for Computing Variances from NCES Data Sets	Ralph Lee
Staff		
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98-08	The Redesign of the Schools and Staffing Survey for 1999-2000: A Position Paper	Dan Kasprzyk
Staff – higher education institutions		
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2002-08	A Profile of Part-time Faculty: Fall 1998	Linda Zimbler
Staff – nonprofessional		
2000-13	Non-professional Staff in the Schools and Staffing Survey (SASS) and Common Core of Data (CCD)	Kerry Gruber
State		
1999-03	Evaluation of the 1996-97 Nonfiscal Common Core of Data Surveys Data Collection, Processing, and Editing Cycle	Beth Young
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Statistical methodology		
97–21	Statistics for Policymakers or Everything You Wanted to Know About Statistics But Thought You Could Never Understand	Susan Ahmed
2003–20	Imputation Methodology for the National Postsecondary Student Aid Study: 2004	James Griffith
Statistical standards and methodology		
2001–05	Using TIMSS to Analyze Correlates of Performance Variation in Mathematics	Patrick Gonzales
2002–04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
Students with disabilities		
95–13	Assessing Students with Disabilities and Limited English Proficiency	James Houser
2001–13	The Effects of Accommodations on the Assessment of LEP Students in NAEP	Arnold Goldstein
Survey methodology		
96–17	National Postsecondary Student Aid Study: 1996 Field Test Methodology Report	Andrew G. Malizio
97–15	Customer Service Survey: Common Core of Data Coordinators	Lee Hoffman
97–35	Design, Data Collection, Interview Administration Time, and Data Editing in the 1996 National Household Education Survey	Kathryn Chandler
98–06	National Education Longitudinal Study of 1988 (NELS:88) Base Year through Second Follow-Up: Final Methodology Report	Ralph Lee
98–11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico
98–16	A Feasibility Study of Longitudinal Design for Schools and Staffing Survey	Stephen Broughman
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2002–01	Legal and Ethical Issues in the Use of Video in Education Research	Patrick Gonzales
2002–02	Locale Codes 1987 - 2000	Frank Johnson
2002–03	National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000), CATI Nonresponse Bias Analysis Report.	Andrew Malizio

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2003-03	Education Longitudinal Study: 2002 (ELS: 2002) Field Test Report	Jeffrey Owings
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Teachers – instructional practices of		
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2002-06	The Measurement of Instructional Background Indicators: Cognitive Laboratory Investigations of the Responses of Fourth and Eighth Grade Students and Teachers to Questionnaire Items	Arnold Goldstein
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2000-16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
2000-16b	Lifelong Learning NCES Task Force: Final Report Volume II	Lisa Hudson
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2003-20	Imputation Methodology for the National Postsecondary Student Aid Study: 2004	James Griffith
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97-09	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman

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95-12	Rural Education Data User's Guide	Samuel Peng
1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson