
NATIONAL CENTER FOR EDUCATION STATISTICS

Working Paper Series

The Working Paper Series was initiated to promote the sharing of the valuable work experience and knowledge reflected in these preliminary reports. These reports are viewed as works in progress, and have not undergone a rigorous review for consistency with NCES Statistical Standards prior to inclusion in the Working Paper Series.

This page intentionally left blank.

NATIONAL CENTER FOR EDUCATION STATISTICS

Working Paper Series

**NAEP VALIDITY STUDIES:
THE EFFECTS OF FINITE SAMPLING
ON STATE ASSESSMENT SAMPLE
REQUIREMENTS**

Working Paper No. 2003-17

April 2003

Contact: Patricia Dabbs
Field Operations and Publication Management
Patricia.Dabbs@ed.gov

**U. S. Department of Education
Institute of Education Sciences**

U.S. Department of Education

Rod Paige
Secretary

Institute of Education Sciences

Grover J. Whitehurst
Director

National Center for Education Statistics

Val Plisko
Associate Commissioner

The National Center for Education Statistics (NCES) is the primary federal entity for collecting, analyzing, and reporting data related to education in the United States and other nations. It fulfills a congressional mandate to collect, collate, analyze, and report full and complete statistics on the condition of education in the United States; conduct and publish reports and specialized analyses of the meaning and significance of such statistics; assist state and local education agencies in improving their statistical systems; and review and report on education activities in foreign countries.

NCES activities are designed to address high priority education data needs; provide consistent, reliable, complete, and accurate indicators of education status and trends; and report timely, useful, and high quality data to the U.S. Department of Education, the Congress, the states, other education policymakers, practitioners, data users, and the general public.

We strive to make our products available in a variety of formats and in language that is appropriate to a variety of audiences. You, as our customer, are the best judge of our success in communicating information effectively. If you have any comments or suggestions about this or any other NCES product or report, we would like to hear from you. Please direct your comments to:

National Center for Education Statistics
Institute of Education Sciences
U.S. Department of Education
1990 K Street NW
Washington, DC 20006-5651

March 2003

The NCES World Wide Web Home Page address is <http://nces.ed.gov>
The NCES World Wide Web Electronic Catalog is: <http://nces.ed.gov/pubsearch>

Suggested Citation

U.S. Department of Education, National Center for Education Statistics. *NAEP Validity Studies: The Effects of Finite Sampling on State Assessment Sample Requirements*. NCES 2003-17, by James R. Chromy.
Project Officer: Patricia Dabbs. Washington, DC: 2003

For ordering information on this report, write:

U.S. Department of Education
ED Pubs
P.O. Box 1398
Jessup, MD 20794-1398

Or call toll free 1-877-4ED-Pubs

Content Contact:

Patricia Dabbs
(202) 502-7332
Patricia.Dabbs@ed.gov

Foreword

In addition to official NCES publications, NCES staff and individuals commissioned by NCES produce preliminary research reports that include analyses of survey results, and presentations of technical, methodological, and statistical evaluation issues.

The *Working Paper Series* was initiated to promote the sharing of the valuable work experience and knowledge reflected in these preliminary reports. These reports are viewed as works in progress, and have not undergone a rigorous review for consistency with NCES Statistical Standards prior to inclusion in the Working Paper Series.

Copies of Working Papers can be downloaded as pdf files from the NCES Electronic Catalog (<http://nces.ed.gov/pubsearch/>), or contact Sheilah Jupiter at (202) 502-7363, e-mail: sheilah.jupiter@ed.gov, or mail: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 1990 K Street NW, Room 9048, Washington, DC 20006.

Marilyn M. Seastrom
Chief Mathematical Statistician
Statistical Standards Program

Ralph Lee
Mathematical Statistician
Statistical Standards Program

This page intentionally left blank.

The Effects of Finite Sampling Corrections on State Assessment Sample Requirements

James R. Chromy
Research Triangle Institute

Commissioned by the NAEP Validity Studies (NVS) Panel
August 1998

George W. Bohrnstedt, Panel Chair
Frances B. Stancavage, Project Director

The NAEP Validity Studies Panel was formed by the American Institutes for Research under contract with the National Center for Education Statistics. Points of view or opinions expressed in this paper do not necessarily represent the official positions of the U.S. Department of Education or the American Institutes for Research.

The NAEP Validity Studies (NVS) Panel was formed in 1995 to provide a technical review of NAEP plans and products and to identify technical concerns and promising techniques worthy of further study and research. The members of the panel have been charged with writing focused studies and issue papers on the most salient of the identified issues.

Panel Members:

Albert E. Beaton
Boston College

John A. Dossey
Illinois State University

Robert Linn
University of Colorado

R. Darrell Bock
University of Chicago

Richard P. Durán
University of California

Ina V. S. Mullis
Boston College

George W. Bohrnstedt, Chair
American Institutes for Research

Larry Hedges
University of Chicago

P. David Pearson
Michigan State University

Audrey Champagne
University at Albany, SUNY

Gerunda Hughes
Howard University

Lorrie Shepard
University of Colorado

James R. Chromy
Research Triangle Institute

Richard Jaeger
*University of North
Carolina*

Zollie Stevenson, Jr.
*Baltimore City Public
Schools*

Project Director:

Frances B. Stancavage
American Institutes for Research

Project Officer:

Patricia Dabbs
National Center for Education Statistics

For Information:

NAEP Validty Studies (NVS)
American Institutes for Research
1791 Arastradero Road
PO Box 1113
Palo Alto, CA 94302
Phone: 650/ 493-3550
Fax: 650/ 858-0958

Contents

Problem Statement	1
<i>Current Practices</i>	1
<i>Theoretical Basis for Using or Ignoring the Finite Population Correction Factor</i>	2
<i>Approach</i>	2
Modeling Assumptions	3
<i>The Ideal Population Structure</i>	3
<i>Variance Component Distributions</i>	3
<i>Finite Population Variance Models</i>	5
<i>Other Anomalous Population Structures</i>	8
<i>Sample Design Options</i>	9
The Few Schools Problem	10
The Many Small Schools Problem	12
Design Effects and Subgroup Estimates	14
Conclusions and Recommendations	16
References	18

This page intentionally left blank.

List of Tables

1. Variance Component Distributions	5
2. 1993 School Distributions for Selected States and Grades.	8
3. Assumed Population Structures.	9
4. Sample Design Options and Effective Sample Sizes for Population 2	11
5. Sample Design Options and Effective Sample Sizes for Population 3	11
6. Sample Design Options and Effective Sample Sizes for Population 4	12
7. Sample Design Options and Effective Sample Sizes for Population 5	13
8. Sample Design Options and Effective Sample Sizes for Population 6	13
9. Design Effects Assuming Variance Component Distribution A.	14
10. Design Effects for Selected Ethnic Subgroups Assuming Variance Component Distribution A.	15

This page intentionally left blank.

Problem Statement

Current Practices

States participating in the National Assessment of Educational Progress State Assessment program (state NAEP) are required to sample at least 2,500 students selected from at least 100 schools per subject assessed. In this ideal situation, 25 students are assessed for a subject in each school selected for that subject. If more than one subject is being assessed for the given state and grade, say k subjects (with k usually 2), then as many as $25k$ students may be assessed at a single school for the target grade if the grade enrollment is sufficiently large.

Two problems have arisen in implementing the required design: (1) some states have too few schools—sometimes fewer than 100 within a target grade—and (2) some states have small schools, thereby requiring many more than 100 schools to obtain a sample of 2,500 students per subject. Specific policies have been developed to exempt states from the stringent sample design requirement above for each case (*e.g.*, Forsyth *et al.* 1996, Freund and Carlson 1997, Rust 1997).

The “partial sample option” addresses the first problem and allows states to negotiate a smaller sample, but not less than 1,250 students per subject assessed. The plan generally requires at least one session per subject per eligible and cooperating school and may require two, three, or four sessions per subject per grade in some schools. Per policy implemented in 1994, there must be 100 schools in the sample or the total number of schools eligible if less than 100.

A “sparse state sample option” has been proposed to deal with the second problem for the 1998 state NAEP. If the required number of schools exceeds 120 when applying the required design, a sampling plan may be negotiated that meets the following: (1) at least 115 schools per grade, (2) at least 80 schools per subject within each grade, and (3) no school selected with less than half the probability required in the initial requirements.

Both options yield a minimum sample size of 1,250 students per subject per grade and in practice would yield sample sizes closer to 2,500.

Theoretical Basis for Using or Ignoring the Finite Population Correction Factor

The sample size requirements for states participating in the state assessment program have been developed to allow adequate precision for estimates of various reporting domains commonly used in state assessment reports. Domains include the total population and also smaller groups defined by gender, education of parents, race or ethnicity, and other factors.

Requiring adequately high precision is equivalent to requiring that the variance of estimates be bounded above by some maximum value. Often relative standard error is used as a standard, but this can be converted to a variance requirement for each specific estimate.

In discussing simple random sampling, Cochran (1973, p.25) suggests that in practice, the finite population correction factor can be ignored (i.e., treated as a multiplicative factor of one) if the sampling fraction does not exceed five percent. A more general reason for ignoring the finite population correction factor, however, is stated in his discussion of comparisons between domain means (p. 39). For this type of analytic purpose, one wishes to test whether two (domain) means could have been drawn from the same infinite population. Since such a test relates to an infinite population, Cochran states it is not appropriate to apply a finite population correction to the variance formulation. Cochran does not re-address these issues with regard to stratified or cluster sampling, both of which apply to the state assessment samples. The usual variance formulation for stratified sampling is equivalent to applying finite population correction factor of zero to the variance component associated with between-stratum differences. When all schools are sampled, schools are treated as strata rather than as primary sampling units. When schools are treated as strata, there is no contribution of between-school differences to the variance of estimates. When a high fraction of schools is sampled, it seems natural to take an intermediate position: namely, to apply a finite population correction factor between zero and one to the between-school component of variance.

Approach

In this paper, we explore the application of finite population correction factors to the between-school component of variance and examine how this might effect sample size requirements in the types of states that currently require exemptions from the minimum sample requirements for the state NAEP. We also explore how we might preserve the infinite population assumptions for hypothesis testing relating to comparisons between

domain means. For this preliminary exploration, we develop hypothetical school and student population structures and hypothetical variance component distributions. For each variance component distribution, we determine the effective sample size resulting from the minimum state NAEP sample size requirements when the infinite population assumptions are a good approximation to reality (i.e., when the finite population correction factor can be ignored at all stages of sampling). We then examine how this effective sample size can be maintained with an alternate sample design which recognizes the population structure and applies the finite population correction factor at the school stage of sampling.

Modeling Assumptions

The Ideal Population Structure

For variance modeling purposes, we assume that the ideal population structure has the following components:

- Fifty geographic strata each with a large number of schools
- Large and equal numbers of eligible schools in each stratum
- A large number of eligible students in each school

From such a population, the sample design for a grade assessment would consist of two schools per stratum and 25 students per subject assessed from each sample school, or a total of 100 schools and 2,500 students per subject.

Variance Component Distributions

We will investigate three variance component distributions corresponding to three levels of intra-school correlation coefficients: 0.10, 0.15, and 0.20. Preliminary results from an ongoing study of National Assessment designs support estimates near 0.15.¹ The

1 Estimates of the variance component distributions for strata, schools, and students for states in the 1992 Trial State Assessment of mathematics varied widely from state to state. Their simple means were 0.082, 0.082, and 0.837, respectively, for strata, schools, and students. The mean intra-school correlation coefficient was 0.163. Median values for the variance components were 0.073, 0.077, and 0.849, respectively. The median intra-school correlation coefficient was 0.15. Two states were omitted from the analyses due to problems with the stratification variable on the file.

preliminary results also support splitting the remaining variance approximately equally between strata and schools. Table 1 shows how these assumptions partition the total variance. Variance component distribution B is the best match to average preliminary data. Distributions A and C are included in recognition of the variability among states as well as the possibility that the variance component distribution for other measures (other than mathematics composite scores) may differ from the empirical results. The table also shows the effective sample size that would be achieved if the population and sample were as described above. Variance component distribution A would correspond to a design effect of 2.15 for the estimates relating to the aggregate population. Variance component distributions B and C lead to design effects of 2.73 and 3.30.² Smaller design effects would be expected for some subgroups of the total population, particularly subgroups which tend to partition all or most sessions. Variance component distributions for subgroup estimates are discussed later in this paper.

The variance of an estimated mean for the ideal setting can be modeled as:

$$V_1 = \frac{\sigma_2^2}{100} + \frac{\sigma_3^2}{2500} .$$

The first component of variance, σ_1^2 , drops out since all strata are included with certainty, and implicitly, a finite population correction factor of zero is applied. The remaining two components of variance correspond to schools and students, respectively. The variance under simple random sampling (assuming a finite population correction factor of 1) would be simply:

$$V_{SRS} = \frac{\sigma^2}{2500} .$$

The design effect can be computed as a ratio of the design-based variance to the variance under simple random sampling, or:

$$Deff_1 = \frac{V_1}{V_{SRS}} .$$

2 The design effect can be computed as the ratio of the actual sample size to the effective sample size; e.g., for model A the design effect is 2,500/1,163 or 2.15.

With a little manipulation, this can be expressed for the ideal design as:

$$Deff_1 = 2500 \left[\frac{\sigma_2^2 / \sigma^2}{100} + \frac{\sigma_3^2 / \sigma^2}{2500} \right].$$

The inverse of the term in brackets can also be interpreted as the effective sample size which is shown in the final column of Table 1.

Table 1. Variance Component Distributions

Distribution	Intra-School Correlation	Proportion of Population Variance Associated with:			Design Effect	Effective Sample Size*
		Strata σ_1^2 / σ^2	Schools σ_2^2 / σ^2	Students σ_3^2 / σ^2		
A	0.10	0.050	0.050	0.900	2.15	1,163
B	0.15	0.075	0.075	0.850	2.73	917
C	0.20	0.100	0.100	0.800	3.30	758

* The effective sample sizes shown are for a sample of 100 schools and 2,500 students per subject selected from an ideal hypothetically infinite population.

Finite Population Variance Models

When we consider incorporating the finite population correction factor at the school and/or student level, there are at least two possible options:

- Variance model 1: Apply the finite population correction factor at the school level and ignore it (set to 1) at the student level
- Variance model 2: Apply the finite population correction factor at both levels and add back a variance component for the finite population

Both of these models are presented in oversimplified form—particularly with regard to all schools having about the same enrollment, or schools within major strata having about the same enrollment. Even though this is unrealistic, it should still help to develop an understanding of the options being considered without developing empirically-based formulae for real state populations.

The finite variance model 1 can be written as:

$$V_{f1} = \frac{\sigma_2^2}{n_2} \left[\frac{N_2 - n_2}{N_2} \right] + \frac{\sigma_3^2}{n_2 n_3}$$

where N_2 refers to the number of schools in the population, n_2 refers to the number of schools in the sample, and n_3 refers to the number of students selected per school. Note that if all schools are selected in the sample, this effectively treats schools as strata with all the variance contributions coming from sampling within schools. Also, no finite population correction factor is applied within schools, so that hypothesis tests about differences between domain means can reasonably be based on infinite population assumptions.

Another way to recognize infinite population assumptions would be based on model 2 which adds back a component of variance related to treating the finite population as a simple random sample from an infinite population. This variance can be modeled as:

$$V_{f2} = \frac{\sigma_2^2}{n_2} \left[\frac{N_2 - n_2}{N_2} \right] + \frac{\sigma_3^2}{n_2 n_3} \left[\frac{N_3 - n_3}{N_3} \right] + \frac{\sigma^2}{N_2 N_3}$$

where σ^2 is the overall population variance, N_3 refers to the average number of eligible students per school.

The choice of appropriate variance models depends on how one views the finite real world arising from or being generated by some infinite process or super-population model. Model 1 treats schools and their served communities as being fixed and finite; it views the students as arising from individual super-populations. The characteristics of the communities served and educational environments of the schools are unique and can vary considerably from school to school. Student performance in model 1 can be viewed as being the combined outcome of community and school environments. To allow us to perform analytical studies and to use standard infinite population-based tests (e.g., those based on Normal distribution theory), the student performance measures are viewed as arising from the individual super-population models specific to the community and school environments of each individual school. The variance component for schools is a function of the differences among the basic processes occurring in each school's educational and community environment.

In contrast to model 1, model 2 treats the state's finite population of students and their performance measures as arising from a single infinite process or super-population model. The finite sample arising from this single model is then arranged into schools and their served communities. The arrangement process is not random and results in a nonzero school variance component. To represent the true variance under this process, the finite

population variance (finite at all stages) is based on the particular super-population outcome and the particular arrangement of students into schools (the first two terms in V_{j2}). Then, an estimate of variance arising from the generation of the finite population from the super-population model is added (the final term in V_{j2}).³

In the remainder of this report, we limit consideration to model 1 because we believe it provides a better representation of the relationship of the finite population to the underlying infinite processes we wish to evaluate in the analysis of assessment data. We view the structure of schools and their served communities as fundamental contributors to the characteristics of students and the performance measures of the student population rather than viewing all states' students as arising from a single process and then simply being partitioned in some arbitrary manner among the schools in a state. Note that stratification and its effectiveness in controlling the variance of estimates is largely influenced by the craft of the study designers and not by any random process; this view of effective stratification is intuitively more consistent with model 1.

In order to study populations with a mixture of large and small schools, we model a partition of the population into two major strata based on size of school. This more general model reflects a mix of large and small schools and is written as:

$$V_{f1,M} = W_1^2 \left[\frac{\sigma_2^2}{n_{12}} \left(\frac{N_{12} - n_{12}}{N_{12}} \right) + \frac{\sigma_3^2}{n_{12}n_{13}} \right] + W_2^2 \left[\frac{\sigma_2^2}{n_{22}} \left(\frac{N_{22} - n_{22}}{N_{22}} \right) + \frac{\sigma_3^2}{n_{22}n_{23}} \right]$$

where W_1 is the proportion of eligible students in large schools and $W_2 (= 1 - W_1)$ is the proportion of eligible students in small schools. Population and sample sizes are appropriately defined with an additional leading subscript. Note that common variance components are assumed across size of school strata.

3 Kendall and Stuart (1966, pp. 190-191) show how the variance of a statistic can be partitioned based on any condition c into a component which is the expected value over all c of the variance of the statistic given c , and a component which is the variance over all c of the expected value of the statistic given c . In this case the condition c is defined as a particular super-population outcome of a particular state's finite population of students.

Other Anomalous Population Structures

Table 2 shows some distributions of schools by size for selected states and grades; data are extracted from the National Center for Education Statistics Common Core of Data 1993 (Sierra Systems Consultants, Inc. 1994). No state fits the ideal population model; these states were selected because they were believed to exhibit some of the problems encountered in the strict interpretation of state NAEP sample size guidelines. For the purposes of summarization, small schools are defined as those with 1 to 49 students in the target grade. Large schools have 50 or more students in the target grade. In actual practice, probability-proportional-to-size samples of schools would be selected; probabilities could be adjusted so that approximately equal probability samples of students could be selected after considering the feasible number of sessions at each school. We use artificial examples to examine the impacts of sample allocation on effective sample sizes both to simplify the calculations and to enhance interpretation.

Table 2. 1993 School Distributions for Selected States and Grades

State and Grade	Large School Stratum (50+ Students)			Small School Stratum (1-49 Students)		
	Schools	Total Students	Students/ School	Schools	Total Students	Students/ School
Delaware, Grade 4	51	8,113	159.1	17	172	10.1
Delaware, Grade 12	29	5,721	197.3	19	161	8.5
Rhode Island, Grade 4	115	9,153	79.6	65	2,450	37.7
Rhode Island, Grade 12	39	8,039	206.1	4	55	13.8
Nebraska, Grade 4	158	11,748	74.4	695	10,643	15.3
Nebraska, Grade 12	77	13,424	174.3	261	5,154	19.7
Texas, Grade 4	2,511	266,357	106.1	750	18,018	24.1
Texas, Grade 12	734	164,642	224.3	729	14,239	19.5
Alaska, Grade 4	97	7,643	78.8	253	2,512	9.9
Alaska, Grade 12	30	5,439	181.3	195	1,529	7.8

In Table 3, we show the hypothetical ideal (population 1) as well as five other hypothetical but finite populations which illustrate some of the situations that prevent strict application of the state NAEP guidelines and which roughly match some of the cases shown in Table 2. Populations 2 and 3 illustrate the few schools problem where the “partial sample option” has been applied; these are similar to Delaware grades 4 and 12 or Rhode Island grade 12. Population 4 illustrates the problem with many small schools for which a “sparse sample option” has been proposed; this population resembles the

Nebraska grade 4 population. Population 5 illustrates a mix of large and small schools in a large state; population 5 most closely resembles the situation in Texas for grade 4. Population 6 illustrates a mix of large and small schools in a small state and is similar to Alaska grade 12.

Table 3. Assumed Population Structures

Population Type	Large School Stratum			Small School Stratum		
	Schools	Total Students	Students/School	Schools	Total Students	Students/School
Population 1: Hypothetical Ideal	Infinite	Infinite	Infinite	0	0	0
Population 2: 80 Schools	80	10,000	125	0	0	0
Population 3: 50 Schools	50	8,000	160	0	0	0
Population 4: Sparse	158	11,580	75	700	10,500	15
Population 5: Mixed, Large	2,500	267,500	107	1,000	18,000	18
Population 5: Mixed, Small	30	6,000	200	200	1,600	8

Sample Design Options

For each of the five hypothetical finite populations (populations 2, 3, 4, 5, and 6 in Table 3, we consider four alternate sample designs. The first design considers attempts to follow the state NAEP guidelines as closely as possible with first priority given to achieving a sample of 2,500 students per subject and second priority given to achieving a sample of at least 100 schools. All designs use proportional allocation to the two sizes of school strata; i.e., the student sample size is approximately proportional (within rounding of design parameters) to the student population in each size stratum. The alternate designs proposed for each hypothetical finite population involve a reduced sample size based on achieving the same precision as the population 1 ideal would achieve under each of the three variance component distributions shown in Table 1; the precision standard is based on achieving or exceeding the effective sample sizes shown in the rightmost column of Table 1 when the particular variance component distribution is assumed. For example, if we assume variance component distribution A, then we require an effective sample size of at least 1,163 students. Similarly, for assumed variance component distributions B and C, we require effective sample sizes of at least 917 and 758, respectively.

The Few Schools Problem

Hypothetical populations 2 and 3 illustrate the “too few schools” problem. State population 2 has only 80 large schools and no small schools (Table 4). The design that most closely meets state NAEP guidelines would include all 80 schools with an average of 31.25 students per school. Effective sample sizes based on finite variance model 1 naturally exceed those that would be required under the infinite population model since they apply a finite correction factor of zero to the first stage variance component. Since this variance model completely removes the variance associated with schools when all schools are selected (i.e., it treats schools as a stratification variable), the effective sample size actually increases as the intra-school correlation coefficient increases from 0.10 for variance component distribution A to 0.20 for variance component distribution C. Alternate designs are presented for each variance component distribution; these designs meet or exceed the comparable infinite population effective sample sizes shown in Table 1. The alternate designs for all three variance component distributions reduce the student sample per school to 25 and scale down the number of schools to below 80; note that the effective sample sizes decrease as we move from variance component distribution A to C when schools are sampled and contribute to the variance.

Table 4. Sample Design Options and Effective Sample Sizes for Population 2

	Total		Large School Stratum		Small School Stratum		Effective Sample Size Under Variance Component Distribution		
	Schools	Students	Schools	Students/School	Schools	Students/School	A	B	C
Population 2	80	10,000	80	125	0	0			
State NAEP	80	2,500	80	31.25	0	0	2,778	2,941	3,125
Design for Distribution A*	58	1,450	58	25	0	0	1,166	1,062	975
Design for Distribution B*	54	1,350	54	25	0	0	1,033	925	837
Design for Distribution C*	54	1,350	54	25	0	0	1,033	925	837

* Alternate sampling designs employing finite sampling correction assumptions that, for the named variance component distribution, meet or exceed the effective sample sizes obtained under the current state NAEP design (with no finite sampling corrections).

Table 5 shows similar results when a state has only 50 large schools and no small schools.

Table 5. Sample Design Options and Effective Sample Sizes for Population 3

	Total		Large School Stratum		Small School Stratum		Effective Sample Size Under Variance Component Distribution		
	Schools	Students	Schools	Students/School	Schools	Students/School	A	B	C
Population 3	50	8,000	50	160	0	0			
State NAEP	50	2,500	50	50	0	0	2,778	2,941	3,125
Design for Distribution A*	47	1,175	47	25	0	0	1,205	1,221	1,237
Design for Distribution B*	43	1,075	43	25	0	0	1,000	966	935
Design for Distribution C*	40	1,000	40	25	0	0	870	816	769

* Alternate sampling designs employing finite sampling correction assumptions that, for the named variance component distribution, meet or exceed the effective sample sizes obtained under the current state NAEP design (with no finite sampling corrections).

In general, these two artificial populations lend support to a policy which allows states with few schools to reduce their sample size below those usually specified for participation in the state NAEP.

The Many Small Schools Problem

Population 4 (Table 6) illustrates the problem encountered when states have many small schools. About one-half of the state's student population is enrolled in small schools. In this example, the state NAEP requirements could be met with a sample of 151 schools. Depending on the variance component distribution assumed, school sample sizes for optional sample designs range from 105 to 115 schools to achieve effective sample sizes equivalent to those obtained using the strictly infinite population model. One of the factors operating in determining effective sample size for this case is the reduced clustering effect associated with the small schools in a large portion of the sample.

Table 6. Sample Design Options and Effective Sample Sizes for Population 4

	Total		Large School Stratum		Small School Stratum		Effective Sample Size Under Variance Component Distribution		
	Schools	Students	Schools	Students/School	Schools	Students/School	A	B	C
Population 4	858	22,350	158	75	700	15			
State NAEP	151	2,501	53	25	98	12	1,580	1,302	1,155
Design for Distribution A*	115	1,913	41	25	74	12	1,166	952	838
Design for Distribution B*	111	1,852	40	25	71	12	1,126	919	809
Design for Distribution C*	105	1,754	38	25	67	12	1,060	864	760

* Alternate sampling designs employing finite sampling correction assumptions that, for the named variance component distribution, meet or exceed the effective sample sizes obtained under the current state NAEP design (with no finite sampling corrections).

Population 5 (Table 7) was chosen to illustrate a case where both types of limitations influence the sample allocation; in fact, this population does not exhibit either problem since the state NAEP standard design requires only 104 schools. Because the number of schools is large in both school size strata, the finite population correction has only minimal influence on effective sample size. Required sample sizes for both schools and total students are reduced only moderately by taking account of the finite population correction.

Table 7. Sample Design Options and Effective Sample Sizes for Population 5

	Total		Large School Stratum		Small School Stratum		Effective Sample Size Under Variance Component Distribution		
	Schools	Students	Schools	Students/School	Schools	Students/School	A	B	C
Population 5	3,500	285,500	2,500	107	1,000	18			
State NAEP	104	2,500	94	25	10	15	1,206	956	795
Design for Distribution A*	101	2,425	91	25	10	15	1,169	926	770
Design for Distribution B*	100	2,410	91	25	9	15	1,162	921	766
Design for Distribution C*	99	2,385	90	25	9	15	1,150	911	758

* Alternate sampling designs employing finite sampling correction assumptions that, for the named variance component distribution, meet or exceed the effective sample sizes obtained under the current state NAEP design (with no finite sampling corrections).

Population 6 (shown in Table 8) was also selected to exhibit the many schools problem. This represents a much smaller state, and application of the finite population correction factor does materially reduce the required sample size from the standard state NAEP model. The state NAEP requirement is not excessive in magnitude, but it does represent a high proportion of the school population. The alternate design options allow for reduction of the proportion of schools sampled.

Table 8. Sample Design Options and Effective Sample Sizes for Population 6

	Total		Large School Stratum		Small School Stratum		Effective Sample Size Under Variance Component Distribution		
	Schools	Students	Schools	Students/School	Schools	Students/School	A	B	C
Population 6	230	7,600	30	200	200	8			
State NAEP	117	2,502	30	66	87	6	2,673	2,704	2,869
Design for Distribution A*	70	1,110	30	29	40	6	1,169	1,175	1,235
Design for Distribution B*	61	917	29	25	32	6	930	917	943
Design for Distribution C*	55	843	27	25	28	6	799	763	759

* Alternate sampling designs employing finite sampling correction assumptions that, for the named variance component distribution, meet or exceed the effective sample sizes obtained under the current state NAEP design (with no finite sampling corrections).

Design Effects and Subgroup Estimates

Table 9 shows the design effects for total population estimates, for males, and for a region constituting one third of the state assuming the six hypothetical populations studied above; all results are shown for variance component distribution A and the sample allocation chosen for that distribution in Tables 4 through 9. We use variance model 1 and define the design effect as:

$$Deff_{f1} = \frac{V_{f1}}{V_{SRS}}$$

Note that the numerator in this expression incorporates the finite population correction⁴ for the school component of variance and that any contribution from the component of variance associated with within-state strata is completely eliminated. No finite population correction is assumed for the simple random sample variance in the denominator.

Table 9. Design Effects Assuming Variance Component Distribution A

Pop.	Total Population			All Males			Region (1/3 of State)		
	Actual Sample Size	Effective Sample Size	Design Effect	Actual Sample Size	Effective Sample Size	Design Effect	Actual Sample Size	Effective Sample Size	Design Effect
1	2,500	1,163	2.15	1,250	820	1.52	833	388	2.15
2	1,450	1,166	1.24	725	676	1.07	483	389	1.24
3	1,175	1,205	0.98	588	627	0.94	392	402	0.98
4	1,913	1,166	1.64	957	753	1.27	638	389	1.64
5	2,425	1,169	2.07	1,213	815	1.49	808	390	2.07
6	1,110	1,169	0.95	555	600	0.93	370	390	0.95

Design effects for subgroups which partition all (or nearly all) sessions tend to reduce the design effect since the effect of clustering is reduced; the design effects for males exhibit this behavior. Subgroups which are formed in terms of entire schools, such as regional estimate, maintain the same clustering effects, and assuming constant variance components across subgroups, the same design effects.

4 For population structure 1, the hypothetical infinite population, the finite correction factor is exactly 1.

More complex changes in design effects are associated with subgroups such as ethnic groups which may exhibit varying concentrations over schools. Table 10 shows design effects for three populations based on their distribution across schools in selected states. Design effects were computed assuming stratification by ethnic subgroup concentration and averaging clustering effects over strata. The model used to approximate these design effects in Table 10 took account of the distribution of schools by concentration of the population subgroup. It also took account of the differing finite population correction factors in different size of school strata for populations 5 and 6.

Table 10. Design Effects for Selected Ethnic Subgroups Assuming Variance Component Distribution A

Population Structure	Population Subgroup	Distribution Based on	Actual Sample size	Effective Sample Size	Design Effect
3	Blacks	Delaware	334	363	0.92
5	Hispanics	Texas	858	517	1.66
6	Indians/Alaskan natives	Alaska	343	346	0.99

To gain a better intuitive understanding of the design effects for subpopulations when using a finite population correction factor, it may be useful to examine a simpler approximation to the design effect for subgroups. When there is no stratification and no finite population correction, the design effect is often expressed as $Deff = 1 + \rho(\bar{n}_3 - 1)$ where we carry over the notation from the previous section on finite population variance models and define the intra-school correlation coefficient as $\rho = 1 - \sigma_3^2/\sigma^2$. If we wish to incorporate stratification, subgroup estimation, and a finite population correction at the first stage as assumed in variance model 1, the simple model can be enhanced as $Deff = 1 + \rho(\gamma d \bar{n}_3 fpc_2 - 1)$ where $\gamma = \sigma_2^2/(\sigma_1^2 + \sigma_2^2)$, or the portion of the remaining variance associated with schools, d represents the proportion of the population that belongs to a particular subgroup or domain, and fpc_2 represents the finite population correction factor for the school stage of sample selection. Several observations can be made from this model. If the finite population correction, fpc_2 , goes to zero, the design effect becomes simply $1 - \rho$ taking full advantage of the initial strata and schools as stratifying variables to totally eliminate contributions from the first two components of variance. If the product, $\gamma d \bar{n}_3 fpc_2$, becomes less than 1 for any reason, the design effect will also be less than 1. For the three populations and sample allocations considered in

Table 10, this model projects design effects of 0.92, 1.31, and 1.03, respectively. The differences occur because the calculations in Table 10 for models 3 and 5 utilized the partitioned or mixed variance model, $V_{fl,M}$, and the finite population correction factor is zero in the first partition. The simpler model uses an average finite population correction factor which does not recognize the mix of zero and nonzero corrections.

Many of the sample size requirements for state NAEP stem from the need to support subgroup level estimates. One must examine both expected yield and projected design effects for population subgroups. The main problem for some subgroup estimates may be that proportional allocation will not yield adequate sample sizes to support the planned analyses. Without adequate stratification controls in a proportional allocation design, the subgroup sample size may behave as an uncontrolled random variable, leaving the adequacy of the sample size to chance. Stratification can be applied to reduce this type of variability in achieved sample sizes; drawing larger overall samples can also reduce the sample-to-sample variability in achieved subgroup sample sizes, thus reducing the risk of an unusually small subgroup sample occurring by chance.

Conclusions and Recommendations

The investigation above lends support to alternate sample size specifications in both states with few schools and states with many small schools. Some additional changes in optional designs should also be considered. The alternate allocations used above assumed proportional or near proportional allocations to the large school and small school strata. Appropriate cost modeling and the application of optimum allocation theory could yield less costly designs which would most likely favor more sampling from the larger schools. The precision requirements for each design were based on maintaining the effective sample size that would pertain to the ideal hypothetical population case (or, equivalently, to the case in which the state had a sufficiently large number of schools such that finite population corrections would have very little impact on the variance). A better approach would be to base the required effective sample size on the needs of data users.

Better estimates of variance components associated with strata, schools, and students for a variety of assessment measures would also be of great assistance in investigations such

as this one. These estimates should be combined with the development of variable survey cost models so that optimal sample design decisions could be based on minimizing overall cost that is subject to meeting specified precision (or, equivalently, effective sample size) requirements.

Allowing states to implement design options other than the standard requirement of at least 100 schools and at least 2,500 students per subject could actually help to reduce the variable costs associated with administration, field quality control, scoring, and data processing. Analyzing a state's school and student population distributions in order to fully develop an alternative which incorporates the reduced sample size and still meets analytic requirements for selected subgroups as well as for the total population would add to the total cost of state assessments. If this process could be routinized, the increased cost should be controllable. Some initial experience would quickly disqualify a large number of states from consideration so that these additional costs should also only apply to a few special cases. In general, analysis of the adequacy of sample and overall survey designs with respect to users' analytic needs should be viewed as essential to the ongoing success of any longitudinal data series such as the National and State assessments of education; the review of state assessment designs certainly fits within this general concept.

References

- Cochran, W. G. (1977). *Sampling techniques*. New York: John Wiley & Sons.
- Forsyth, R., Hambleton, R., Linn, R., Mislevy, R., & Yen, W. (1966). Design/feasibility team report to the National Assessment Governing Board.
- Freund, D., & Carlson, J. (1997). Memo to NAEP Staff on the Effect on State NAEP of reduced no. of schools *Revised*. Educational Testing Service.
- Kendall, M. G., & Stuart, A. (1966). *The advanced theory of statistics*. London: Charles Griffin & Company Limited.
- Rust, K. (1997). Reduced sample option for states with a high proportion of small schools. Draft report. Westat, Inc.
- Sierra Systems Consultants, Inc. (1994). *CD-ROM installation and technical user guide: National Center for Education Statistics Common Core of Data (CCD93 CD-ROM DISC 1988/1989 - 1993/94)*. Arlington, VA.

Listing of NCES Working Papers to Date

Working papers can be downloaded as .pdf files from the NCES Electronic Catalog (<http://nces.ed.gov/pubsearch/>). You can also contact Sheilah Jupiter at (202) 502-7363 (sheilah.jupiter@ed.gov) if you are interested in any of the following papers.

Listing of NCES Working Papers by Program Area

No.	Title	NCES contact
Baccalaureate and Beyond (B&B)		
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
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)		
95-12	Rural Education Data User's Guide	Samuel Peng
96-19	Assessment and Analysis of School-Level Expenditures	William J. Fowler, Jr.
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
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
2000-04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
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 Childhood	Elvira Hausken

No.	Title	NCES contact
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)		
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.
97-43	Measuring Inflation in Public School Costs	William J. Fowler, Jr.
98-04	Geographic Variations in Public Schools' Costs	William J. Fowler, Jr.
1999-16	Measuring Resources in Education: From Accounting to the Resource Cost Model Approach	William J. Fowler, Jr.
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)		
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
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
HS Transcript Studies		
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
International Adult Literacy Survey (IALS)		
97-33	Adult Literacy: An International Perspective	Marilyn Binkley
Integrated Postsecondary Education Data System (IPEDS)		
97-27	Pilot Test of IPEDS Finance Survey	Peter Stowe
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
2000-14	IPEDS Finance Data Comparisons Under the 1997 Financial Accounting Standards for Private, Not-for-Profit Institutes: A Concept Paper	Peter Stowe
National Assessment of Adult Literacy (NAAL)		
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
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

No.	Title	NCES contact
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
National Assessment of Educational Progress (NAEP)		
95-12	Rural Education Data User's Guide	Samuel Peng
97-29	Can State Assessment Data be Used to Reduce State NAEP Sample Sizes?	Steven Gorman
97-30	ACT's NAEP Redesign Project: Assessment Design is the Key to Useful and Stable Assessment Results	Steven Gorman
97-31	NAEP Reconfigured: An Integrated Redesign of the National Assessment of Educational Progress	Steven Gorman
97-32	Innovative Solutions to Intractable Large Scale Assessment (Problem 2: Background Questionnaires)	Steven Gorman
97-37	Optimal Rating Procedures and Methodology for NAEP Open-ended Items	Steven Gorman
97-44	Development of a SASS 1993-94 School-Level Student Achievement Subfile: Using State Assessments and State NAEP, Feasibility Study	Michael Ross
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
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
2001-08	Assessing the Lexile Framework: Results of a Panel Meeting	Sheida White
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

No.	Title	NCES contact
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
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
2002-07	Teacher Quality, School Context, and Student Race/Ethnicity: Findings from the Eighth Grade National Assessment of Educational Progress 2000 Mathematics Assessment	Janis Brown
2003-06	NAEP Validity Studies: The Validity of Oral Accommodation in Testing	Patricia Dabbs
2003-07	NAEP Validity Studies: An Agenda for NAEP Validity Research	Patricia Dabbs
2003-08	NAEP Validity Studies: Improving the Information Value of Performance Items in Large Scale Assessments	Patricia Dabbs
2003-09	NAEP Validity Studies: Optimizing State NAEP: Issues and Possible Improvements	Patricia Dabbs
2003-10	A Content Comparison of the NAEP and PIRLS Fourth-Grade Reading Assessments	Marilyn Binkley
2003-11	NAEP Validity Studies: Reporting the Results of the National Assessment of Educational Progress	Patricia Dabbs
2003-12	NAEP Validity Studies: An Investigation of Why Students Do Not Respond to Questions	Patricia Dabbs
2003-13	NAEP Validity Studies: A Study of Equating in NAEP	Patricia Dabbs
2003-14	NAEP Validity Studies: Feasibility Studies of Two-Stage Testing in Large-Scale Educational Assessment: Implications for NAEP	Patricia Dabbs
2003-15	NAEP Validity Studies: Computer Use and Its Relation to Academic Achievement in Mathematics, Reading, and Writing	Patricia Dabbs
2003-16	NAEP Validity Studies: Implications of Electronic Technology for the NAEP Assessment	Patricia Dabbs
2003-17	NAEP Validity Studies: The Effects of Finite Sampling on State Assessment Sample Requirements	Patricia Dabbs
National Education Longitudinal Study of 1988 (NELS:88)		
95-04	National Education Longitudinal Study of 1988: Second Follow-up Questionnaire Content Areas and Research Issues	Jeffrey Owings
95-05	National Education Longitudinal Study of 1988: Conducting Trend Analyses of NLS-72, HS&B, and NELS:88 Seniors	Jeffrey Owings
95-06	National Education Longitudinal Study of 1988: Conducting Cross-Cohort Comparisons Using HS&B, NAEP, and NELS:88 Academic Transcript Data	Jeffrey Owings
95-07	National Education Longitudinal Study of 1988: Conducting Trend Analyses HS&B and NELS:88 Sophomore Cohort Dropouts	Jeffrey Owings
95-12	Rural Education Data User's Guide	Samuel Peng
95-14	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
96-03	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings
98-06	National Education Longitudinal Study of 1988 (NELS:88) Base Year through Second Follow-Up: Final Methodology Report	Ralph Lee
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
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
1999-15	Projected Postsecondary Outcomes of 1992 High School Graduates	Aurora D'Amico
2001-16	Imputation of Test Scores in the National Education Longitudinal Study of 1988	Ralph Lee
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
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
National Household Education Survey (NHES)		
95-12	Rural Education Data User's Guide	Samuel Peng
96-13	Estimation of Response Bias in the NHES:95 Adult Education Survey	Steven Kaufman
96-14	The 1995 National Household Education Survey: Reinterview Results for the Adult Education Component	Steven Kaufman

No.	Title	NCES contact
96-20	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler
96-21	1993 National Household Education Survey (NHES:93) Questionnaires: Screener, School Readiness, and School Safety and Discipline	Kathryn Chandler
96-22	1995 National Household Education Survey (NHES:95) Questionnaires: Screener, Early Childhood Program Participation, and Adult Education	Kathryn Chandler
96-29	Undercoverage Bias in Estimates of Characteristics of Adults and 0- to 2-Year-Olds in the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
96-30	Comparison of Estimates from the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
97-02	Telephone Coverage Bias and Recorded Interviews in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97-03	1991 and 1995 National Household Education Survey Questionnaires: NHES:91 Screener, NHES:91 Adult Education, NHES:95 Basic Screener, and NHES:95 Adult Education	Kathryn Chandler
97-04	Design, Data Collection, Monitoring, Interview Administration Time, and Data Editing in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97-05	Unit and Item Response, Weighting, and Imputation Procedures in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97-06	Unit and Item Response, Weighting, and Imputation Procedures in the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
97-08	Design, Data Collection, Interview Timing, and Data Editing in the 1995 National Household Education Survey	Kathryn Chandler
97-19	National Household Education Survey of 1995: Adult Education Course Coding Manual	Peter Stowe
97-20	National Household Education Survey of 1995: Adult Education Course Code Merge Files User's Guide	Peter Stowe
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
97-28	Comparison of Estimates in the 1996 National Household Education Survey	Kathryn Chandler
97-34	Comparison of Estimates from the 1993 National Household Education Survey	Kathryn Chandler
97-35	Design, Data Collection, Interview Administration Time, and Data Editing in the 1996 National Household Education Survey	Kathryn Chandler
97-38	Reinterview Results for the Parent and Youth Components of the 1996 National Household Education Survey	Kathryn Chandler
97-39	Undercoverage Bias in Estimates of Characteristics of Households and Adults in the 1996 National Household Education Survey	Kathryn Chandler
97-40	Unit and Item Response Rates, Weighting, and Imputation Procedures in the 1996 National Household Education Survey	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
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
National Longitudinal Study of the High School Class of 1972 (NLS-72)		
95-12	Rural Education Data User's Guide	Samuel Peng
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
National Postsecondary Student Aid Study (NPSAS)		
96-17	National Postsecondary Student Aid Study: 1996 Field Test Methodology Report	Andrew G. Malizio
2000-17	National Postsecondary Student Aid Study:2000 Field Test Methodology Report	Andrew G. Malizio
2002-03	National Postsecondary Student Aid Study, 1999-2000 (NPSAS:2000), CATI Nonresponse Bias Analysis Report.	Andrew Malizio
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
National Study of Postsecondary Faculty (NSOPF)		
97-26	Strategies for Improving Accuracy of Postsecondary Faculty Lists	Linda Zimbler
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
2000-01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler

No.	Title	NCES contact
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
2002-08	A Profile of Part-time Faculty: Fall 1998	Linda Zimbler
Postsecondary Education Descriptive Analysis Reports (PEDAR)		
2000-11	Financial Aid Profile of Graduate Students in Science and Engineering	Aurora D'Amico
Private School Universe Survey (PSS)		
95-16	Intersurvey Consistency in NCES Private School Surveys	Steven Kaufman
95-17	Estimates of Expenditures for Private K-12 Schools	Stephen Broughman
96-16	Strategies for Collecting Finance Data from Private Schools	Stephen Broughman
96-26	Improving the Coverage of Private Elementary-Secondary Schools	Steven Kaufman
96-27	Intersurvey Consistency in NCES Private School Surveys for 1993-94	Steven Kaufman
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
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
2000-04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
2000-15	Feasibility Report: School-Level Finance Pretest, Private School Questionnaire	Stephen Broughman
Progress in International Reading Literacy Study (PIRLS)		
2003-05	PIRLS-IEA Reading Literacy Framework: Comparative Analysis of the 1991 IEA Reading Study and the Progress in International Reading Literacy Study	Laurence Ogle
2003-10	A Content Comparison of the NAEP and PIRLS Fourth-Grade Reading Assessments	Marilyn Binkley
Recent College Graduates (RCG)		
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
2002-04	Improving Consistency of Response Categories Across NCES Surveys	Marilyn Seastrom
Schools and Staffing Survey (SASS)		
94-01	Schools and Staffing Survey (SASS) Papers Presented at Meetings of the American Statistical Association	Dan Kasprzyk
94-02	Generalized Variance Estimate for Schools and Staffing Survey (SASS)	Dan Kasprzyk
94-03	1991 Schools and Staffing Survey (SASS) Reinterview Response Variance Report	Dan Kasprzyk
94-04	The Accuracy of Teachers' Self-reports on their Postsecondary Education: Teacher Transcript Study, Schools and Staffing Survey	Dan Kasprzyk
94-06	Six Papers on Teachers from the 1990-91 Schools and Staffing Survey and Other Related Surveys	Dan Kasprzyk
95-01	Schools and Staffing Survey: 1994 Papers Presented at the 1994 Meeting of the American Statistical Association	Dan Kasprzyk
95-02	QED Estimates of the 1990-91 Schools and Staffing Survey: Deriving and Comparing QED School Estimates with CCD Estimates	Dan Kasprzyk
95-03	Schools and Staffing Survey: 1990-91 SASS Cross-Questionnaire Analysis	Dan Kasprzyk
95-08	CCD Adjustment to the 1990-91 SASS: A Comparison of Estimates	Dan Kasprzyk
95-09	The Results of the 1993 Teacher List Validation Study (TLVS)	Dan Kasprzyk
95-10	The Results of the 1991-92 Teacher Follow-up Survey (TFS) Reinterview and Extensive Reconciliation	Dan Kasprzyk
95-11	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
95-12	Rural Education Data User's Guide	Samuel Peng
95-14	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
95-15	Classroom Instructional Processes: A Review of Existing Measurement Approaches and Their Applicability for the Teacher Follow-up Survey	Sharon Bobbitt
95-16	Intersurvey Consistency in NCES Private School Surveys	Steven Kaufman
95-18	An Agenda for Research on Teachers and Schools: Revisiting NCES' Schools and Staffing Survey	Dan Kasprzyk
96-01	Methodological Issues in the Study of Teachers' Careers: Critical Features of a Truly Longitudinal Study	Dan Kasprzyk
96-02	Schools and Staffing Survey (SASS): 1995 Selected papers presented at the 1995 Meeting of the American Statistical Association	Dan Kasprzyk
96-05	Cognitive Research on the Teacher Listing Form for the Schools and Staffing Survey	Dan Kasprzyk

No.	Title	NCES contact
96-06	The Schools and Staffing Survey (SASS) for 1998-99: Design Recommendations to Inform Broad Education Policy	Dan Kasprzyk
96-07	Should SASS Measure Instructional Processes and Teacher Effectiveness?	Dan Kasprzyk
96-09	Making Data Relevant for Policy Discussions: Redesigning the School Administrator Questionnaire for the 1998-99 SASS	Dan Kasprzyk
96-10	1998-99 Schools and Staffing Survey: Issues Related to Survey Depth	Dan Kasprzyk
96-11	Towards an Organizational Database on America's Schools: A Proposal for the Future of SASS, with comments on School Reform, Governance, and Finance	Dan Kasprzyk
96-12	Predictors of Retention, Transfer, and Attrition of Special and General Education Teachers: Data from the 1989 Teacher Followup Survey	Dan Kasprzyk
96-15	Nested Structures: District-Level Data in the Schools and Staffing Survey	Dan Kasprzyk
96-23	Linking Student Data to SASS: Why, When, How	Dan Kasprzyk
96-24	National Assessments of Teacher Quality	Dan Kasprzyk
96-25	Measures of Inservice Professional Development: Suggested Items for the 1998-1999 Schools and Staffing Survey	Dan Kasprzyk
96-28	Student Learning, Teaching Quality, and Professional Development: Theoretical Linkages, Current Measurement, and Recommendations for Future Data Collection	Mary Rollefson
97-01	Selected Papers on Education Surveys: Papers Presented at the 1996 Meeting of the American Statistical Association	Dan Kasprzyk
97-07	The Determinants of Per-Pupil Expenditures in Private Elementary and Secondary Schools: An Exploratory Analysis	Stephen Broughman
97-09	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman
97-10	Report of Cognitive Research on the Public and Private School Teacher Questionnaires for the Schools and Staffing Survey 1993-94 School Year	Dan Kasprzyk
97-11	International Comparisons of Inservice Professional Development	Dan Kasprzyk
97-12	Measuring School Reform: Recommendations for Future SASS Data Collection	Mary Rollefson
97-14	Optimal Choice of Periodicities for the Schools and Staffing Survey: Modeling and Analysis	Steven Kaufman
97-18	Improving the Mail Return Rates of SASS Surveys: A Review of the Literature	Steven Kaufman
97-22	Collection of Private School Finance Data: Development of a Questionnaire	Stephen Broughman
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
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

No.	Title	NCES contact
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

Listing of NCES Working Papers by Subject

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
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

No.	Title	NCES contact
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
2002-07	Teacher Quality, School Context, and Student Race/Ethnicity: Findings from the Eighth Grade National Assessment of Educational Progress 2000 Mathematics Assessment	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		
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
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
Data warehouse		

No.	Title	NCES contact
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
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
2002-07	Teacher Quality, School Context, and Student Race/Ethnicity: Findings from the Eighth Grade National Assessment of Educational Progress 2000 Mathematics Assessment	Janis Brown
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		

No.	Title	NCES contact
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
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
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

No.	Title	NCES contact
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
97-17	International Education Expenditure Comparability Study: Final Report, Volume II, Quantitative Analysis of Expenditure Comparability	Shelley Burns
2001-01	Cross-National Variation in Educational Preparation for Adulthood: From Early Adolescence to Young Adulthood	Elvira Hausken
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		
95-13	Assessing Students with Disabilities and Limited English Proficiency	James Houser
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
Literacy of adults – international		
97-33	Adult Literacy: An International Perspective	Marilyn Binkley
Mathematics		
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
1999-08	Measuring Classroom Instructional Processes: Using Survey and Case Study Field Test Results to Improve Item Construction	Dan Kasprzyk

No.	Title	NCES contact
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
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	Arnold Goldstein
2002-07	Teacher Quality, School Context, and Student Race/Ethnicity: Findings from the Eighth Grade National Assessment of Educational Progress 2000 Mathematics Assessment	Janis Brown
Parental involvement in education		
96-03	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings
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
1999-01	A Birth Cohort Study: Conceptual and Design Considerations and Rationale	Jerry West
2001-06	Papers from the Early Childhood Longitudinal Studies Program: Presented at the 2001 AERA and SRCD Meetings	Jerry West
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
Participation rates		
98-10	Adult Education Participation Decisions and Barriers: Review of Conceptual Frameworks and Empirical Studies	Peter Stowe
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
2000-16b	Lifelong Learning NCES Task Force: Final Report Volume II	Lisa Hudson
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 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
Principals		
2000-10	A Research Agenda for the 1999-2000 Schools and Staffing Survey	Dan Kasprzyk
Private schools		
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
2000-13	Non-professional Staff in the Schools and Staffing Survey (SASS) and Common Core of Data (CCD)	Kerry Gruber
2000-15	Feasibility Report: School-Level Finance Pretest, Private School Questionnaire	Stephen Broughman
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

No.	Title	NCES contact
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
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
2002-07	Teacher Quality, School Context, and Student Race/Ethnicity: Findings from the Eighth Grade National Assessment of Educational Progress 2000 Mathematics Assessment	Janis Brown
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		
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

No.	Title	NCES contact
Staff – higher education institutions		
97–26	Strategies for Improving Accuracy of Postsecondary Faculty Lists	Linda Zimbler
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
Statistical methodology		
97–21	Statistics for Policymakers or Everything You Wanted to Know About Statistics But Thought You Could Never Understand	Susan Ahmed
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
1999–07	Collection of Resource and Expenditure Data on the Schools and Staffing Survey	Stephen Broughman
1999–17	Secondary Use of the Schools and Staffing Survey Data	Susan Wiley
2000–01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler
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
2000–12	Coverage Evaluation of the 1994–95 Public Elementary/Secondary School Universe Survey	Beth Young
2000–17	National Postsecondary Student Aid Study:2000 Field Test Methodology Report	Andrew G. Malizio
2001–04	Beginning Postsecondary Students Longitudinal Study: 1996–2001 (BPS:1996/2001) Field Test Methodology Report	Paula Knepper
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
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
2002–01	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

No.	Title	NCES contact
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
2003-03	Education Longitudinal Study: 2002 (ELS: 2002) Field Test Report	Jeffrey Owings
Teachers		
98-13	Response Variance in the 1994-95 Teacher Follow-up Survey	Steven Kaufman
1999-14	1994-95 Teacher Followup Survey: Data File User's Manual, Restricted-Use Codebook	Kerry Gruber
2000-10	A Research Agenda for the 1999-2000 Schools and Staffing Survey	Dan Kasprzyk
2002-07	Teacher Quality, School Context, and Student Race/Ethnicity: Findings from the Eighth Grade National Assessment of Educational Progress 2000 Mathematics Assessment	Janis Brown
Teachers – instructional practices of		
98-08	The Redesign of the Schools and Staffing Survey for 1999-2000: A Position Paper	Dan Kasprzyk
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
Teachers – opinions regarding safety		
98-08	The Redesign of the Schools and Staffing Survey for 1999-2000: A Position Paper	Dan Kasprzyk
Teachers – performance evaluations		
1999-04	Measuring Teacher Qualifications	Dan Kasprzyk
Teachers – qualifications of		
1999-04	Measuring Teacher Qualifications	Dan Kasprzyk
Teachers – salaries of		
94-05	Cost-of-Education Differentials Across the States	William J. Fowler, Jr.
Training		
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
Variance estimation		
2000-03	Strengths and Limitations of Using SUDAAN, Stata, and WesVarPC for Computing Variances from NCES Data Sets	Ralph Lee
2000-04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
2001-18	A Study of Variance Estimation Methods	Ralph Lee
Violence		
97-09	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman
Vocational education		
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