June, 1997

1993 National Study of Postsecondary Faculty Methodology Report

Lance A. Selfa
Natalie Suter
Sharon Myers
Shaun Koch
Robert A. Johnson
Daniel A. Zahs
Brian D. Kuhr
Sameer Y. Abraham
National Opinion Research Center (NORC)
University of Chicago

Linda J. Zimbler
Project Officer
National Center for Education Statistics

U.S. Department of Education
Office of Educational Research and Improvement

NCES 97-467

National Center for Education Statistics
"The duties of the Center shall be to collect, analyze, and disseminate statistics and other information related to education in the United States and in other nations."
—National Education Statistics Act of 1994 (20 U.S.C. 9003)

June, 1997

Contact:
Linda J. Zimbler
(202) 219-1834

Acknowledgments

The authors wish to thank the many individuals who contributed to the success of the 1992-93 National Study of Postsecondary Faculty (NSOPF-93).

The NSOPF-93 National Technical Review Panel (NTRP) played an important role in advising the National Center for Education Statistics (NCES) and its contractor for NSOPF-93—the National Opinion Research Center (NORC) at the University of Chicago—on questionnaire development and related design issues. A list of individual NTRP members can be found in Appendix Q.

Additional support for NSOPF-93 was provided by the National Science Foundation (NSF) and the National Endowment for the Humanities (NEH). Both agencies are co-sponsors of the study, and both have supported the field test and the full-scale study. Our special thanks are extended to NSF's **Larry Suter**, **Jim Dietz**, **Mary Golladay**, **Joan Burrelli** and **Roger Baldwin** (the latter currently at the College of William and Mary), and to NEH's **Jeff Thomas** for their unstinting efforts on behalf of NSOPF-93.

The study was overseen by NCES staff. **Paul D. Planchon** is the Associate Commissioner, Surveys and Cooperative Systems Group. **Roslyn Korb** and **Daniel Kasprzyk** provided additional oversight. **Linda Zimbler** is the NCES Project Officer responsible for NSOPF-93. Other NCES staff who assisted in various aspects of the study include **Sue Ahmed**, **Sam Barbette**, **Robert Burton**, **Michael Cohen**, **Steve Kaufman**, **Edith McArthur**, **Marilyn McMillen**, **Sam Peng**, **Mary Rollefson**, **Dennis Carroll**, and **Larry Bobbitt**.

Sameer Abraham was the Project Director for NSOPF-93 until April, 1996. **Natalie Suter**, the current Project Director, served as Associate Project Director, Task Leader for Questionnaire Development, and Coordinator of Data Collection and Data File Preparation. Other principal members of the NSOPF-93 team include the following NORC staff: **Bruce Spencer**, Task Leader for Sampling; **Tracy Berckmans**, Task Leader for Faculty Data Collection; **Brian Kuhr**, Task Leader for Institution Data Collection; **Sharon Myers**, Coordinator of List Processing; **Robert Bailey**, Task Leader for Data Preparation; **Karen Grigorian** and **Belinda Willis**, Data Preparation Supervisors; **Suzanne Turner**, **David Kusinitz**, and **Marek Pietrzyk**, Data Processing Managers; **Shaun Koch**, Task Leader for Data Delivery; **Lance Selfa**, Task Leader for Survey Documentation; **Kirk M. Wolter**, Senior Vice President, Statistics and Methodology; **Robert Johnson**, Senior Survey Methodologist; **Daniel Zahs** and **Hee Choon Shin**, Survey Methodologists; **Jiahe Qian**, Statistician; **Terry Callier**, Programmer; **Hiroaki Minato**, **Kelly Daley**, **Patrick Smillie** and **Kristen Petzinger**, Research Assistants; **Jamie Friedman**, Telephone Center Supervisor; and **Daniel Sichelski**, **Meredith Roat**, and **Robert Dustin**, Budget Monitors. **Sally Murphy** and **Ezella Pickett** coordinated refusal conversion and locating efforts during data collection. **Jim Wolf** served as a consultant in the preparation of the institution data file. **Suzanne Erfurth** and **Karen Rosenthal** provided editorial assistance. Additional assistance and support was generously provided by: **Norman Bradburn**, **Patricia Green**, **Bernard Dugoni**, **Gloria Evenson**, **Marilyn Ford**, **Jay Goddard**, **Steven Ingels**, **Donald Kotecki**, **Richard Kulka**, **Kenneth Rasinski**, **Karen Sutherlin**, and **Lisa Thalji.**

Under a subcontract from the National Opinion Research Center (NORC), **Rita Kirshstein** of Pelavin Research Institute assisted in development of the questionnaires, designed and conducted most of the data analysis, and assisted in related project tasks. **Valerie Martin Conley** of Synectics, Inc., provided technical guidance on various aspects of the study. **Steve Wenck** of Synectics, Inc., provided technical support. Additional support was provided by project consultants: **James Fairweather** of Pennsylvania State University, **Robert Blackburn** and **Janet Lawrence** of the University of Michigan, and **Kathryn Moore** of Michigan State University.

The authors wish to express their gratitude to NCES reviewers and other reviewers of this document. The following individuals served as the principal reviewers, and provided valuable feedback and helpful suggestions: **Daniel Kasprzyk**, **Roslyn Korb**, **Linda Zimbler**, **Robert Burton**, **Michael Cohen**, **Steve Kaufman**, and **Marilyn McMillen**, NCES; **Valerie Conley**, Synectics, Inc.; **Jeff Thomas**, NEH; and **Jay Chronister**, University of Virginia.

Finally, the authors would like to express their gratitude to the thousands of Institutional Coordinators, institution respondents, Chief Administrative Officers and individual faculty members who participated in the study. Without their cooperation, NSOPF-93 could never have been completed.

Table of Contents

Table of Contents (cont.)

Table of Contents (cont.)

Table of Contents (cont.)

Exhibits

Exhibits (cont.)

Appendices

1. Introduction

1.1 Organization of the Methodology Report

The *1993 National Study of Postsecondary Faculty: Methodology Report* is designed to give readers an accurate picture of this important study and the data generated by its methodology. The report is organized into 11 chapters, and begins by introducing NSOPF-93 in the context of the earlier NSOPF-88 study. Chapter 2 details the data collection instruments, while Chapter 3 discusses the NSOPF-93 sample design and implementation. Next, the Methodology Report moves on to review institutional recruitment procedures and their results in Chapter 4. The report then examines the data collection procedures (Chapter 5) and data control and processing (Chapter 6). Chapters 7 and 8 deal with institution and faculty unit response and nonresponse, and questionnaire item nonresponse. Chapter 9 examines data quality in terms of validity and reliability. Chapter 10 examines faculty counts and summarizes the procedures used to reconcile discrepancies and to calculate "best estimates" for the NSOPF-93 faculty dataset. Finally, Chapter 11 offers recommendations for future NSOPF studies.

1.2 Background: NSOPF-88

The 1988 National Survey of Postsecondary Faculty (NSOPF-88)—whose successor study was renamed the National *Study* of Postsecondary Faculty—was the first comprehensive study of higher education instructional faculty conducted by the National Center for Education Statistics (NCES) since 1963. The National Endowment for the Humanities provided additional support. NSOPF-88 generated immediate interest in the higher education community because prior to the release of these data there had been very little comprehensive information available on this topic. The survey provided a national profile of faculty in two-year, four-year, doctoral-granting, and other public and private non-proprietary institutions. Information was gathered on the professional backgrounds, responsibilities, workloads, salaries, benefits, and attitudes of both full- and part-time instructional faculty. In addition, data were collected from institutional representatives and department-level respondents on such issues as faculty composition, new hires, departures and recruitment, retention, and tenure policies.

The 1988 study, conducted by SRI International, involved both field test and full-scale survey components. The field test targeted a sample of 105 non-proprietary two-year and four-year institutions, 235 faculty, and 91 department chairpersons (from 51 four-year institutions and a supplement of 40 two-year and four-year institutions). Ninety-one percent of the institutions participated in the field test by returning their faculty lists. Questionnaire responses were obtained from 80 percent of institutional representatives (two and four-year institutions, excluding specialized institutions), 86 percent of the department chairpersons (four-year institutions only), and 68 percent of the faculty (two-year and four-year institutions).

The NSOPF-88 field test was conducted from July through October of 1987. It was designed primarily to test the relative effectiveness of two alternative data collection strategies, to determine the most effective procedures for obtaining lists of faculty, and to examine the adequacy of the questionnaires. The results of the field test informed the design of the full-scale NSOPF-88 study. A brief synopsis of the field test procedures and results can be found in the *National Survey of Instructional Staff: Field Test Methodology Report* (U.S. Department of Education, National Center for Education Statistics: Washington, D.C., March 8, 1988).

The NSOPF-88 full-scale study had three components: an institution-level survey of 480 colleges and universities in the United States; a survey of 3,029 eligible department chairpersons (or their equivalents) within the participating institutions; and a survey of 11,013 eligible faculty members within the same participating institutions. Data were collected for these three surveys between December 1987 and

October 1988. Non-proprietary higher education institutions (two-year, four-year, or advanced degree) were stratified
by size and assigned to strata adapted from the higher education institution classification system developed by the Carnegie Foundation for the Advancement of Teaching.[1] Within each stratum, institutions were randomly selected. Lists of faculty employed as of October 15, 1987 were requested from participating institutions, and of the 480 institutions selected, 449 (94 percent) agreed to participate and provided lists of their fall 1987 instructional faculty and department chairpersons. Within four-year institutions, faculty and department chairpersons were stratified by program area and selected; within two-year institutions, simple random samples of faculty and department chairpersons were selected; and within specialized institutions (religious, medical, etc.), only faculty were sampled. At all institutions, instructional faculty were stratified on the basis of employment status—full-time and part-time. Questionnaires that asked about activities during the 1987 fall term were mailed in 1988. Questionnaire responses were obtained from 424 institutions (88 percent), 2,427 department chairpersons (80 percent), and 8,383 instructional faculty (76 percent).

A discussion of the procedures and results of the 1988 full-scale study appears in *1988 National Survey of Postsecondary Faculty: Methodology Report* (U.S. Department of Education, National Center for Education Statistics: Washington, D.C., May 18, 1990). Four analytical reports were also prepared using NSOPF-88 data: *Faculty in Higher Education Institutions, 1988* [NCES 90-365]; *Institutional Policies and Practices Regarding Faculty in Higher Education* [NCES 90-333]; *A Descriptive Report of Academic Departments in Higher Education Institutions* [NCES 90-339]; and *Profiles of Faculty in Higher Education Institutions, 1988* [NCES 91-389].

1.3 Background: NSOPF-93

Like its predecessor, NSOPF-93 was designed to provide a national profile of faculty in two-year, four-year (and above), doctoral-granting, public and private non-proprietary institutions, and to gather information on the backgrounds, responsibilities, workloads, salaries, benefits, and attitudes of both full- and part-time faculty. NSOPF-93 was conducted by the National Opinion Research Center (NORC), a social science research center at the University of Chicago. NSOPF-93 was sponsored by the National Center for Education Statistics (NCES), with additional support from two co-sponsoring agencies, the National Endowment for the Humanities (NEH) and the National Science Foundation (NSF). NEH and NSF sponsored sample augmentations for both the field test and full-scale study, and provided support for the study in its entirety. The sample augmentations were designed to provide higher levels of precision for faculty overall and to provide oversamples of specific subgroups of faculty, particularly full-time females; black, non-Hispanics; Asian/Pacific Islanders; Hispanics; and faculty in the humanities.

The second cycle of the National Study of Postsecondary Faculty (NSOPF-93) was conducted in response to a continuing need for data on faculty and other instructional personnel, all of whom directly affect the quality of education in postsecondary institutions. Faculties determine curriculum content, performance standards for students, and the quality of students' preparation for careers. In addition, faculty members perform research and development work upon which the nation's technological and economic advancement depend. For these reasons, it is essential to understand who they are; what they do; and whether, how, and why the nation's faculty are changing.

Data collected for the second cycle of NSOPF expand the current information base about faculty in several

[1]See *A Classification of Institutions of Higher Education*, The Carnegie Foundation for the Advancement of Teaching (Princeton, N.J., 1987).

important ways. First, the data allow for comparisons to be made over time. Second, more detailed comparisons can be made because of the increase in both the institutional and faculty sample sizes. Third, these data examine critical issues surrounding faculty that have developed since the 1988 study. Fourth, to get a clearer and more accurate picture of faculty and instruction, NSOPF-93 expanded the definition of faculty to include both non-instructional faculty and non-faculty instructional personnel in higher education institutions. Henceforth, the term "faculty" will be used in its broadest sense to designate both non-instructional and instructional faculty and other instructional staff. Chapter 3 discusses the definitions of eligible faculty in greater detail.

1.4 NSOPF-93 Field Test

A field test of NSOPF-93 data collection instruments and survey procedures with a national probability sample of 136 institutions (54 core institutions, and 82 institutions selected to augment the core sample, funded by NSF) and 636 faculty was conducted between February and September 1992. The general purposes of the field test were to evaluate the adequacy of the faculty and institution questionnaires and to test key procedures to be used in the full-scale study.

Institutional cooperation was sought from all 136 institutions and a faculty list was solicited from each institution. The overall participation rate for faculty list collection was 89 percent (93 percent for the core sample and 87 percent for the augmented sample). The field test faculty sample consisted of 636 faculty selected from 53 participating core institutions. A total of 495 faculty participated, for a response rate of 82 percent. The institution survey was limited to the 120 participating institutions that had provided lists of faculty and/or confirmed their participation prior to September 1, 1992. Ninety four of these institutions responded to the institution questionnaire for a response rate of 78 percent (82 percent for the core institutions and 78 percent for the augmented sample).

The results of the field test informed the design of the full-scale study. A detailed discussion of the procedures and results of the 1992 field test appears in the *1992-93 National Study of Postsecondary Faculty Field Test Report* (U.S. Department of Education, National Center for Education Statistics, Washington, D.C., February 1994 [NCES 93-390]).

1.5 NSOPF-93 Full-Scale Study

For the NSOPF-93 full-scale study, the sample sizes were increased from 480 institutions and 11,013 faculty (in 1988), to 974 institutions and 31,354 faculty. The larger sample sizes allowed for more detailed comparisons and higher levels of precision at both the institution and faculty levels. The sample was also augmented to provide data about faculty in the humanities; faculty in these disciplines were oversampled, as were black, non-Hispanic; Hispanic; Asian/Pacific Islander; and full-time female faculty. As in the 1988 study, the sample consisted of non-proprietary two- and four-year (and above) higher education institutions stratified by a modified Carnegie classification and by faculty size. Institutional recruitment for the full-scale study began in October, 1992, when recruitment packets were mailed to the Chief Administrative Officers of 789 institutions. A supplemental sample of 185 institutions was added to ensure adequate representation across all strata. Of the 974 institutions in the total sample, 12 were found to be ineligible. Of the 962 eligible institutions, 817 institutions (85 percent) agreed to participate in the study (i.e., to provide lists of faculty employed during the 1992 Fall Term, that is, the term in progress on October 15, 1992). The faculty sample was selected from these 817 institutions. In 1993, questionnaires that asked primarily about the 1992 Fall term were mailed to institutions and faculty. (Specific questionnaire items are discussed in Chapter 2.)

The target sample for the faculty survey consisted of 31,354 faculty selected from 817 participating institutions. Of these, 1,590 were found to be ineligible. Of the 29,764 eligible faculty, 25,780 (87 percent) completed questionnaires either by self-administration or by a computer-assisted telephone interview (CATI).

Institution questionnaires were mailed to institution representatives at all 962 eligible institutions, including those that did not supply a list of faculty. Of the eligible institutions, 872 (91 percent) completed an institution questionnaire.

A survey report summarizing key results from the faculty survey is available: *Faculty and Instructional Staff: Who Are They and What Do They Do?* [NCES 94-346]. Other reports based on data from the NSOPF-93 faculty survey include: *Instructional Faculty and Staff in Higher Education Institutions: Fall 1987 and Fall 1992* [NCES 97-470] and *Characteristics and Attitudes of Instructional Faculty and Staff in the Humanities* [NCES 97-973]. Another report, *Institutional Policies and Practices Regarding Faculty in Higher Education* [NCES 97-080] is based on the NSOPF-93 institution survey. These and future publications will also be available on the Internet on NCES's World Wide Web site at: http://www.ed.gov/NCES.

1.6 Restricted-use Data File and Documentation

A restricted-use data file has been produced for the NSOPF-93 faculty component on magnetic tape and on CD-ROM. The *1993 National Study of Postsecondary Faculty Data File User's Manual* [NCES 97-466] accompanies the NSOPF-93 data files appearing on magnetic tape and on CD-ROM.

The restricted-use data file has been released through individual licensing agreements to analysts who require access to the complete NCES data files for their research. Users agree, under penalty of law, that they shall not release any information that may lead to disclosure of a respondent's identity. The restricted-use data file contains data for 25,780 respondents from 817 participating institutions.

1.7 Public-use Data Files and Documentation

Public-use institution and faculty data files are also available on diskette or CD-ROM. The institution file contains data from the 872 postsecondary institutions that completed an institution questionnaire.

The public-use faculty data file contains data for 25,780 respondents from 817 participating institutions. Because multi-level micro data carry some risk of statistical disclosure of institutional or individual identities, the faculty data were subjected to an extensive deductive disclosure analysis to determine which items, used alone, in conjunction with other key variables, or in conjunction with public external sources such as NCES's Integrated Postsecondary Education Data System (IPEDS) files, have significant disclosure potential. To minimize the possible risk of disclosure of individual respondents, in compliance with the National Education Statistics Act, Public Law 103-382 [20 USC 9001 *et seq*.], the Carl D. Perkins Vocational Education Act, and the Privacy Act of 1974 [5 U.S.C. 552a], variables found to pose significant disclosure risks were modified or suppressed to remove or to substantially reduce such risks.

1.8 Derived Variables

For NSOPF-93, a total of 36 institution-level and 107 faculty-level derived variables were created in order to simplify access to standard queries useful to analysts as well as to enhance substantive analysis. Since research questions frequently require independent or control variables, this set of derived variables has been carefully constructed and added to the faculty and institution data files. The faculty restricted-use file

includes all 143 derived variables. The institution file contains only the 36 institution-level derived variables. The public-use faculty file contains selected derived variables that were found not to pose significant disclosure risks.

Multiple sources of data were used to create institution-level derived variables including: the 1991-92 IPEDS, the "Carnegie classification" system, and NSOPF-93 sampling information. Documentation for all derived variables appears in Appendix O.

1.9 Electronic Codebooks on CD-ROM and Documentation

In addition to hardcopy codebooks that accompany the various releases of NSOPF-93 data, three NSOPF-93 electronic codebooks (ECBs) are also available to users. One ECB consists of the public-use institution file, another consists of the restricted-use faculty data file, and the other consists of the faculty restricted-use file merged with the public-use institution file. The ECBs feature windows with unweighted frequencies and percentages. A README.TXT file on the CD-ROM describes how to install the ECBs. Extensive "help" files and menus explain ECB features.

The ECB combines the convenience, simplicity, and cost efficiencies of personal computers (PCs) with CD-ROM technology. ECBs permit users to search for variables based on key words and names. The ECB displays full question text and unweighted frequencies for each variable in order to assist users in deciding which data elements may be useful for their analyses. The ECB can also be used as a tool for selecting variables for subsequent analysis, writing SAS or SPSS-PC code for file construction of the designated variables, and for generating a codebook of the chosen set of variables. More detailed information on the features of the NSOPF-93 ECBs appears in the *1993 National Study of Postsecondary Faculty: Data File User's Manual* [NCES 97-466] and in the ECB "help" files and menus on the CD-ROM.

1.10 Data Analysis System on CD-ROM and Documentation

A NSOPF-93 faculty Data Analysis System (DAS) is also available. The DAS provides a convenient, menu-driven system allowing researchers to produce tables of frequencies and cross tabulations and correlation matrices. The NSOPF-93 sample is not a simple random sample. Therefore, simple random sample techniques for estimating sampling error cannot be applied to these data. The DAS takes into account the complexity of the sampling procedures and calculates standard errors appropriate for such samples. DAS software provides all information necessary for a user to set up and run a variety of analyses. Each DAS is self-documenting, with weighted data distributions and full descriptions for each variable. The DAS allows users to select variables for rows, columns, and subgroups for tables from the list of available variables, many of which have been computed to simplify analysis. Continuous variables, such as income, can be recoded into categories for rows, column percentages, or subgroup definitions. Categorical variables, such as race, can be grouped or "lumped" in various ways for analysis. Table titles as well as variable labels can be edited by the user, and DAS output is compatible with most spreadsheet software. In addition to the table estimates, the DAS calculates proper standard errors and weighted sample sizes for these estimates. If the number of valid cases does not meet the minimum requirement based on NCES statistical standards, the DAS prints the message "low-N." Users can also define variables for use in a correlation matrix, which can be imported into standard statistical packages for more complex analysis. More detailed information on the features of the NSOPF-93 DAS appears in the "help" files and menus on the DAS/CD-ROM.

1.11 How to Obtain NSOPF-93 Products

Restricted-use faculty data are available at no charge on a restricted loan basis to organizations that obtain an approved licensing agreement from NCES. To request a licensing agreement, the individual and/or institution must provide the following information:

- The title of the survey to which access is desired.
- A detailed discussion of the statistical research project that requires accessing the restricted NCES survey data.
- The name and title of the most senior official who has the authority to bind the organization to the provisions of the licensing agreement.
- The name and title of the project officer who will oversee the daily operations.
- The name, telephone number, and title of professional and technical staff who will access the survey database. Each professional or technical staff member with access to the data is required to sign and to have notarized an Affidavit of Nondisclosure.
- The estimated loan period necessary for accessing the NCES survey database.
- The desired computer product specifications, such as medium (9-track tape, CD-ROM), code convention (ASCII, EBCDIC, SAS), etc.

To obtain further details and a licensing agreement form please write to:

Data Security Officer
Statistical Standards and Services Group
U.S. Department of Education
Office of Educational Research and Improvement
National Center for Education Statistics
555 New Jersey Avenue, N.W., Room 408
Washington, D.C. 20208
(202) 219-1831

Individuals who obtain restricted-use faculty data after signing a licensing agreement with NCES can receive the following products on one CD-ROM: the NSOPF-88 and NSOPF-93 faculty data files; the NSOPF-93 institution data file; the NSOPF-93 faculty ECB, the 1993 merged faculty and institution ECB; the user's manual for the institution and restricted-use faculty data files; and the faculty and institution questionnaires.

For those individuals who do not wish to obtain a licensing agreement, a public-use faculty data file (which contains a reduced number of variables to avoid disclosure) can be ordered from the National Education Data Resource Center (see address below). The public-use institution file can also be ordered from the National Education Data Resource Center. Individuals who order the public-use faculty file on CD-ROM will receive the NSOPF-93 public-use faculty and institution data files, the institution ECB, a user's guide for the public-use faculty and institution files, and the faculty and institution questionnaires.

The DAS can be accessed also through the Internet on NCES's World Wide Web site at http://www.ed.gov/
NCES. DAS procedures can be performed over the World Wide Web. The DAS CD-ROM for PC use (in DOS and Windows versions) can also be ordered by contacting:

National Education Data Resource Center
c/o Pinkerton Computer Consultants, Inc.
1900 N. Beauregard Street, Suite 200
Alexandria, VA 22311-1722
Phone: (703) 845-3151
FAX: (703) 820-7465
E-mail: nedrc@inet.ed .gov.

Feedback and suggestions on the products and other features of NSOPF-93 are welcome. Please address your comments to:

Linda Zimbler
NSOPF Project Officer
U.S. Department of Education
Office of Educational Research and Improvement
National Center for Education Statistics
555 New Jersey Avenue, N.W.
Room 422A
Washington, D.C. 20208
Phone: (202) 219-1834
E-mail: Linda_Zimbler@ed.gov.

2. Data Collection Instruments

2.1 Overview

This chapter provides a brief description of the two survey instruments developed and used in NSOPF-93: the faculty questionnaire and the institution questionnaire. Both instruments were designed as self-administered questionnaires (SAQs). A CATI (computer-assisted telephone interview) version of the faculty questionnaire was also developed and used during the follow-up data collection effort. Copies of the NSOPF-93 self-administered instruments appear in Appendix F and Appendix G.

2.2 Development of Questionnaire Items

Several research and policy concerns guided questionnaire development. One of the overriding objectives was to preserve as many of the 1988 items as were relevant and feasible. But this goal had to be balanced with the need to address recent policy issues that had emerged since the previous study. In order to balance these aims, it was necessary to identify, to revise, or to eliminate some questionnaire items that were either problematic or were no longer relevant to the broader issues.

For both the field test and the full-scale study, questionnaire items were constructed based on input from several sources, including the 1988 questionnaires, other postsecondary education surveys, the NSOPF-93 National Technical Review Panel (NTRP), and project staff and consultants. Questionnaire items for the full-scale study were further revised (or deleted) based on the results of the 1992 NSOPF field test and recommendations from the NTRP.

The 1988 institution and faculty questionnaires were used as a point of departure in determining which items should initially be preserved, expanded, or revised for the NSOPF-93 field test and later for the full-scale study. One major change was the definition of faculty used in the 1993 cycle of NSOPF. While the 1988 survey collected data from full- and part-time faculty who provided instruction for credit, the 1993 sample was expanded to include non-instructional faculty, as well as instructional faculty and staff. The consensus resulting from the NTRP meetings was that the population of non-instructional personnel with faculty status was too important to exclude from the study. Deans, college and university administrators, librarians and directors of university resource centers are included in this population of non-instructional faculty.

In addition, NSOPF-93 eliminated the Departmental Chairperson survey (a major part of the 1988 cycle) in favor of larger faculty and institution samples.[2] Because the items in this survey were best addressed by the department chairperson, it was deemed advisable to incorporate only a few of the questionnaire items from this earlier survey into the NSOPF-93 faculty or institution questionnaire.

A variety of related postsecondary education studies were reviewed in the process of developing the questionnaires,[3] and some of their items were incorporated into the questionnaires for the field test and the

[2]The final status of the department chairperson survey has not been determined for future NSOPF cycles.

[3]Institute of Social Research, York University, *The Academic Profession in Canada* (York, Ontario: Institute of Social Research, 1986); Harvard University, *1967 Survey of Faculty* (Cambridge, Mass.: Harvard University, 1967); Higher Education Research Institute, *1989 Faculty Survey* (Los Angeles: Higher Education Research Institute, 1989); National Center for Research to Improve Postsecondary Teaching and Learning, *Faculty at Work: A Survey of Motivations, Expectations, and Satisfactions* (Ann Arbor, Mich.: University of Michigan, 1987); Carnegie Foundation for the Advancement of Teaching, *National Survey of Faculty* (Princeton, N.J.:

full-scale study. Exhibits 2-1 and 2-2 describe the items in the faculty and institution questionnaires by content area and link specific questions to the 1988 instruments. Copies of the 1988 questionnaires appear in Appendices A-C.

2.3 Faculty Questionnaire

The faculty questionnaire was designed to address a variety of policy-relevant issues about higher education faculty and their institutions, including: (1) the background characteristics and current activities of instructional and non-instructional faculty; (2) the supply of, and demand for, faculty in postsecondary institutions; (3) faculty as both a resource and a consumer of resources; and (4) faculty attitudes and behaviors about key aspects of the higher education environment.

Given the changed definition of faculty, questions were added about research-only and other non-instructional faculty members to an instrument that had previously sought information only about instructional faculty. The faculty questionnaire was also revised to emphasize behavioral rather than attitudinal questions in order to collect data on who the faculty are; what they do; and whether, how, and why the composition of the nation's faculty is changing. The questionnaire addressed:

- background characteristics and academic credentials;
- workloads and time allocation between classroom instruction and other activities such as research, course preparation, consulting, public service, doctoral or student advising, conferences, and curriculum development;
- compensation, and the importance of other sources of income, such as consulting fees, royalties, etc., or income-in-kind;
- roles and differences, if any, between full- and part-time faculty in their participation in institutional policy-making and planning;
- faculty attitudes toward their jobs, their institutions, higher education, and student achievement in general;
- changes in teaching methods, and the impact of new technologies on teaching techniques;
- career and retirement plans;
- differences between those who have instructional responsibilities and those who have no instructional responsibilities, such as those engaged only in research; and
- differences between those with teaching responsibilities but no faculty status and those with teaching responsibilities and faculty status.

The design of the full-scale study questionnaire required input from NCES, the National Science Foundation (NSF), the National Endowment for the Humanities (NEH), and the NSOPF-93 National Technical Review Panel (NTRP), as well as an analysis of the data collected using the field test questionnaire. Respondent comments collected during the field test were reviewed and a debriefing was

Carnegie Foundation for the Advancement of Teaching, 1984 and 1989).

held with field test interviewers. Respondent and interviewer comments are summarized in the *1992-93 National Study of Postsecondary Faculty Field Test Report* [NCES 93-930]. Many questions, or subparts of questions, were deleted from the field test questionnaire based on high nonresponse or low reliability. Questions which were retained were sometimes modified to be clearer or more understandable. Some new items were added based on NTRP recommendations.

2.4 Institution Questionnaire

The institution questionnaire for the full-scale study was divided into three major sections, dealing with full-time instructional faculty and staff, part-time instructional faculty and staff, and full-time non-instructional faculty, respectively. As noted above, the inclusion of non-instructional faculty was new to NSOPF-93. Because institutional definitions of faculty vary widely, a question asked each institution for its own definitions of full- and part-time faculty, both instructional and non-instructional. The institution questionnaire obtained information on:

- the numbers of full- and part-time instructional and non-instructional faculty, as well as instructional personnel without faculty status, and their distributions by employment status (i.e. full-time, part-time) and tenure status (based on the definitions provided by the institution);
- institutional tenure policies and changes in policies on granting tenure to faculty members;
- the impact of tenure policies on the influx of new faculty and on career development;
- the growth and promotion potential for existing non-tenured junior faculty;
- the benefits and retirement plans available to faculty; and
- the turnover rates of faculty at the institution.

The institution questionnaire used in the full-scale study was quite different in content from the field test questionnaire. The results of the field test were reviewed by NCES, the NSOPF-93 NTRP and members of the Association for Institutional Research (AIR) in order to revise the questionnaire to capture as much data as possible while minimizing respondent burden. One of the major changes between the field test and the full-scale study was the elimination of items that asked for counts of minority and female faculty. Based on field test results and discussions with the NTRP, it was apparent that many institutions could not provide accurate information. Others refused to respond. In addition, the full-scale questionnaire included a glossary to highlight the operational definitions being used in the survey (e.g., instructional faculty versus non-instructional faculty) but also asked for the respondent to provide institutional definitions of permanent, temporary, full- and part-time faculty. Separate benefits questions were added for temporary full-time faculty and instructional staff. Another set of questions on institution subsidization of benefits was added as well.

Other changes between the field test and full-scale study included the addition of items asking about institutional downsizing. These items were included because of recommendations from NTRP and AIR members, and because institutions were reporting the loss of faculty due to fiscal constraints. Another recommendation of the NTRP was to collect data on the percentage of full- and part-time faculty represented by a union for purposes of collective bargaining. For more discussion of the field test, see the *1992-93 National Study of Postsecondary Faculty Field Test Report* [NCES 93-390].

Exhibit 2-1: NSOPF faculty questionnaire: content and linkage of items between 1988 and 1993 NSOPF cycles

Content area	NSOPF-93 faculty questionnaire question	Source question from NSOPF-88	How NSOPF-93 question differs from NSOPF-88 question
Instructional duties	1	1	
Instructional duties	1A Revised	2	**Change in order of response categories.** **New response choice:** 1. All of your instructional duties related to credit courses. **Wording changes:** Question shortened. Added: "...or advising or supervising academic activities" to response categories 2 and 3. "At least..." eliminated from response category 2.
Principal activity	2 New	3	**Question expanded**: Asks for "principal activity at this institution", and lists "sabbatical from another institution" as one of eight response categories. NSOPF-88 asks only if respondent is on sabbatical from this institution ("yes" or "no").
Faculty status	3 New		
Full-time/part-time status	4 4A New	4	**Question expanded:** A new sub-question at Q.4a asks for reasons respondent worked part-time; provides six response categories (a-f) to be answered yes or no. Change in order of response categories at Q.4 (full-time = category 1 and part-time = category 2 in 1988) to facilitate approach to Q.4a.
Responsibilities	5	7	
Year job at institution began	6 New		
Tenure status	7 Revised 7A New	9, 10	**Order of response categories changed.** **Question reformatted:** If respondent selects category 1 (tenured), then respondent answers 7A about the year tenure was achieved (Q.10 in the NSOPF-88 questionnaire).
Length of contract	8 Revised	11	**Wording changes:** Response category 3 changed from: "two or more academic/calendar years" to: "A limited number of years (i.e., two or more academic/calendar years)." "OTHER" category for open-ended answer added.
Academic rank	9 Revised	12	**Question expanded:** Asks for academic rank, title, or position. **Response category eliminated:** "Distinguished/Named Professor."
Year achieved academic rank	10	13	

Content area	NSOPF-93 faculty questionnaire question	Source question from NSOPF-88	How NSOPF-93 question differs from NSOPF-88 question
Type of appointment	11 Revised	14	**Wording change:** From: "...Did you hold any of the following kinds of appointments at this institution?" To: "...which of the following kinds of appointments did you hold at this institution?" **New response categories:** 5. Clinical (WRITE IN TITLE OR POSITION). 6. Research (WRITE IN TITLE OR POSITION).
Principal teaching discipline	12	16	
Principal area of research	13 New		
Undergraduate academic awards	14 Revised	27	**Change in order of response categories:** Response category 6 was 0 in 1988.
Graduate financial assistance	15	28	**Change in wording in 1993:** Phrase "forms of financial assistance" added. **New response choice:** "Other loan" added to response category choices.
Academic degrees	16 Revised	26	**Response categories reordered and changed for degree code:** Categories reordered from highest to lowest degree and category "Graduate work not resulting in a degree" eliminated. **Other changes:** Name of field added. Number of degrees asked about reduced from seven to four.
Other current employment	17 Revised 17A New	5	**Wording change:** From: "Please include outside consulting or other self-owned business..." To: "... or did you also have other employment including any outside consulting or other self-owned business, or private practice?" **New question asks:** "How many different jobs, other than your employment at this institution, did you have...(WRITE IN NUMBER)"

Content area	NSOPF-93 faculty questionnaire question	Source question from NSOPF-88	How NSOPF-93 question differs from NSOPF-88 question
Main other current employment	18 Revised 18C Revised 18A New 18B New	6	**Wording changed to apply only to main other job:** From: "Other than this institution, in which of the following ways were you employed during the...Fall Term..." To: "Not counting any employment at this institution, what was the employment sector of the main other job you held during Fall 1992?" Other changes: First two NSOPF-88 response categories combined into one category; two-year or less postsecondary combined into one category; two consulting categories combined into one; two government categories combined into one. Definition of full- and part-time deleted (35 hours). Minor changes in phrasing ("On staff of" deleted from response categories). **New questions:** 18A. What year did you begin that job? 18B. What was your primary responsibility in that job? 1. Teaching 2. Research 3. Technical activities (e.g., programmer, technician, chemist, engineer, etc.) 4. Clinical service 5. Community/public service 6. Administration 7. Other 18C. Was that job full-time or part-time? 1. Full-time 2. Part-time
Previous employment	19 Revised	29	**Question reformatted to pre-coded response categories.** **Wording changes:** From: "Please begin with your current job, and work backward" (up to 15 jobs) to: "the three most recent and significant main jobs that you held during the past 15 years." Added: "...at one place of employment" To: "Do not list promotions in rank...as different jobs." **Changes in response categories:** Employment sector and primary responsibility categories changed to match categories at Q.18 and Q.18B.
Presentations/ publications	20 Revised	30	**Wording changes:** NSOPF-93 response categories 1-2 refer to articles published; categories 3-4 refer to creative works; 1988 question refers to articles or creative works published for all four categories. **Added phrase:** "...Count multiple presentations/publications of the same work only once." **Format change:** Reversed response category columns to ask about total career before asking about past 2 years.

Content area	NSOPF-93 faculty questionnaire question	Source question from NSOPF-88	How NSOPF-93 question differs from NSOPF-88 question
Thesis/ dissertation committees	21 Revised	31	**Wording change:** "... or examination or certificate committees" added to question. **Changes to response categories:** Not applicable code added. **Question reformatted:** For each category, asks: A. Number served on B. Of that number, how many did you chair? **Response categories added:** Examination/certification committees. Separates categories into 3 undergraduate and 3 graduate categories.
Number of classes taught (Fall 1992)	22 New 22A New		Added to identify total classes and, or those, number for-credit.
Classroom responsibilities (for-credit)	23 Revised	32	**Question reformatted into one column per class, categories pre-coded for level and instructional methods.** **New instructions:** Main question, 1st sentence, 2nd clause shortened to "please answer the following items." Second and 3rd sentences of NSOPF-88 main question eliminated. **Added/revised response categories:** Added "CODE FOR ACADEMIC DISCIPLINE OF CLASS." 1st to 3rd and 6th NSOPF-88 response categories become sub-categories for NSOPF-93 Q.23(2), which has two new sub-questions, "Number of weeks the class met," and "Number of credit hours." 2nd NSOPF-88 response choice split into two sub-questions for Q.23(2), "Was this class team taught?" and "Average # hours per week you taught the class." 4th NSOPF-88 question becomes Q.23(3). NSOPF-88 primary level of students response codes 1 to 3 become 1st three sub-categories for Q.23(3). Primary level of students, codes 4 to 6, incorporated into one category at Q.23(3) "All other students." "Primary setting" item changed to "Primary instructional method used." 2nd primary setting code split into sub-categories 2 and 3 for Q.23(4) "Seminar" and "discussion group or class presentation." Primary setting response codes 7 and 8 replaced with new categories "Group projects" and "Cooperative learning groups."
Undergraduate courses taught for credit/tools and methodology used	24 New 24a New		

Content area	NSOPF-93 faculty questionnaire question	Source question from NSOPF-88	How NSOPF-93 question differs from NSOPF-88 question
Individual instruction	25 Revised	33	**Wording change:** Additional definitions offered in text: "independent study or one-on-one instruction, including working with student in a clinical or research setting" Additional instructions: "Do not count regularly scheduled office hours." **Response categories:** Multiple response categories collapsed into "all other students."
Weekly scheduled office hours	26 New		
Informal student contact	27 New		
Research/creative works	28 New		
Primary research/creative work	29 New		
Any funded research/creative work	30 New		
PI or Co-PI: funded research/ creative work	31 Revised	34	**Wording change:** "principal investigator (PI) or project director" changed to "principal investigator (PI) or co-principal investigator (Co-PI)" phrase deleted: "...including service contracts or internal awards"
Individuals supported by funded research/creative work	32 New		
Funded research/creative work	33 Revised	35	**Question introduction changed.** 1988 question asked about grants and contracts for which respondent was principal investigator. 1993 questionnaire asks about all grants and contracts for which respondent was a principal investigator, a Co-PI or a staff member. **Question expanded (Parts C and E are new):** A. Funding source (re-ordered) B. Number of grants/contracts C. Work done as... 1. PI 2. Co-PI 3. Staff D. Total funds for 1992-93 academic year E. How funds were used... 1. Research 2. Program/curriculum development 3. Other
Quality of available resources	34 New		
Internal funds for professional development	35 New		

Content area	NSOPF-93 faculty questionnaire question	Source question from NSOPF-88	How NSOPF-93 question differs from NSOPF-88 question
Faculty activities/ workload	36 Revised	36	**Wording changes:** "work" replaced by "activities" **Category added:** Paid activities at institution asked separately from unpaid activities at institution. Number of categories expanded from three to four.
Faculty activities/ workload	37 Revised 37A Revised 37B New	37	**Wording change:** From: "Please estimate the percentage of your total working hours ...spent on each of the following activities..." To: "In column A we ask you to allocate your total work time ...into several categories." **New instructions added:** "We realize they are not mutually exclusive categories..." **Instruction change:** "We know that this is tedious..." deleted from request that percentages add up to 100% of total time. **Change in response categories, question added, questions reformatted:** Two responses asked for each category: A. % of Work Time Spent, B. % of Work Time Preferred. a. Teaching (incorporates 1st 3 categories from NSOPF-88). b. Research (incorporates 5th to 7th NSOPF-88 categories). c. Professional Growth (incorporates 8th and 9th NSOPF-88 categories d. Administration (matches 4th 1988 category). e. Outside consulting or freelance work (matches 11th 1988 category). f. Service/Other Non-Teaching Activities (incorporates 10th, 12th and 13th NSOPF-88 categories).
Union membership	38 Revised	17,18	**Response categories expanded, two questions combined into one:** 1. Union is available, but I am not eligible. 2. I am eligible, but not a member. 3. I am eligible, and a member. 4. Union is not available at this institution.
Job satisfaction	39 Revised 40 Revised	19	**Wording changes:** Replaced "do you personally feel about" with "How satisfied or dissatisfied...?" at Q.39, changed "your job" to "your instructional duties." **Category changes:** Q.39 asks about six instructional duties categories and Q.40 asks about nine general job satisfaction categories. Some categories were modified or deleted, and new categories added. NSOPF-88 had 29 categories.

Content area	NSOPF-93 faculty questionnaire question	Source question from NSOPF-88	How NSOPF-93 question differs from NSOPF-88 question
Faculty mobility	41 Revised	20	**Wording change:** From: "How likely is it you will leave this job to do the following" To: "How likely is it that you will leave this job to..." **Categories modified/added/reordered:** "Seek or accept" changed to "accept." Two categories added to differentiate "...postsecondary institution" from "...not at a postsecondary institution." Retirement asked about last, instead of first.
Faculty retirement age	42 Revised	24	Question reformatted to ask for verbatim response to age respondent expects to retire.
Job satisfaction: Reasons for accepting new position	43 Revised	22	**Wording change:** From: "this job" To: "your current position in academia," "...inside or outside of academia" added after "to accept another position." **Category changes:** Some categories were reordered, six were deleted and three were added.
Retirement options	44 New 45 New		
Projected age of retirement	46 New		
Compensation from institution	47 Revised	40	**Wording changes:** "Earnings" is replaced by "compensation." Response category headers replace "Income" with "Compensation." **Changes to response categories:** "Other sources of earned income" becomes a header. Two response categories added for verbatim responses. b. Type of appointment (e.g., 9 months) added. Instruction added to non-monetary compensation items: "Do not include employee benefits, such as medical, dental, or life insurance."
Household enumeration	48 New		
Total household income	49 New		
Number of dependents	50 New		
Sex (male/female)	51 Revised	41	NSOPF-88 asks "Your gender" and NSOPF-93 question asks "Are you..." with response categories
Date of birth	52 Revised	42	**Wording change:** From: "In what year were you born?" To: "In what month and year were you born?"
Race/ethnicity	53	44	"African-American/black" replaces "black."

Content area	NSOPF-93 faculty questionnaire question	Source question from NSOPF-88	How NSOPF-93 question differs from NSOPF-88 question
Race/ethnicity	53A New	44	Added to allow categorization of Asian/Pacific Islander ethnic groups.
Race/ethnicity	54	43	
Race/ethnicity	54A New	43	Added to allow categorization of Hispanic ethnic groups.
Current marital status	55 Revised	45	**Response category added:** "Living with someone in a marriage-like relationship."
Country of birth	56 New		
Citizenship status	57 Revised	46	**Wording changes** **From:** "Of what country are you currently a citizen?" **To:** "What is your citizenship status?" **Question reformatted:** 1. United States citizen, native, 2. United States citizen, naturalized, 3. Permanent resident of the United States (immigrant visa), 4. Temporary resident of United States (non-immigrant visa). Categories 3 and 4 each ask for country of present citizenship.
Parents' education	58 Revised	47	Revised question does not ask about spouse.
Academic interests and values	59 Revised 60 Revised	48 49	**Category changes:** Some categories were modified or deleted, and new categories were added. Categories also reordered. Five of the 1988 categories were retained at Q.59 and eight were deleted; two new categories were added. Four of the 1988 categories were retained at Q.60 and two were deleted; five new categories were added.

Exhibit 2-2: NSOPF institution questionnaire: content and linkage of items between 1988 and 1993 NSOPF cycles

Content area	NSOPF-93 institution questionnaire question	Source question from 1988 institution questionnaire	Source question from 1988 department questionnaire	How NSOPF-93 question differs from NSOPF-88 question
Institutional definitions of faculty	New			
Numbers of full/part-time faculty/staff, Fall 1992	1 Revised	4,5,19		Combined questions from NSOPF-88 into one question. Omitted asking specifically for "full-time faculty with visiting, acting, or adjunct appointments"
Section I: Full-time instructional faculty/staff Changes in total of permanent staff 1991-92	2 Revised	6		**Wording changes:** From: "How many full-time instructional faculty did your institution have in each of the following categories?" To: "Please provide the following information about changes in the number of permanent full-time instructional faculty/staff between the 1991 and 1992 Fall Terms." **Change in response categories:** Reordered sub-items, added "d. Number...who left because of downsizing..."
Number of permanent staff institution sought to hire	3 Revised		13	**Wording change:** From: "For how many unfilled full-time instructional faculty positions in your department were candidates being hired?" To: "How many permanent full-time instructional faculty/staff did your institution seek to hire for the 1992 Fall Term?"
Number of permanent instructional positions not filled	4, 4A New			
Tenure system	5 Revised	3		Deleted "for any of your"
Number of tenured/ tenure track staff 1991/1992	6 Revised	8	9	Reformatted answer matrix
Number of tenured staff who left between 1991-92	7 Revised	9	10	Slight change in question wording. **Change in response categories:** Deleted "to assume another position," "formally removed for cause," and "dismissed because of institutional budget pressures or program closure" Added "downsizing"
Number of staff considered for/granted tenure	8	7	8	

Content area	NSOPF-93 institution questionnaire question	Source question from 1988 institution questionnaire	Source question from 1988 department questionnaire	How NSOPF-93 question differs from NSOPF-88 question
Maximum number of years on tenure track	9 Revised	10, 12	11	**Wording change:** From: "Is there a maximum number of years an instructional faculty member can be on tenure track and not receive tenure at your institution?" To: "Fill in the following information about the maximum number of years..." **Change in response categories:** Added "9b. If maximum number of years has changed..." from NSOPF-88 question 12.
Changes in tenure policy in last 5 years	10 Revised	12		**Change in question wording:** From "three years" to "five years" **Change in response categories:** Deleted "offered optional early or phased retirement"; asked separately in question 11. Deleted "changed the upper limit on the percentage of full-time faculty who may be tenured" and "changed the maximum number of years a person can be on tenure track..."
Early or phased retirement policy (permanent staff)	11 Revised	12		See note for question 10.
Retirement plans available to permanent staff	12 Revised	15		Reformatted question wording slightly; deleted asking for approximate number of faculty participants; reformatted response matrix **Change in response categories:** Reordered categories, added "b. Other 403B plan" and changed "d. 401K or 401B plan" from "401(k) or 403(b) plan"
Employee benefits (permanent staff)	13 Revised	14, 16		**Changes in question wording:** Added "permanent" to question, added "If available, indicate whether the benefit is subsidized or not subsidized by your institution." **Change in response categories:** Reordered categories, added k. Transportation/parking n. Medical insurance for retirees o. Cafeteria-style plan...
Percent of salary contributed to benefits by institution	14 Revised	17		**Changes in question wording:** Added "permanent" to question text
Availability of benefits to temporary faculty	15 *New	14		**Changes in question wording:** Added "temporary" to question text

Content area	NSOPF-93 institution questionnaire question	Source question from 1988 institution questionnaire	Source question from 1988 department questionnaire	How NSOPF-93 question differs from NSOPF-88 question
Employee benefits (temporary faculty)	16 *New	14		See changes for question 13; added "temporary" in question text
Percent of undergraduate instruction by full-time staff	17 New			
Teacher assessment	18 Revised		19	**Changes in question wording:** From: "In which of the following ways, if any, is the teaching performance of full-time faculty assessed in your department?" To: "Are any of the following used in assessing teaching performance of full-time (permanent or temporary) instructional faculty/staff at this institution?" **Change in response categories:** Changed c. from "student placement or honors" to "student career placement"
Collective bargaining	19, 19A	13	17	**Changes in question wording:** Added "with this institution"
Section II: Full-time non-instructional faculty Changes in total of permanent staff 1991/92	20 *New	6		See note for question 2
Tenure system	21 *New	3		See note for question 5
Number of tenured/ tenure track staff 1991/1992	22 *New	8	9	See note for question 6
Number of tenured staff who left between 1991-92	23 *New	9	10	See note for question 7
Number considered for/granted tenure	24 *New	7	8	See note for question 8
Maximum number of years on tenure track	25 *New	10	11	See note for question 9
Changes in tenure policy in last 5 years	26 *New	12		See note for question 10
Early or phased retirement policy (permanent staff)	27 *New	12		See note for question 11
Retirement plans available to permanent staff	28 *New	15		See note for question 12

Content area	NSOPF-93 institution questionnaire question	Source question from 1988 institution questionnaire	Source question from 1988 department questionnaire	How NSOPF-93 question differs from NSOPF-88 question
Employee benefits (permanent staff)	29 *New	14		See note for question 13
Percent of salary contributed to benefits by institution	30 *New	17		See note for question 14
Availability of benefits to temporary faculty	31 *New	14		See note for question 15
Employee benefits (temporary faculty)	32 *New	14		See note for question 16
Collective bargaining	33,33A *New	13	17	See note for question 19, 19A
Section III: Part-time instructional faculty/staff Availability of retirement plans	34 New			
Retirement plans: subsidized/nonsubsidiz-ed	35 Revised	23		See note for question 12
Employee benefits	36 New			
Employee benefits available	37 *New	24,14		See note for question 13 Also added p. "other"
Percent of salary contributed to benefits by institution	38 Revised	25		Question wording slightly revised
Eligibility criteria for benefits	39 New			
Eligibility requirements for benefits	40 New			
Percent of undergraduate instruction by part-time staff	41 New			
Teacher assessment	42 Revised		32	See note for question 18
Collective bargaining	43, 43A	22	29	See note for question 19, 19A

* Not asked in 1988 for this faculty type though asked for other types

3. Sample Design and Implementation

This chapter describes the sample design and procedures used for selecting institutions and faculty for NSOPF-93. It also provides information on the calculation of sample weights and the relative efficiency of the sample design.

3.1 NSOPF-93 Sample Design

NSOPF-93 sought to create a nationally representative sample of instructional faculty and staff and non-instructional faculty at two-year and above, non-proprietary or public postsecondary institutions. To achieve this, a two-stage sample design was used, with a sample of 974 postsecondary institutions in the first stage, and a sample of 31,354 faculty from these institutions in the second stage.

3.2 Institution Universe

The definition of the institution universe for NSOPF-93 was identical to the one used in NSOPF-88. It was defined as those institutions in the traditional sector of postsecondary education whose accreditation at the college level is recognized by the U.S. Department of Education. Institutions were selected from the IPEDS universe into the NSOPF-93 institution frame if they:

- were classified as two-year, four-year (and above), or doctoral-granting institutions;
- € were public or private nonprofit;
- offered an educational program designed for persons who have earned a traditional four-year high school diploma or a high school graduate equivalency diploma;
- offered programs that are academically, occupationally, or vocationally oriented;
- made programs available to persons other than those employed by the institution;
- offered some courses other than correspondence courses; and
- were located in the 50 states or the District of Columbia.

Institutions were excluded from the universe if they:

- were not recognized as accredited at the college level by the U.S. Department of Education;
- were classified as for-profit, or less-than-two-year institutions;
- provided only avocational, recreational, basic adult education, or remedial courses (e.g., driver training schools, real estate courses, dance schools, tax preparation schools, and the like);
- provided only in-house business courses or training; and
- were not located in the 50 states or the District of Columbia.

3.3 Faculty Universe

Unlike NSOPF-88, which was limited to instructional faculty, the faculty universe for NSOPF-93 was expanded to include all who were designated as faculty, whether or not their responsibilities included for-credit instruction. Under this definition, researchers and administrators and other institutional staff who held faculty positions, but who did not instruct, were included in the sample. Instructional staff without faculty status were also included. Teaching assistants and teaching fellows were excluded in both NSOPF-88 and NSOPF-93. In instructions for preparing lists from which the NSOPF-93 faculty sample was drawn, institutions were asked to use the following eligibility criteria to determine which faculty members to include on the lists.

Eligibility criteria for faculty. The eligible universe of postsecondary faculty was defined to include:

- full- and part-time personnel whose regular assignment included instruction;
- full- and part-time individuals with faculty status whose regular assignment did not include instruction;
- permanent and temporary personnel with any instructional duties, including adjunct, acting, or visiting status; and
- faculty and instructional personnel on sabbatical leave.

Excluded from the NSOPF-93 universe of faculty were:

- faculty and other personnel with instructional duties outside the U.S. (but not on sabbatical leave);
- temporary replacements for faculty and other instructional personnel;
- faculty and other instructional and non-instructional personnel on leave without pay;
- graduate teaching assistants;
- military personnel who taught only ROTC courses; and
- instructional personnel supplied by independent contractors.

3.4 Sampling Frame

An explicit or an implicit list of the elements to be sampled can be used in designing a sampling frame. Creating an explicit list of all faculty and staff working at every institution in the frame of eligible institutions would have been an impossible task. Therefore, NCES elected to use an implicit list of faculty—a comprehensive list of faculty constructed from lists provided by the *sampled* postsecondary institutions. This list of faculty from sampled institutions needed to be comprehensive, accurate, and able to provide complete data for variables to be used in the subsequent stratification of the faculty sampling list.

The most appropriate and readily accessible source for a complete and accurate frame of institutions is the Integrated Postsecondary Education Data System (IPEDS),[4] a recurring set of surveys developed and maintained by NCES. IPEDS defines postsecondary education as "the provision of a formal instructional program whose curriculum is designed primarily for students who have completed the requirements for a high school diploma or its equivalent." This includes programs whose purpose is academic, vocational, and continuing professional education, and excludes avocational and adult basic education. IPEDS encompasses all institutional providers of postsecondary education in the United States and its outlying areas. The final IPEDS universe for 1991-92 consisted of 10,144 known entities: 4,390 nonproprietary or public higher education (two-year and four-year) institutions, 932 proprietary higher education institutions, and 4,822 less than two-year institutions. The NSOPF sample frame was drawn from IPEDS higher education nonproprietary or public institutions, following the institutional eligibility criteria described above. After eliminating 1,077 unaccredited nonproprietary or public higher education institutions and an additional 57 accredited nonproprietary or public higher education institutions located outside of the 50 states and the District of Columbia, the first-stage NSOPF-93 sampling frame was limited to a subset of 3,256 1991-92 IPEDS institutions: all accredited nonproprietary or public higher education institutions in the 50 states and the District of Columbia.

The NSOPF-93 universe of institutions was stratified using a modified Carnegie classification system,[5] based on the highest degree institutions offer and the amount of federal research dollars they receive. For NSOPF-93, there were two levels of control, public and private, and nine types of institutions, based on 1987 Carnegie classifications, as follows:

- *Research universities* : This is a combination of the categories Research Universities I and II. Carnegie defines Research Universities I as those institutions which "offer a full range of baccalaureate programs, are committed to graduate education through the doctorate degree, and give high priority to research. They receive annually $33.5 million or more in federal support and award at least 50 or more doctoral degrees each year." The definition of Research Universities II is identical to that of Research Universities I except for the condition that "they receive annually between $12.5 million and $33.5 million in federal support for research and development . . ."

- *Other Ph.D.*: This is a combination of the categories Doctorate-Granting Universities I and II. Doctorate-Granting Universities I is defined as including institutions "offering a full range of baccalaureate programs [and] the mission of these institutions includes a commitment to graduate education through the doctorate degree. They award at least 40 Ph.D. degrees annually in five or more disciplines." The definition of Doctorate-Granting Universities II is identical to that of Doctorate-Granting Universities I, except that these institutions "award annually 20 or more Ph.D. degrees in at least one discipline or 10 or more Ph.D. degrees in three or more disciplines."

[4]For more information on IPEDS data used in this study, see National Center for Education Statistics, *IPEDS Manual for Users* (Washington, D.C.: National Center for Education Statistics, 1991 [NCES 95-724]). This manual is also distributed with IPEDS data on CD-ROM.

[5]See *A Classification of Institutions of Higher Education*, The Carnegie Foundation for the Advancement of Teaching (Princeton, N.J., 1987), pp. 7-8.

- *Comprehensive colleges and universities*: Offer liberal arts and professional programs. Master's degrees are the highest degrees offered. This is a combination of the categories Comprehensive Universities and Colleges I and II. Carnegie defines Comprehensive Universities and Colleges I as institutions that "offer baccalaureate programs and, with few exceptions, graduate education through the master's degree. More than half of their baccalaureate degrees are awarded in two or more occupational or professional disciplines such as engineering or business administration. All of the institutions in this group enroll at least 2,500 students." The definition of Comprehensive Universities and Colleges II is identical to that of Comprehensive Universities and Colleges I, except for the qualification that they enroll between 1,500 and 2,500 students.

- *Liberal arts colleges*: Smaller and generally more selective than comprehensive colleges and universities. Primarily offer bachelor's degrees, although some offer master's degrees. This definition combines the categories Liberal Arts Colleges I and II. Carnegie defines Liberal Arts Colleges I as "primarily undergraduate colleges that award more than half of their baccalaureate degrees in arts and science fields." The definition of Liberal Arts Colleges II is identical to Liberal Arts Colleges I, except it also "includes a group of colleges that award *less* than half of their degrees in liberal arts fields but, with fewer than 1,500 students, are too small to be considered comprehensive."

- *Independent medical schools*: Those not considered as part of a four-year college or university. Includes medical schools and medical centers.

- *Religious colleges*: Includes theological seminaries, bible colleges, and other institutions offering degrees in religion. There are no public religious colleges in the U.S.

- *Non-profit, two-year colleges*: Offer certificate or degree programs through the Associate of Arts level and with few exceptions, offer no baccalaureate degrees.

- *Other*: A wide range of professional and other specialized degree-granting colleges and universities. Includes other separate health professional schools, schools of law, schools of engineering and technology, schools of business and management, schools of art, music, and design, teachers colleges, and other specialized schools.

- *Unknown*: Carnegie classification was unknown at the time of sample selection.

Exhibit 3-1 compares the 1993 and 1988 NSOPF sample designs. It also provides a comparison with the 1991-92 IPEDS frame used for NSOPF-93.

Exhibit 3-1: Institutional sample
1988 design, 1993 design, and NSOPF-93 frame

Institution type	Total		
	1988 design	**1993 design**	**NSOPF-93 frame****
Research*	70	104	104
Percent of sample	14.6	10.7	
Percent of frame	67.3	100.0	3.2
Other Ph.D.- granting*	50	109	109
Percent of sample	10.4	11.2	
Percent of frame	45.9	100.0	3.3
Comprehensive	115	242	578
Percent of sample	24.0	24.8	
Percent of frame	19.9	41.9	17.8
Liberal arts	40	71	578
Percent of sample	8.3	7.3	
Percent of frame	6.9	12.3	17.8
Medical	20	35	52
Percent of sample	4.2	3.6	
Percent of frame	38.5	67.3	1.6
Religious	20	20	309
Percent of sample	4.2	2.0	
Percent of frame	6.5	6.5	9.5
Two-year	120	329	1,107
Percent of sample	25.0	33.8	
Percent of frame	10.8	29.7	34.0
Other	45	33	222
Percent of sample	9.4	3.4	
Percent of frame	20.3	14.9	6.8
Unknown	0	31	197
Percent of sample	0.0	3.2	
Percent of frame	0.0	15.7	6.0
Total	480	974	3,256
Percent of sample	100.0	100.0	
Percent of 1993 frame	14.7	29.9	100.0

* All institutions in the "research" stratum were selected with certainty. The "other Ph.D.-granting" stratum represented 100 percent of the frame because: 1) all public doctoral granting institutions were selected with certainty, and 2) all private doctoral granting universities were selected in the initial sample or added to the sample later when 185 supplemental institutions were selected to compensate for institutions determined to be ineligible or for institutions that were unlikely to participate in the study. See sections 3.6 and 3.7 for further discussion.

****** Represents a subset of the IPEDS universe. Only those higher education IPEDS institutions that are nonproprietary, are located in the 50 states or the District of Columbia, and are accredited by the U.S. Department of Education were included in the frame.

3.5 First Stage Sampling: Institution-Level

At the time of sample selection, 278 (8.5 percent) of the 3,256 institutions in the sample frame could not be classified using the 1987-88 Carnegie crosswalk file. Updates were supplied for 81 of these institutions by Carnegie staff, leaving 197 institutions unclassified. This remaining group of unclassified institutions was designated as "unknown" in the sample frame. In addition, NCES requested that 25 institutions be transferred from the "Other" Carnegie classification into "Liberal Arts." These institutions included Teachers' Colleges (Carnegie code=58) and Schools of Art, Music, and Design (Carnegie code=56) whose highest level of offering was a Bachelor's degree. This adjustment was made under the assumption that these institutions more closely approximated Liberal Arts colleges than other specialized schools.

Institutions were stratified according to a cross-classification of control by type. There were two levels of control, public and private, and nine types, as discussed in section 3.4: research, other Ph.D., comprehensive, liberal arts, medical, religious, two-year institutions, other, and unknown. Since there are no public religious institutions, the cross-classification has 17 cells. The desired sampling rates for three of the cells, public research, private research, and public "other Ph.D.," were so close to 100 percent that it was appropriate to sample all of the institutions in those cells. A separate sampling stratum was constructed for these institutions, "stratum 15"; all institutions in this stratum were selected (i.e. selected with certainty). Grouping the institutions together in stratum 15 makes sense from a sampling design and selection standpoint, although this stratum does not comprise a grouping of analytical interest. Institutions in the other 14 strata are referred to as noncertainty institutions. The 15 sampling strata are described below:

Stratum 1 = Private, other Ph.D.
Stratum 2 = Public, comprehensive
Stratum 3 = Private, comprehensive
Stratum 4 = Public, liberal arts
Stratum 5 = Private, liberal arts
Stratum 6 = Public, medical
Stratum 7 = Private, medical
Stratum 8 = Private, religious
Stratum 9 = Public, two-year
Stratum 10 = Private, two-year
Stratum 11 = Public, other
Stratum 12 = Private, other
Stratum 13 = Public, unknown
Stratum 14 = Private, unknown
Stratum 15 includes all Public, research; Private, research; Public, other Ph.D. institutions

The stratum sample sizes for the noncertainty institutions, determined by a preliminary pass through the 14 strata, were allocated proportional to the total estimated number of faculty and instructional staff in each stratum. In those strata, the first-stage selections were made using stratified sampling with probabilities within each stratum proportional to the expected numbers of faculty and instructional staff. Various combinations of first-stage (institution) sampling rates and second-stage (faculty) sampling rates may be used to achieve equal selection probabilities for faculty. However, under reasonable assumptions, such as constant intraclass correlation within institutions in a stratum, setting first-stage probabilities proportional to the number of faculty in the institution and choosing a constant sized cluster of faculty from each selected institution is optimal in the sense of minimizing variance of sample means.

The sampling requirements for NSOPF-93 were developed using a dynamic standard error model that simulated various sampling scenarios at the institution and faculty levels. After numerous simulations of the model were performed, it was determined that acceptable levels of precision for most faculty subgroups could be obtained with an institutional sample of 789 institutions. To meet the study's analytical objectives, the sample design also required oversampling certain subgroups of faculty including: full-time females; black, non-Hispanics and Hispanics; Asian/Pacific Islanders; and faculty in four disciplines of particular interest (philosophy/religion, foreign languages, English language and literature, and history). An average cluster size of 41.5 faculty was targeted for each. Systematic probability proportional to size

(PPS) sampling with a measure of size (MOS) equal to 41 or the estimated number of faculty, whichever was larger, was used to select institutions.

MOS was defined as the total number of faculty as specified in the most recent IPEDS available at the time (the 1991 Fall Staff survey). Of the 3,256 institutions listed on the sample frame, 3,106 had a MOS available. For the remaining 150 (4.6 percent) institutions for which faculty data were missing, MOS was imputed using one of two methods. After imputation, the MOS was available for each institution in the frame, whether selected or not.

The first imputation method involved 123 of the 150 institutions for which only student enrollment data were available from the most recent IPEDS file. A student-faculty (S-F) ratio was first calculated for the 3,106 institutions for which information on both variables was available. The S-F ratio was then arrayed by type and control for these institutions. A MOS for the 123 institutions was determined using the following formula: (number of students)/(S-F ratio for that institution's cell). The second method of imputation involved the 27 remaining institutions for which neither student nor faculty enrollment data were available. The average number of faculty for the 3,106 institutions was calculated by type and control and the 27 institutions were given an imputed MOS based on the average number of faculty for their respective cells.

In systematic sampling, the order in which the institutions are listed on the frame is important because it reflects an implicit stratification. Within each stratum the institutions were sorted by MOS in a "serpentine" manner, i.e., if one stratum was sorted in ascending order by MOS, the next was sorted in descending order, the one after that was sorted in ascending order, and so on. This procedure helped to balance the sample with respect to institution size (based on number of faculty). A total of 789 institutions was initially selected and later supplemented with 185 institutions for a total of 974 selected in the first stage (see section 3.6 below).

Institutions were selected in two replicates. The first replicate, "Pool 1," contained the initial sample of 789 noncertainty and certainty institutions. The second replicate, "Pool 2," was sorted into random order within strata and contained 606 noncertainty institutions. Pool 2 provided a source of institutions available so that like institutions could be selected to replace nonparticipating Pool 1 institutions.

3.6 Institution Nonresponse

Nonresponse is likely to increase sample variance by causing departures from strict PPS selection. Nonresponse is also likely to cause some bias, the extent of which is difficult to measure. Nonresponse rates were used to serve as simple indicators of the magnitude of nonresponse.[6] Institutions that were determined ineligible or which could not be recruited after extensive follow-up were replaced at random by institutions within the same explicit stratum in Pool 2.[7] Since, by definition, all institutions in stratum 15 were selected, they did not have replacements within stratum 15.

However, research institution non-participation posed a problem with attaining sufficient samples of some

[6]Nonresponse rates were calculated separately for Pool 1 selections and for the combined selections from Pool 1 and Pool 2 (excluding nonselections from Pool 2).

[7]The first replicate, "Pool 1," contained the original sample. If 100 percent response could be achieved, the second replicate, "Pool 2," would not have been used at all. The response rate was not 100 percent, however. Pool 2 was sorted into random order within stratum. When a nonresponse was encountered in stratum x ($1 \leq x \leq 14$) in Pool 1, the first nonselected institution from stratum x in Pool 2 was selected as a replacement institution.

of the important faculty groups targeted for oversampling. Thus, a decision was made to include additional institutions from similar strata. "Private, other Ph.D.," "Public comprehensive" and "Private comprehensive" sampling strata were used for this purpose. Sixteen nonresponding certainty institutions were compensated for in this manner. More on nonresponse rates can be found in Chapters 4 and 7.

The sampling plan assumed an institutional participation rate of 95 percent and a faculty response rate of 85 percent, for a yield of approximately 750 institutions and 27,750 faculty. However, the final institution participation rate (i.e., provided faculty lists) was 85 percent, based on the total institution sample (the original sample plus 185 supplemental institutions). The lower-than-anticipated institutional participation rate did not, however, noticeably hamper the representativeness of the sample. NCES performed a discriminant analysis comparing faculty characteristics reported on a sample of the NSOPF-93 faculty sampling lists with the faculty characteristics detailed in the IPEDS universe. The analysis showed no significant differences between the NSOPF-93 sampling lists and the IPEDS universe.

3.7 Institution Replacements

Based largely on the field test experience, it was initially anticipated that 20 to 25 percent of the sampled institutions would ultimately refuse to participate in the full-scale study. Between October 1992 and early March 1993, 26 institutions in the original sample were replaced by randomly selected comparable institutions (from Pool 2): five because they were ineligible and 21 because they were determined to be final refusals. After trying to gain cooperation from the initial sample of 789 institutions for almost six months, it was determined that a certain number of other institutions were unlikely to participate in the study. These institutions were identified in March 1993 and 159 additional institutions were randomly selected within the relevant strata (from Pool 2). Thus, a total of 185 institutions, equivalent to 23 percent of the initial sample (n=789), was selected to compensate for institutions determined to be ineligible or for institutions that were unlikely to participate in the study. Replacement selections were made to achieve two objectives: to assure adequate representation across strata, and to achieve an institution participation rate of 85 percent. Project staff tried to gain cooperation from both the original and replacement samples simultaneously. The final participation rate for list collection was 85 percent for both the original sample and the additional sample.

Typically, an institution that initially refused to participate was recontacted by key members of the project staff, usually by one of the project supervisors. After determining the reasons for their refusal, a specific plan was proposed to respond to the institution's concerns. In some instances, this meant providing compensation to prepare the list; in other instances, it required accepting a list without some of the requested sampling or address information. If the proposed plan proved unacceptable to the institution, other senior members of the project staff or the NCES project officer recontacted the institution to try once again to win their participation. If following these repeated attempts the institution still decided not to participate, the institution was considered a final refusal.

3.8 Second Stage Sampling: Faculty-Level

At the second stage of sample selection, the NSOPF-93 sampling frame consisted of lists of faculty and instructional staff obtained from 817 participating institutions. The sampling of faculty was handled by a multi-step program developed specifically for NSOPF-93. The program was designed to ensure the adequate representation in the sample of particular faculty groups, according to NSF and NEH analytical objectives. These faculty groups were: full-time females; black, non-Hispanics and Hispanics; Asian/Pacific Islanders; and faculty in four NEH-designated disciplines: philosophy/religion, foreign languages, English language and literature, and history. The sampling program proceeded through the following steps in sampling an institution's faculty:

(1) Each institution was randomly assigned a target total sample size, say *n*, of either 41 or 42 to yield the desired average cluster size of 41.5. Whenever an institution employed fewer than 42 individuals, all faculty were selected.

(2) Depending on the composition of an institution's faculty, the program oversampled to achieve the following average oversample sizes[8] per institution:

Black, non-Hispanic/Hispanic	5.6081
Full-time female	3.3649
Faculty in NEH disciplines	2.2432
Asian/Pacific Islander	1.1216
None of the above	0.0000 (no oversampling)

The oversample sizes in each institution were randomly rounded to integers; the rounding was independent across institutions.

(3) Some faculty belonged to more than one of the oversampled groups—termed "multi-group" members. For example, a full-time faculty member who was a Hispanic female would belong to two of the groups. To use stratified sampling to select the faculty, it was necessary to classify each faculty member into just one of the groups. Once this was accomplished, the groups would be exhaustive and mutually exclusive and hence they would be true strata. Although simple randomization could have been used to assign multi-group members to a single group, alternative methods of assignment can lead to more efficient samples. Thus, it was decided to make the assignments so as to minimize the oversampling rates.[9] Specifically, the faculty lists were processed sequentially, so that in a given institution a multi-group member was assigned to the group for which the oversampling rate (defined as the oversample size divided by the number of individuals in that institution which could qualify for the group) was largest. As the program proceeded through the list, the oversampling rates varied depending on how many multi-group members there were and how they were classified into single groups. At the end of this step, each faculty member was classified into one group. The oversample size for each group was then checked to ensure that it did not exceed the number of members of the group; any oversample sizes that did were reduced accordingly.

(4) The final sampling rate for a group was set equal to the sum of the oversampling rate and the rate that would have been used if no oversampling was done. Using these final sampling rates, stratified sampling was performed with the groups as strata.

(5) The residual sample size (*n* minus the sum of the oversample sizes) was allocated across the five strata in proportion to the number of faculty in the strata. Then the total sample in each stratum (consisting of the oversample size plus the proportionally allocated residual) was specified by simple random sampling without replacement, with the sampling independent from one faculty stratum to the next.

[8]The oversample size for a group is the difference between the expected sample size for the group and the expected sample size that would have been attained if all faculty had been sampled at the same rate, i.e., in the absence of oversampling.

[9]The oversampling rate is the ratio of the oversample size to the size of the group. Increasing the size of the group decreases the oversampling rate. The lower the oversampling rate, the smaller the design effect due to unequal weighting. Oversample sizes were not affected.

Among the 789 initial sample institutions, it was determined that 48 (6.1 percent) institutions overlapped with the NSOPF-93 field test sample. Six of the institutions from the replacement pool also overlapped with the field test sample for a combined overlap (initial and replacement) of 54 institutions or 5.5 percent of the 974 selections. Faculty who were selected into both the field test and the full-scale study samples were excluded from the latter in accordance with OMB requirements.

3.9 Subsampling of Faculty

As a cost-saving measure, 2,000 faculty were subsampled from the overall sample of faculty in August, 1993. This reduced the sample size for the NSOPF-93 faculty sample from 33,354 to 31,354. These faculty were subsampled at random. First, all completed cases were excluded from the subsample. Second, all remaining cases were assigned a "wave" indicator, taking integer values from 1 to 6, indicating which of the six survey waves the case belonged to. Because all faculty in any institution belonged to the same wave, subsampling then proceeded according to the following specifications. (For further explanation of the fielding of the faculty survey in waves, see section 5.3.)

For wave j, let N_j denote the number of faculty selected, let n_j denote the number of faculty cases completed, and let $A_j = N_j - n_j$ denote the number of cases not yet completed. Let A_+ denote the sum of the A_j terms, i.e., $A_+ = A_1 + A_2 + \ldots + A_6$. Subsampling proceeded in two steps. First the number of cases to be excluded (subsampled out) of wave j, say m_j, was calculated. Second, these cases were subsampled out.

Set $m_j = 2000(A_j / A_+)$ for each wave j. For each wave j, $1 \le j \le 6$, A_j noncompleted cases from wave j were sorted by institution. Thus, all faculty in an institution appeared consecutively in the file. Then a random start was chosen and systematic sampling taking every kth record from stratum j was performed. This yielded a sample of m_j records. These cases were removed from the sample.

The $A_j - m_j$ cases in wave j that were not excluded by this sampling received a flag indicating that they were eligible for exclusion at this point but were not excluded. Their raw sampling weights were inflated by a factor equal to $1/(1 - m_j/A_j)$.

3.10 Calculation of Weights

The sample was weighted to produce national estimates of institutions and faculty by using weights designed to adjust for differential probabilities of selection and nonresponse at the institution and faculty levels. After excluding ineligible institutions from the institution sample, the adjusted weights for institutions sum to 3,188.[10] Likewise, after excluding ineligible members from the faculty sample, the adjusted weights for faculty sum to 1,033,966, the estimated total number of faculty in the target population. This number includes instructional staff who did not have faculty status and whose instructional duties related only to noncredit courses or advising, or to supervising noncredit academic activities.

Three weights were computed for the NSOPF-93 sample: a first-stage institution-level weight and final institution and faculty weights. The first-stage institution-level weights accounted for the institutions that participated in the study by submitting a faculty sampling list and permitted faculty members to be

[10]Twelve institutions in the sample were found to be ineligible. When ineligible institutions were excluded from the sample, the sum of weights for eligible institutions was 3,188, rather than the 3,256 institutions specified in the sampling frame.

sampled. The two final weights—weights for the sample faculty, and institution-level weights for those institutions that

returned institution questionnaires—were adjusted for nonresponse. The final faculty weights were poststratified to the "best" estimates of the number of faculty.

A poststratification adjustment to the IPEDS population was not calculated. The IPEDS and NSOPF-93 faculty population definitions and estimates, although similar in many respects, are not identical nor are they intended to correspond directly. IPEDS defines as Faculty (Instruction/Research) "all persons whose specific assignments customarily are made for the purpose of conducting instruction, research or public service as a principle activity (or activities) and who hold academic-rank titles of professor, associate professor, assistant professor, instructor, lecturer, or the equivalent of any of these academic ranks. If their principle activity is instructional [this category also includes] deans, directors, or the equivalent, as well as associate deans, assistant deans and executive officers of academic departments . . ." While NSOPF-93's definition of instructional faculty parallels the IPEDS definition, many of the job titles that NSOPF considers non-instructional faculty are classified in IPEDS under other non-faculty categories. For example, in its instructions to IPEDS respondents, NCES lists "librarians" as an example of a "Professional Non-Faculty" position. Yet, NSOPF-93 institution questionnaire respondents listed "librarians" as the largest single group of non-instructional *faculty.* Because of such definitional differences between the NSOPF and IPEDS populations, a poststratification adjustment to IPEDS estimates was ruled out.

3.11 First-Stage Institution Weights

The first-stage institution weights for the NSOPF-93 faculty survey were constructed in three steps. First, the institution's base weight was calculated as the reciprocal of its selection probability. Second, the initial base weights were adjusted for institutions that had merged and so were effectively listed multiple times in the sampling frame. Finally, nonresponse adjustment factors were applied to the weights to compensate for institution-level nonresponse.

Base weights. The selection probability for an institution's selection into the sample, P^*_{hi}, was calculated by dividing the institution's MOS by the product of the total number of faculty members in the institution sampling stratum which included that institution and the reciprocal of the desired sample of institutions for that stratum. The first-stage base weight for institution *i* in stratum *h*, $W_{1.hi}$, is the reciprocal of the first-stage selection probability, P^*_{hi}. These initial weights reflect the several steps used to select the institutions. In the first step, a stratified sample was drawn, with extra selections from each stratum. The selections were then sorted into two groups, Pool 1 and Pool 2, so that (i) all certainty selections were put into Pool 1, and (ii) the noncertainty selections within each stratum were systematically randomly allocated to Pool 1 or Pool 2. The Pool 1 institutions were those selected for initial fielding in the survey, and the Pool 2 institutions were extra institutions to compensate for nonresponse among Pool 1 institutions. Thus, although all of Pool 1 institutions were selected for the sample, most of the Pool 2 selections were not selected. Within each stratum, Pool 2 institutions were sorted into random order and then selected as needed for inclusion in the survey.

For institution *i*, in stratum *h*, with a desired sample size of n_h, the selection probability is

$$P_{hi} \quad \frac{MOS_{hi}}{\frac{n_h}{\sum_{i\ 1} MOS_{hi}}}$$

$$n_h$$

For institution *i*, in stratum *h*, the first-stage base weight is

$$W_{1.hi} = 1/P^*_{hi},$$

with P^*_{hi} representing the probability that institution *i* in stratum *h* was selected for fielding. The selection probability for institution *i* in pool *g* and in stratum *h* was 1 for certainty institutions and $P_{hi}(b_{1h} + a_{2h})/b_h$ for noncertainty institutions, with

a_{gh} = number of noncertainty selections in Pool *g*, stratum *h* that were actually fielded
b_{gh} = total number of noncertainty selections in Pool *g*, stratum *h*
b_h = the total number of noncertainty selections in either pool (= $b_{1h} + b_{2h}$)
P_{hi} = probability that institution *i* in stratum *h* was selected into either Pool 1 or Pool 2.

Note that $a_{1h} = b_{1h}$. The probability that noncertainty institution *i* in stratum *h* was selected into Pool 1 and fielded is $P_{hi}b_{1h}/b_h$ (all Pool 1 institutions were fielded); the probability for a certainty institution is 1. The probability that institution *i* in stratum *h* was selected into Pool 2 and surveyed is $P_{hi}a_{2h}/b_h$. The probability that institution *i* in stratum *h* was selected for fielding is the sum of these two probabilities.

Adjustment for multiplicity. After the sample had been selected and institutions were contacted, it was learned that a few of the institutions in the sample had merged with other institutions on the sampling frame. Since a merged institution would be in the sample if either listing of the institution was selected from the frame, its sampling weight had to be reduced. Let *A* denote the listing of the institution that was selected and let *B* denote the other listing. If P^*_A and P^*_B denote the respective selection probabilities, the probability of surveying either institution was approximately $P^*_A + P^*_B$ € $P^*_A \times P^*_B$. (This approximation rests on the assumption of independence of selection, which has a trivial numerical effect.) Thus, the weights for such an institution were modified accordingly. Specifically, the base weight for institution *A* was changed to

$$W€_{1.A} = W_{1.A} \times W_{1.B} / [W_{1.A} + W_{1.B} € 1]$$

if institution *A* was identified with institution *B*, and $W€_{1.A} = W_{1.A}$ otherwise. We will use the notation $W€_{1.hi}$ to denote the weight for institution *i* in stratum *h* after modifications of the weights for multiplicity.

Adjustment for nonresponse. Prior to computing the nonresponse adjustment, two indicators were created to flag cooperating and eligible institutions. The first indicator, I_{hi}, was given the value of 1 if institution *i* in stratum *h* cooperated in the survey and 0 if the institution did not cooperate. Similarly, the second indicator variable, J_{hi}, was set to 1 if the surveyed institution *i* in stratum *h* was found to be eligible and to 0 if it was found to be ineligible. Institutions that turned out to be ineligible as cooperators were classified; thus, it is possible that $I_{hi} = 1$ and $J_{hi} = 0$. Institutions were classified according to Exhibit 3-2, in which € €€ denotes a weighted number of institutions in the sample (weighted by $W€_{1.hi}$).

Exhibit 3-2: Classification of institutions by eligibility and cooperation

	Eligible	Not eligible	Total
Respondents	€ $_{11}$	€ $_{12}$	€ $_{1+}$
Nonrespondents	€ $_{21}$	€ $_{22}$	€ $_{2+}$
Total	€ $_{+1}$	€ $_{+2}$	€ $_{++}$

The desired response rate for the weighting adjustment is € $_{11}$/€ $_{+1}$, based on eligible institutions. However, direct estimates are available for only € $_{11}$, € $_{12}$, € $_{1+}$, € $_{2+}$, and € $_{++}$. If a surveyed institution was ineligible for the survey, that fact would have been established during the contacting process, i.e., € $_{22}$ = 0.[11] This implies that € $_{+1}$can be calculated as € $_{+1}$ = € $_{++}$ € € $_{12}$ and the desired response rate by € $_{11}$/(€ $_{++}$ € € $_{12}$). In calculating nonresponse adjustments, the first-stage response rate can be estimated for stratum *h*, $R_{1.h}$, using data only from institutions not found to be ineligible as indicated below:

$$R_{1.h} \quad \frac{\sum_{i\ 1}^{b_h} W_{1.hi} I_{hi} J_{hi}}{\sum_{i\ 1}^{b_h} W_{1.hi} J_{hi}}.$$

In adjusting the institution-level weights, the original sampling strata were used to define nonresponse adjustment cells. (The response rates did not vary widely across other subgroups of institutions.)

The first-stage nonresponse-adjusted weight, *W€ € $_{1.hi}$*, was then calculated as:

$$W€\ €_{1.hi} = W€_{1.hi} / R_{1.hi}.$$

3.12 Calculation of Faculty Weights

Weights for the faculty sample were computed in four steps. First, the base conditional selection probabilities were calculated; these reflected the selection rates for faculty members given that their institutions were sampled. In this step, the initial selection probabilities also were adjusted to reflect the exclusion of a random subsample of faculty. Then the reciprocals of these selection probabilities were calculated to yield conditional base weights. Second, these faculty base weights were multiplied by the first-stage nonresponse-adjusted weights to yield second-stage sampling weights adjusted for institutional nonresponse. Third, a second-stage nonresponse adjustment factor was applied to these latter weights to

[11]The contacting process was extensive and served two related goals, gaining cooperation and determining eligibility. The field staff were trained to be able to determine the eligibility of an institution. Since all nonresponding institutions were contacted, the eligibility rate is a known quantity for all institutions, both responding and nonresponding. Of the 974 institutions in the total sample, 12 (1.2 percent) were found to be ineligible. Ineligible institutions included those which had closed or which had merged with other institutions, satellite campuses that were not independent units, and institutions that did not grant any degrees or certificates.

compensate for nonresponse by faculty members. Fourth, the nonresponse-adjusted weights were poststratified to the best estimates of total, full-, and part-time faculty by sampling stratum.

Second-stage weights. Faculty members in the surveyed institutions were selected by stratified random sampling within five strata per institution. The strata were based on classification of faculty as (i) black, non-Hispanic/ Hispanic (ii) full-time female faculty, (iii) faculty in one of the NEH disciplines, (iv) Asian/Pacific Islander faculty, and (v) all other faculty. The classification was unique, so that any faculty member on the institution's roster was assigned to only one stratum. Letting N_f denote the number of faculty on the roster who were assigned to stratum *f*, and n_f denote the number of faculty in stratum *f* in the institution who were sampled, the *initial* second-stage raw conditional selection probability weight for faculty member *k* in stratum *f* was calculated as n_f/N_f.

Each faculty member in the sample was classified into one of six "waves," denoted by the subscript *j*, and each faculty member was identified as being a respondent (or "initial respondent") or not by that point in the fielding of the sample. The first wave consisted of faculty who were contacted early on in the survey, and second wave faculty were contacted somewhat later, and the sixth wave faculty were contacted last. Thus, S_{kj} was set to 1 if faculty member *k* in wave *j* was an initial respondent and was 0 otherwise. If T_j denotes the number of initial nonrespondents in wave *j*, then

$$T_j \qquad (1 \;\; S_{kj}\;).$$
$$k \;\; wave \;\; j$$

As discussed in section 3.9, 2,000 of the selected faculty were deliberately dropped from the sample during fielding of the sample. The exclusions were made randomly but the exclusion probabilities were not constant. Overall, 2,000 initial nonrespondents were dropped after subsampling. Let m_j denote the number of such excluded nonrespondents in wave *j*. The conditional probability that a faculty member was retained in the sample (i.e., not excluded), given that he or she was in wave *j*, equaled 1 if the faculty member was an initial respondent in that wave (i.e., if $S_{kj} = 1$), and it equaled $(1 - m_j/T_j)$ if the faculty member was an initial nonrespondent ($S_{kj} = 0$).

Thus, for initial respondents in each wave, the second-stage base weight ($W_{2.fk}$ for faculty member *k* in faculty-stratum *f*) was given by

$$W_{2.fk} = N_f / n_f .$$

For initial nonrespondents in wave *j*, the base weight was

$$W_{2.fjk} = N_f / [n_f(1 - m_j / T_j)].$$

Adjustment for institution-level selection and nonresponse. The second-stage weights were adjusted for institutional sampling and nonresponse by multiplying the raw second-stage faculty weight by the final institution-level weight. Thus, for faculty member *k* in faculty stratum *f* in institution *i* in institution-level stratum *h*, the adjusted weight ($W_{2.fkhi}$) is given by

$$W_{2.fkhi} = W_{2.fk} W_{1.hi} \text{ or } W_{2.fjk} W_{1.hi},$$

depending on whether the respondent was classified as an initial respondent or initial nonrespondent.

Adjustment for faculty nonresponse. Response rates for part-time faculty differed significantly from those for full-time faculty. The nonresponse adjustment for faculty weights accounts for this. The following three variables were cross-classified to create the cells for nonresponse adjustment: institution stratum (15 categories), part-time/full-time status (two categories),[12] and race/ethnicity (two categories).[13] In principle, there should not be any missing values on the three classification variables. However, faculty lists for some institutions reported missing values for full-time/part-time status and for race/ethnicity, as illustrated in Exhibit 3-3.

Exhibit 3-3: Profile of faculty sampling lists

Total number of faculty sampling lists	31,354
Race/ethnicity present on sampling lists	22,715
Race/ethnicity missing on sampling lists	8,639
Available from faculty questionnaire	6,235
Not available from faculty questionnaire: Imputed	2,404
Full/part-time status present on sampling lists	27,659
Full/part-time status missing on sampling lists	3,695
Available from faculty questionnaire	2,824
Not available from faculty questionnaire: Imputed	871

Most of the missing data was directly imputed from the faculty questionnaire. The remainder of missing data for part-time/full-time status and for race/ethnicity was imputed using the sequential hot-deck method within the 15 institution strata.

To calculate nonresponse adjustment factors, let $W_{1.ijkl}$ be the base weights for *l*th faculty with *j*th part-time/full-time status and *k*th race/ethnicity background in *i*th institution stratum. And let corresponding indicator I_{ijkl} be the response indicator, i.e., I_{ijkl} 1 if the sampled faculty member responded to the survey and I_{ijkl} 0 if the sampled faculty member did not respond to the survey. The response rate, R_{ijk}, for faculty members with *j*th part-time/full-time status and *k*th race/ethnicity background in *i*th institution stratum is

$$R_{ijk} \quad \frac{\sum_{l} W_{1.ijkl} I_{ijkl}}{\sum_{l} W_{1.ijkl}}$$

with the summation over *eligible* faculty selected within *ijk*th cell for the full-time faculty and with the summation over *all* faculty selected within *ijk*th cell for part-time faculty, where this full-time/part-time status and race/ethnicity is obtained largely from the faculty list. It is assumed that all the ineligible cases for full-time faculty have been identified, and that the same ineligibility rate applies between respondents and nonrespondents among part-time faculty. This means that it is assumed that all nonrespondents coded as full-time are eligible, while nonrespondents coded as part-time are partly eligible and partly ineligible in the same ratio as among respondents coded as part-time.

[12] 1=Full-time, 2=Part-time, as determined by faculty list.

[13] 1=White; 2=non-White.

The faculty weight adjusted for the nonresponse, $W_{2.ijkl}$, was

$$W_{2.ijkl} \frac{W_{1.ijkl}}{R_{ijk}} \quad .$$

Within each cell, if there were at least 15 cases and the weighted response rate was not less than two-thirds of the overall weighted response rate, the nonresponse adjustment factor was computed. When a given cell did not meet these criteria, it was collapsed with a neighboring cell. Collapsing on race/ethnicity occurred first, followed by collapsing on part-time/full-time status. Such collapsing is intended to limit the large increase in variability that could be associated with large adjustment factors (i.e., large R^{-1}).

Poststratification to "best estimates." To create the final faculty weights, nonresponse-adjusted faculty weights were poststratified to "best estimates" of the national population of full-time and part-time faculty. Chapter 10 describes the procedures used to derive best estimates. Let $\hat{T}_{ij}$ be the best estimate for the total number of faculty with *j*th part-time/full-time status in *i*th institution stratum. The post-stratified weights, $W_{3.ijkl}$, are

$$W_{3.ijkl} \; W_{2.ijkl} \frac{T_{ij}}{W_{2.ijkl}}$$

with the summation over all respondents within *ij*th cell. These poststratified final faculty weights produce the weighted national population estimates for the NSOPF-93 faculty questionnaire dataset.

The poststratification adjustment should reduce sampling variability, and more importantly reduce any reporting biases and bias due to undercoverage of the faculty sampling frame. Poststratification provides a means of weighting the faculty respondents to represent all faculty on the original faculty sampling frame as well as faculty missed on the frame. The method is entirely analogous to the nonresponse adjustment, where faculty respondents are weighted up to represent themselves as well as the faculty nonrespondents. While the nonresponse adjustment is based upon the assumption that the means of respondents and nonrespondents are similar, the poststratification adjustment is based upon the assumption that the means of covered faculty and missed faculty are similar. Neither assumption is perfect, but the resulting estimates are thought to be more accurate than they would be in the absence of the adjustments.

3.13 Calculation of Weights for Institution Questionnaires

The weights for institution questionnaires were calculated in the same manner as the first-stage weights for institutions from which faculty were selected (see section 3.11), the only difference being the definition of "respondent." For calculating the weights for institutions with institution questionnaires, a respondent was defined as any institution from which an acceptable institution questionnaire was received. For most institutions, the response classification was identical under the two criteria. As a result, the weighting cells for the first-stage weights were used without change for the weights for institution questionnaires. Exhibit 3-4 provides summary statistics of the faculty and institution weights.

Exhibit 3-4: Summary statistics for NSOPF-93 faculty and institution weights

Statistic	Faculty	Institution
Mean	40.11	3.66
Variance	1,605.92	16.68
Standard Deviation	40.07	4.09
Minimum	1.28	1.15
Maximum	710.75	27.11
Skewness	4.21	2.47
Kurtosis	33.95	5.8
Sum of Weights (rounded to whole number)	1,033,966	3,188

3.14 Design Effects and Approximate Standard Errors

Statistical estimates calculated using NSOPF-93 survey data are subject to two sources of error: sampling errors and nonsampling errors. Sampling errors occur because the estimates are based on a sample of individuals in the population rather than on the entire population. Sampling errors can be quantified using statistical procedures in which a variance estimate is calculated. NSOPF-93 analytical reports provide each estimate's standard error, which measures the variability of the sample estimator in repeated sampling, using the same sample design and sample size. It indicates the variability of a sample estimator that would be obtained from all possible samples of a given design and size. Standard errors are used as a measure of the precision expected from a particular sample. If all possible samples were surveyed under similar conditions, intervals of 1.96 standard errors below to 1.96 standard errors above a mean or proportion would include the true population parameter in about 95 percent of the samples. In general, for large sample sizes (*n* greater than or equal to 30) and for estimates of the mean or the proportion, the intervals described above provide a 95 percent confidence interval. If sample sizes are too small, or if the parameters being estimated are not means or proportions, then these intervals may not correspond to the 95 percent confidence level.

Sample estimates also are subject to bias from nonsampling errors. It is more difficult to measure the magnitude of these errors. They can arise for a variety of reasons: nonresponse, noncoverage, differences in the respondent's interpretation of the meaning of questions, memory effects, misrecording of responses, incorrect editing, coding, and data entry, time effects, or errors in data processing. For example, noncoverage or incomplete lists (in which institutions did not provide a complete enumeration of eligible faculty) and listing of ineligible faculty necessitated the "best estimates" correction to decrease measurement error in the NSOPF-93 faculty population estimates. (For a more detailed discussion of the noncoverage problem, see Chapter 10.) The NSOPF-93 field test, discussed in Chapter 1, tested the faculty and institution questionnaires (as well as the sample design, data collection, and data processing procedures) to minimize the potential for nonsampling errors.

Because the sample design involved stratification, disproportionate sampling, and clustered (i.e., multi-stage) probability sampling, the calculation of exact standard errors for survey estimates can be difficult. While popular statistical analysis packages such as SPSS or SAS can often accommodate unequal selection probabilities in the calculation of standard errors and other statistics by allowing for the use of weights,

they do not calculate standard errors by taking into account complex sample designs. Because of NSOPF-93's complex sample design, standard errors generated by SPSS and SAS will usually underestimate the sampling variability of statistical estimates such as population means, percentages, and more complex statistics such as correlations and regression coefficients. Several procedures are available for calculating precise estimates of sampling errors for complex samples. Procedures such as Taylor series approximation, balanced half-sample replication (BHS), and jackknife repeated replication (JRR) produce similar results.[14] Consequently it is largely a matter of convenience which approach is taken. For BHS, 32 replicate weights are provided on the NSOPF-93 faculty and institution data files. The Data Analysis System (DAS), available on CD-ROM, calculates variances with the Taylor series approximation method.

The institution sampling stratum variable, ISTRATUM, and the primary sampling unit variable, PSU, are provided on the data files to facilitate calculation of standard errors using the Taylor series approximation method.[15] This method was used to calculate standard errors reported in NSOPF-93 analytical reports. Standard errors reported in the NSOPF-93 institution report, *Institutional Policies and Practices Regarding Faculty in Higher Education* [NCES 97-080] were produced with SUDAAN software using a "without replacement" design to handle the certainty stratum and the large sampling fractions in certain strata. These variance estimates assume a zero variance for the stratum of institutions selected with certainty. (Section 3.15 discusses in greater detail variance estimation for institutions selected with certainty.) In using the Taylor-series approximation method to calculate variances for the faculty report *Instructional Faculty and Staff in Higher Education Institutions: Fall 1987 and Fall 1992*, [NCES 97-470] based on the NSOPF-93 faculty dataset, a "with replacement" design was utilized.

The impact of departures from simple random sampling on the precision of sample estimates is often measured by the design effect. For any statistical estimator (for example, a mean or a proportion), the design effect is the ratio of the estimate of the variance of a statistic derived from consideration of the sample design to that obtained from the formula for simple random samples.

Exhibits 3-5 through 3-7 present standard errors and design effects for the NSOPF-93 faculty and institution data, calculated with SUDAAN's Taylor series approximation method. These standard errors and design effects used weighted data and took into account NSOPF-93's complex sample design. Faculty questionnaire standard errors and design effects, presented in Exhibit 3-5, were calculated using a "with replacement" design. Institution questionnaire standard errors and design effects, presented in Exhibit 3-6, use SUDAAN's "without replacement" design with finite population correction factors. The standard errors and design effects presented in Exhibits 3-5 through 3-7 take into account the features of the sampling design: 1) stratification in the selection of institutions; and, 2) clustering (i.e., the use of institutions as first-stage sampling units).

Exhibits 3-5 and 3-6 present standard errors and design effects ("DEFF") for 30 randomly selected dichotomized items from the faculty and institution questionnaires. In selecting items from each questionnaire, 30 questions were randomly selected, using systematic selection from the beginning of the questionnaire. Response categories for each selected survey question were dichotomized for the purpose of

[14]Frankel, M., *Inference from Survey Samples: An Empirical Investigation* (Ann Arbor: Institute for Social Research, 1971).

[15]Two widely available variance estimation software packages, SUDAAN and CENVAR, use the Taylor series approximation method to calculate variances. For more information on SUDAAN, see Shah, Babubhai V., Beth G. Barnwell and Gayle S. Bieler, *SUDAAN User's Manual Release 6.4* (Research Triangle Park, N.C.: Research Triangle Institute, 1995). For information on CENVAR, see U.S. Bureau of the Census, *CENVAR IMPS Version 3.1* (Washington D.C.: U.S. Bureau of the Census, 1995).

representing the full range of levels which percentages can assume, i.e., the range from one percent (equivalently, 99 percent) to 50 percent.

The column titled "Questionnaire item" in these exhibits gives a brief description of the dichotomous item. A separate column titled "Question response number" gives the questionnaire numbers of the question and response categories which were used to construct this dichotomous item. For example, the first item in Exhibit 3-5 pertains to the percent of faculty who said they were hired by the institution for which they worked in 1981 or before. Similarly, the second item in Exhibit 3-6 refers to the percentage of institution respondents who selected response categories 0 or 1 in response to subitem A of Question 7 in questionnaire section B, i.e., "B7a:0,1". Thus, 49.35 percent of institution respondents answered that one or no tenured full-time faculty members who left the institution between Fall 1991 and Fall 1992 retired.

Exhibit 3-7 presents *average* design effects ("DEFF") for the faculty sample and questionnaire treated in Exhibit 3-5. Exhibit 3-7 also presents the average of the square roots of DEFFs ("DEFT") for the same sets of dichotomous items. This exhibit presents mean DEFFs and mean DEFTs not only for total respondents but also for 30 subgroups: two genders (male and female), five racial/ethnic groups, and subgroups based on tenure status, faculty rank, employment status, and type and control of institution. Because of small sample sizes within each Carnegie classification stratum in the institution sample, a similar exhibit of mean DEFFs and DEFTs was not produced for the institution sample.

Researchers who do not have access to software for computing estimates of standard errors can use the mean design effects presented in Exhibit 3-7 to approximate the standard errors of statistics based on the NSOPF-93 data. Design-corrected standard errors for a proportion can be approximated from the standard error computed using the formula for the standard error of a proportion based on a simple random sample and the appropriate mean root design effect (DEFT):

$$SE = DEFT \times [(p\ (1\text{-}p)/n)]^{1/2} \quad (1)$$

where p is the weighted proportion of respondents giving a particular response, n is the size of the sample, and DEFT is the mean root design effect.

Similarly, the design-corrected standard error of a mean can be approximated from the standard error based on simple random sampling and the appropriate mean DEFT:

$$SE = DEFT\times (Var/n)^{1/2} \quad (2)$$

where Var is the simple random sample variance, n is the size of the sample, and DEFT is the mean root design effect. Exhibit 3-7 makes clear that the design effects and root design effects vary considerably by subgroup. It is therefore important to use the mean DEFT for the relevant subgroup in calculating approximate standard errors for subgroup statistics.

Standard error estimates may be needed for subgroups that are not tabulated here. One rule of thumb may be useful in such situations: design effects will generally be smaller for groups that are formed by subdividing the subgroups listed in the tables. This is because smaller subgroups will be less affected by clustering than larger subgroups. Estimates for minority respondents, for example, will generally have smaller design effects than the corresponding estimates for all respondents. For this reason, it will usually be conservative to use the subgroup mean DEFT to approximate standard errors for estimates concerning a portion of the subgroup. This rule applies only when the variable used to subdivide a subgroup crosscuts institutions. Gender is one

such variable, since most institutions include faculty of both sexes. It will not reduce the average cluster size to form groups that are based on subsets of institutions.

Standard errors may also be needed for other types of estimates than the simple means and proportions that are the basis for the results presented here. A second rule of thumb can be used to estimate approximate standard errors for comparison between subgroups. If the subgroups crosscut institutions, then the design effect for the difference between the subgroup means will be somewhat smaller than the design effect for the individual means. The variance of the difference estimate will be less than the sum of the variances of the two subgroup means from which it is derived:

$$\text{Var}(b\text{-}a) \text{ € } \text{Var}(b) + \text{Var}(a) \qquad (3)$$

in which Var(*b*-*a*) refers to the variance of the estimated difference between the subgroup means, and Var(*a*) and Var(*b*) refer to the variances of the two subgroup means. It follows from equation (3) that Var(*a*) + Var(*b*) can be used in place of Var(*b*-*a*) with conservative results.

A final rule of thumb is that some complex estimators show smaller design effects than simple estimators.[16] Thus, correlation and regression coefficients tend to have smaller design effects than subgroup comparisons, and subgroup comparisons have smaller design effects than means. This implies that it will be conservative to use the mean root design effects presented here in calculating approximate standard errors for multiple regression coefficients. The procedure for calculating such approximate standard errors is the same as with simpler estimates. First, a standard error is calculated using the formula for data from a simple random sample; then, the simple random sample standard error is multiplied by the appropriate mean root design effect. This rule of thumb may not apply to other complex estimators,[17] and analysts should use caution in applying it to complex estimators other than regression coefficients.

[16]Kish, L., and Frankel, M., "Inference from Complex Samples," *Journal of the Royal Statistical Society: Series B* (Methodological), 36 (1974): 2-37.

[17]Skinner, C.J., Holt, D., and Smith, T.F.M., eds., *Analysis of Complex Surveys* (Chichester, England: Wiley, 1989): 70.

Exhibit 3-5: NSOPF-93 faculty questionnaire: standard errors and design effects

Questionnaire item	Question response number	Estimate	Design S.E.[a]	DEFT	DEFT	*n*	SRS-S.E.[b]
Year started job at institution	A6:€81	30.11	0.54	3.58	1.89	25780	0.29
Highest degree received	B16A1:1, 2	48.98	0.93	8.84	2.97	25454	0.31
Other employment besides institution	B17:1	53.51	0.74	5.65	2.38	25780	0.31
Employment sector of other main job held	B18:4-8	66.17	0.76	3.1	1.76	10003	0.43
Primary responsibility in three most recently held jobs	B19B3:1, 2	9.29	0.48	3.24	1.8	12164	0.27
Number of book/article reviews published during career	B20A5: €5	8.32	0.32	3.49	1.87	25780	0.17
No. of articles published in non-refereed journals in last 2 years	B20B2: €2	9.19	0.34	3.48	1.87	25780	0.18
Number of patents/copyrights won in last 2 years	B20B13: 0	96.86	0.17	2.54	1.59	25780	0.11
Number of graduate thesis committees chaired in Fall 1992	C21B4:0	89.48	0.41	4.54	2.13	25780	0.19
Was 1st for-credit course taught in Fall 1992 team taught?	C23A2f:1	11.25	0.45	4.13	2.03	21774	0.22
Avg. number of hours/week taught 2nd for-credit course in Fall 1992	C23B2g: €5	18.22	0.66	4.07	2.02	16098	0.33
Level of students taught in 3rd for-credit course in Fall 1992	C23C3:1	54.01	0.88	2.45	1.57	10474	0.56
Primary instructional method used in 4th for-credit course taught in Fall 1992	C23D4:1	54.74	0.86	1.25	1.12	5959	0.77
Taught any for-credit undergraduate courses in Fall 1992?	C24:2	62.86	0.97	10.49	3.24	25780	0.3
Used competency-based grading in undergraduate course	C24Ak:3	37.49	0.55	2.12	1.46	18249	0.38
Engaged in professional research, writing	C28:1	53.02	0.84	7.3	2.7	25780	0.31
Foundation/nonprofit funding for research?	C33B2: €2	25.98	1.6	2.09	1.45	1379	1.11

Exhibit 3-5: NSOPF-93 faculty questionnaire: standard errors and design effects (cont.)

Questionnaire item	Question response number	Estimate	Design S.E.[a]	DEFF	DEFT	*n*	SRS-S.E.[b]
Total research funds obtained from state/local government	C33D4: €5000	80.74	1.78	1.7	1.3	786	1.37
Assessment of institution's research equipment	C34a:3,4	71.34	0.62	2.82	1.68	15113	0.37
Assessment of institution's studio/performance space	C34j:1	10.19	0.48	2.00	1.41	8406	0.34
Adequacy of institution's funding for professional travel	C35C3:1	61.95	0.75	2.41	1.55	12098	0.48
Avg. hours per week spent on unpaid activities	C36b: €5	32.36	0.46	2.47	1.57	25780	0.29
Preferred percent of work time for professional growth	C37Bc: €50	1.22	0.09	1.64	1.28	25780	0.07
Satisfaction with work load	D40a:2	17.5	0.34	2.06	1.44	25780	0.24
Likelihood of accepting part-time job at non-postsecondary institution in next 3 years	D41c:3	85.9	0.38	3.00	1.73	24731	0.22
Importance of instructional facilities in decision to leave current institution	D43h:3	61.69	0.45	2.24	1.5	25780	0.3
Basic salary in 1992 (dollars)	E47a: 100000+	2.71	0.22	4.77	2.18	25780	0.1
Royalties or commissions received in 1992 (dollars)	E47m: €2000	3.07	0.17	2.51	1.58	25780	0.11
Citizenship status	F57:2	5.99	0.25	2.76	1.66	25780	0.15
Have opportunities for junior faculty advancement improved or worsened	F60b:1	29.55	0.55	2.98	1.73	20765	0.32

[a] Standard errors calculated taking into account the sample design.

[b] Standard errors calculated under the assumption of simple random sampling.

Exhibit 3-6: NSOPF-93 institution questionnaire standard errors and design effects

Questionnaire item	Question response number	Estimate	Design S.E.[a]	DEFF	DEFT	*n*	SRS-S.E.[b]
Number of permanent full-time faculty who left in last year	B2e:0	33.57	2.18	1.85	1.36	871	1.60
Number of tenured full time faculty who retired last year	B7a:0,1	49.35	2.44	1.47	1.21	726	2.01
Has institution taken action to lower percentage of full-time faculty in last five years?	B10c:2	91.93	1.19	1.17	1.08	726	1.10
Institution subsidy to state retirement plan for full-time faculty	B12c1:1	20.41	1.77	0.75	0.87	528	2.04
Full-time faculty benefits: wellness program	B13a:2	57.27	2.07	1.53	1.24	871	1.67
Full-time faculty benefits: tuition remission for faculty children	B13g:2	30.94	1.99	1.61	1.27	871	1.57
Institution subsidy for meal plan for full-time faculty	B13j1:1	22.27	6.23	3.22	1.79	114	3.47
Temporary full-time faculty benefits: medical insurance or medical care	B16b:1	85.83	2.32	1.99	1.41	584	1.64
Temporary full-time faculty benefits: life insurance	B16e:1	72.41	2.47	1.37	1.17	584	2.11
Temporary full-time faculty benefits: transportation/parking	B16k:2	35.27	2.56	1.29	1.14	584	2.25
Institution subsidy for retiree medical insurance for temporary full-time faculty	B16n1:1,2	74.14	3.07	0.85	0.92	250	3.33
Peer evaluations used to assess full-time faculty performance	B18g:1	63.75	2.24	1.89	1.37	871	1.63

Exhibit 3-6: NSOPF-93 institution questionnaire standard errors and design effects (cont.)

Questionnaire item	Question response number	Estimate	Design S.E.[a]	DEFF	DEFT	*n*	SRS-S.E.[b]
Total number of permanent full-time faculty in Fall 1991 (last yr.)	C20f: €100	6.49	0.99	0.83	0.91	566	1.09
Number of full-time faculty considered for tenure in 1992-93	C24a:0-5	99.07	0.23	0.14	0.37	315	0.61
403B retirement plan available to full-time non-instructional faculty?	C28b:2	51.81	3.06	1.93	1.39	556	2.20
Institution subsidy for wellness program for full-time non-instructional faculty	C29a1:1	31.32	3.11	1.02	1.01	301	3.08
Institution subsidy for disability insurance for full-time non-instructional faculty	C29d1:3	20.41	2.25	1.42	1.19	518	1.89
Full-time non-instructional faculty benefits: meals	C29j:2	80.16	2.73	2.42	1.56	556	1.75
Institution subsidy for paternity leave for full-time non-instructional faculty	C29m1:2	31.26	3.06	1.33	1.15	386	2.65
Temporary full-time non-instructional faculty benefits: life insurance	C32e:2	27.11	3.57	1.47	1.21	307	2.94
Institution subsidy for child care for temporary full-time non-instructional faculty	C32h1:2	26.32	4.48	0.85	0.92	129	4.86
Temporary full-time non-instructional faculty benefits: retiree medical insurance	C32n:1	42.05	3.66	1.25	1.12	307	3.27
Availability of retirement plans for part-time faculty	D34:2	57.46	2.1	1.52	1.23	857	1.70

Exhibit 3-6: NSOPF-93 institution questionnaire standard errors and design effects (cont.)

Questionnaire item	Question response number	Estimate	Design S.E.[a]	DEFF	DEFT	*n*	SRS-S.E.[b]
Availability of 401K or 401B plans for part-time faculty	D35d1: 1,2	24.50	11.26	2.57	1.60	51	7.02
Part-time faculty benefits: tuition remission for children	D37g:1	30.43	3.12	1.91	1.38	493	2.26
Institution subsidy for housing/mortgage for part-time faculty	D37i1:3	53.55	13.49	2.05	1.43	29	9.42
Part-time faculty benefits: other	D37p:2	88.39	2.28	2.09	1.45	493	1.58
Benefit eligibility criteria for part-time staff	D39:1	72.15	2.98	1.83	1.35	493	2.20
Percent of part-time faculty meeting eligibility criteria for receiving benefits	D40c2: 0-20	37.18	4.74	1.46	1.21	202	3.92
Methods of evaluating part-time instructors (open-ended)	D42i:2	96.07	0.54	0.66	0.81	857	0.66

[a] Standard errors calculated taking into account the sample design.

[b] Standard errors calculated under the assumption of simple random sampling.

Exhibit 3-7: Mean design effects (DEFF) and root design effects (DEFT) for NSOPF-93 faculty subgroups

Faculty sample strata	DEFF	DEFT
Total	3.52	1.82
Gender		
Male	2.90	1.66
Female	2.53	1.57
Race/ethnicity		
American Indian/Alaskan Native	1.44	1.17
Asian/Pacific Islander	2.00	1.40
Black, non-Hispanic	2.33	1.50
Hispanic	2.52	1.56
White, non-Hispanic	3.21	1.74
Tenure status		
Tenured	2.62	1.59
On tenure track, but not tenured	2.23	1.47
Not on tenure track	2.29	1.50
No tenure system for R's faculty status	2.24	1.48
No tenure system at institution	3.34	1.78
Faculty rank		
Not applicable	2.21	1.46
Full professor	3.03	1.69
Associate professor	2.43	1.53
Assistant professor	2.45	1.54
Instructor	2.57	1.57
Lecturer	1.75	1.31
Other ranks	2.93	1.61
Type and control of institution		
Public research	1.80	1.32
Private research	2.39	1.51
Public Ph.D. and medical	2.42	1.53
Private Ph.D. and medical	3.85	1.90
Public comprehensive	2.43	1.53
Private comprehensive	2.74	1.57
Private liberal arts	2.62	1.55
Public two-year	3.05	1.69
Other	2.93	1.61
Employment status		
Part-time	2.57	1.58
Full-time	3.03	1.69

3.15 Calculating Estimates for Institutions Selected with Certainty

All 168 institutions in the certainty stratum were selected into the institution sample. One hundred and fifty-two (152) of them returned faculty sampling lists and 144 of them responded to the institution questionnaire. Thus, aside from a small nonresponse variance, the variability associated with this stratum in the institution questionnaire dataset is essentially zero.

Analysts should take note of two cautions about calculating estimates of sampling variability from the NSOPF-93 institution questionnaire dataset. First, if a comparison is to be made between the class of institutions in the certainty stratum and other classes of institutions, then (as an approximation) either the variance of the estimator for the certainty stratum should be set equal to zero, or a without-replacement type variance formula should be used for the certainty stratum with an appropriate finite population correction factor to account for random nonresponse variance. The former recommendation is equivalent to setting the variance of the estimated difference equal to the variance of the estimator for the noncertainty class.

Second, if analysis calls for certainty and noncertainty institutions to be combined, then appropriate standard errors should be calculated. For example, in most tables in NSOPF-93 analytical reports, noncertainty institutions are divided into seven (out of nine) modified Carnegie strata, and institutions selected with certainty are divided into three strata: "Public research," "Private research," and "Public doctoral."[18] The two research strata include *only* certainty institutions, and thus any estimators of variance for these strata should follow the recommendations presented above. Standard errors must be calculated for estimators for the public doctoral stratum, however, because it includes both certainty and noncertainty institutions (i.e. medical schools).

Even in the case of the 14 noncertainty strata, many of the sampling fractions are important. Thus, a without-replacement type variance formula—incorporating appropriate finite population correction factors—should be used for these strata also.

3.16 Using Replicate Weights with the NSOPF-93 Datasets

Both the NSOPF-93 institution and faculty datasets include 32 replicate weights for variance estimation. These weights implement the balanced half-sample (BHS) method of variance estimation.[19] Two widely available software packages, WesVarPC®,[20] and PC CARP,[21] have capabilities to use replicate weights to estimate variances.

Analysts who use either the faculty file or the institution file should be cautious about cross-classifying data so deeply that the resulting estimates are based upon a very small number of observations. Analysts should interpret the accuracy of NSOPF-93 statistics in light of estimated standard errors and in light of the

[18]In the institution stratum variable used in most NSOPF-93 analytical reports, the stratum labeled "Public doctoral" is not equivalent to the set of "Public, other Ph.D." institutions which form part of the certainty stratum in the sampling variable, since the "Public doctoral" stratum includes medical institutions.

[19]For a discussion of the balanced half-sample (BHS) method of variance estimation, see Wolter, Kirk M., *Introduction to Variance Estimation* (New York: Springer-Verlag, 1985), pp. 110-152.

[20]Westat, Inc., *A User's Guide to WesVarPC®, Version 2.0* (Rockville, Md.: Westat, Inc., 1996).

[21]Fuller, Wayne C., *et al., PC CARP IV*. (Ames, Iowa: Statistical Laboratory, Iowa State University, 1986).

number of observations used in the statistics. Analysts should also be cautious about use of BHS-estimated variances that relate to one stratum or to a group of two or three strata. Such variance estimates may be based upon far fewer than 32 replicates, and thus the variance of the variance estimator may be large.

3.16.1 Faculty File Replicate Weights

To achieve NCES standards, $k = 32$ half-sample replicates were employed in both the restricted-use faculty data file and the public-use faculty data file. The 15 sampling strata were subdivided to form 31 pseudo-strata. Let w_j denote the full-sample weight for the jth faculty respondent, and let $w_{j€}$ denote the weight corresponding to the €-th half-sample for the same respondent. Using $k = 32$ half-sample replicates, 33 (or 1 + 32) sets of weights were created. Nonresponse weighting adjustments and poststratification were performed within each half-sample replicate.

Define the real-valued function $G(€)$ as

$$G(w) = +1, \quad \text{if } w > 0,$$

$$= -1, \quad \text{if } w € 0,$$

and define $\mathbf{G}_j = (G(w_{j1}), G(w_{j2}), ..., G(w_{jk}))$.

The 32 replicate weights provided for variance estimation on the NSOPF-93 faculty data file did not incorporate finite population correction factors. The finite population correction factor (fpc) is omitted, because the faculty population being much larger than the NSOPF-93 sample, the sampling fraction (i.e, the ratio of the sample to the total population) tends to zero and the fpc approaches 1.

3.16.2 Institution File Replicate Weights

Institution dataset replicate weights incorporate finite population correction factors. This is important because several of the institution sampling strata sampled large proportions of institutions listed on the frame. As the number of sampled units in each strata approaches the finite number of possible units that could be sampled in that strata, the standard errors for estimates incorporating these units correspondingly decrease. Therefore, to account fully for the proportion of the frame of institutions in each sampling strata, finite population correction factors (fpc) have been incorporated into the replicate weights. For the purposes of these calculations, the approximate finite population correction factor is:

$$fpc \quad 1 \quad [\frac{1}{n} \quad \frac{1}{w_i}]$$

where n is the number of responding institutions in each stratum and w_i is the final institutional weight adjusted for nonresponse. Finite population correction factors for each stratum are reported in Exhibit 3-8.

Replicate weights for the NSOPF-93 institution dataset proceeded from three assumptions. First, random nonresponse was assumed in each stratum. For purposes of variance estimation, the 144 institutions in the certainty stratum were treated as a random sample from a population of 168 institutions. Therefore, the replicate weights calculate a variance for the certainty stratum despite the fact that all certainty institutions were selected into the sample with a probability of one.

Second, all replicate weights incorporate finite population correction factors for each stratum reported in Exhibit 3-8. This approach reflects the "near-certainty" (144 out of 168 institutions) status of the certainty stratum in the NSOPF-93 institution survey. It also includes the important fpc in stratum 1 ("Private, Other Ph.D.") and other noncertainty strata. Standard errors calculated using these replicate weights are smaller than standard errors calculated by other means, such as Taylor series standard errors presented in NCES's report, *Institutional Policies and Practices Regarding Faculty in Higher Education* [NCES 97-080].

To incorporate finite population corrections in variance calculations, a half-sample estimator was used:

$$\hat{Y} \qquad U_i \;\; Y_i \qquad (\quad 1, \;\; k) \;,$$

where the *U*-weights are defined by

$$U_i \qquad W_i \quad \sqrt{}_i \; (W_i \qquad W_i) \;,$$

€ $_i$ is the approximate finite population correction factor for the stratum in which institution *i* was sampled, and the summation is over all respondents in the full sample. The *U*-weight can be rewritten as

$U_i \qquad W_i \; (1 \quad \sqrt{}_i)$, for institutions not in the €-th half sample

$W_i \; (1 \quad \sqrt{}_i)$, for institutions in the €-th half sample.

Thus, the final replicate weights, i.e., the *U*-weights, are larger than the full-sample weights for institutions in the half sample and smaller for institutions not in the half sample.

The standard BHS (balanced half-sample) formula for variance calculations applies here, namely

$$v(\hat{Y}) \qquad \frac{1}{k} \quad (\hat{Y} \qquad \hat{Y})^2 \;,$$

and $\hat{Y}$ is equal to the mean of the $\hat{Y}$ across the *k* half samples. For NSOPF, *k* = 32 for both the institution and the faculty files.

Third, to produce the NCES-required 32 replicate weights, institutions in each pseudo-stratum were separated into two random groups and specified 32 balanced half samples. Replicate weights for each half sample and a set of weights for the full sample were then calculated. Nonresponse weighting was performed independently within each half-sample.

Exhibit 3-8: Finite population correction factors (fpc) for each institution stratum

Institution stratum	Eligible institutions	Institutions responding	Finite population correction factor
Private other Ph.D.	46	39	.1552
Public comprehensive	159	144	.5273
Private comprehensive	82	71	.6422
Public liberal arts	3	2	.9505
Private liberal arts	68	66	.8334
Public medical	25	20	.3103
Private medical	10	9	.5563
Private religious	18	18	.9284
Public two-year	316	298	.5591
Private two-year	10	10	.8877
Public other	7	7	.6864
Private other	24	19	.7913
Public unknown	19	18	.5987
Private unknown	7	7	.8510
Research/public other Ph.D.	168	144	.1429

4. Institutional Recruitment: Procedures and Results

NSOPF-93 differed in a number of significant ways from NSOPF-88. This chapter reviews procedures used for recruiting sampled institutions and collecting faculty lists and related information used for sampling and data collection. Sampling procedures were discussed in Chapter 3. Key changes to the sample frame are outlined below.

- Institution sample size was increased, from 480 in 1988, to a final sample of 974 institutions in 1993. The larger sample allowed for more detailed comparisons both at the faculty and institutional levels. The faculty sample was also augmented to provide data about faculty in key disciplines.

- The criteria for defining faculty were broadened to include non-instructional faculty. Institutions were given a complete set of instructions for preparing the list, including detailed criteria for determining who should be included and excluded from the list. (See Appendix K for list preparation instructions sent to institutions.)

- Representation of certain subgroups of faculty in the sample (full-time females; faculty in NEH-specified disciplines; black, non-Hispanics; Asian/Pacific Islanders; and Hispanics) was increased by oversampling. This required institutions to provide race and gender information not requested in 1988.

- Due to institutional downsizing and increased research demands on institutions, participation in NSOPF and other large-scale surveys was problematic for some institutions (see section 4.3). Institutions are taking longer to comply with research requests, and are far more likely to refuse participation than in years past. Hence, the initial sample of 789 was supplemented by a pool of 185 institutions that were selected to replace non-participating institutions, and to augment the sample by ensuring adequate representation of institutions across strata. At the same time, extensive follow-up and refusal conversion campaigns were conducted with the original sample, as well as with the supplemental sample.

Based on the results of the 1992 field test, the following procedures were implemented in the full-scale study:

- The 1992 field test results clearly demonstrated that institutions that provided the home addresses of faculty had a higher completion rate than those that did not. A majority of institutions were willing to release these data when given assurance that the data would remain confidential. Therefore, institutions were asked to provide home addresses, if possible, while recognizing that some institutions have institutional policies prohibiting the release of this information. Home addresses were used to mail questionnaires and to follow-up with nonrespondents to the faculty survey.

- Institutional Coordinators—the institution staff who agreed to provide the sample lists and work with NORC to implement the survey—were enlisted to prompt nonresponding faculty for the return of their questionnaires. The role of coordinators was crucial given the necessity of extending the field period into the summer of 1993, particularly since many institutions were unable to provide home telephone numbers. The names of sampled faculty were released only to those coordinators who signed the NCES Affidavit of Nondisclosure and had it notarized. Under penalty of fines and imprisonment, the

affidavit affirms that the signatory will maintain the confidentiality of any information released which identifies individual respondents. Again, the field test demonstrated that two-thirds of the Institutional Coordinators were willing to sign the affidavit, enabling them to prompt faculty.

- To facilitate processing and quality control of the lists, both hardcopy and machine-readable (tape or floppy diskette) versions of the list were requested. To standardize list formats as much as possible, the institution was given detailed specifications for producing machine-readable faculty lists.

- Employee ID numbers were requested from the institution to facilitate quality control of the lists (e.g., checking for duplicate faculty entries) and locating efforts. Again, institutions with provisions against the release of such data were assured they could omit it.

- Other forms and informational materials were provided to assist institutions in preparing lists in a workable, easy-to-read format. These included instructions for formatting the machine-readable versions of the lists, and forms to document the format of the lists and to provide the names, titles, and telephone numbers of individuals involved in preparing the lists. The number of documents in the packet was reduced from eight in the field test, to six in the full-scale study to streamline the process of compliance for the institution.

- Supplementary information was requested in order to help the list processing staff interpret the lists and, if necessary, institution staff were recontacted for clarification of discrepancies. Course catalogs and faculty directories were also requested. The course catalog was requested separately, from the Director of Admissions, to minimize burden to the Institutional Coordinator.

4.1 OMB Clearance and Mail Procedures

The U.S. Department of Education Information Management Compliance Division/Office of Management and Budget (OMB) list collection clearance package for the full scale study was submitted to OMB on September 4, 1992, with a request for expedited review. On September 14, 1992, an amendment to the list collection OMB package was submitted, providing an analysis of the discrepancies in field test faculty counts. A second amendment described the sampling requirements for the study and the NEH and NSF sample augmentation. OMB clearance of the list collection process was given on October 5, 1992.

The initial mailing to sampled institutions was conducted on October 7, 1992. The mailing was directed to the institution's Chief Administrative Officer (CAO). In this first mailing, the CAO was asked to designate two individuals: an Institutional Coordinator to act as a liaison to the project and to assume responsibility for preparing the faculty list; and an institution respondent, who would be responsible for completing the institution questionnaire. Copies of all institutional contacting materials appear in Appendix K.

The initial mailing contained the following materials:

Cover letter. The cover letter was printed on NCES letterhead and signed by Emerson J. Elliott, then Commissioner of NCES. It explained the purpose of the study, detailed NCES' confidentiality laws and protections, requested the CAO's participation, and provided an estimate of institutional burden. It asked the CAO to return the enclosed confirmation form within five

days. It also encouraged the CAO to call the Project Director at a toll-free number with any questions or concerns about the study.

Confirmation form. The three-ply confirmation form asked the CAO to provide the name, title, institutional address, and telephone number of the administrative officials designated as the Institutional Coordinator and as the institution respondent. The form noted that the same person could be designated to perform both roles. Fewer than one-half (44.2 percent) of the Institutional Coordinators in the full-scale study were also named as institution respondents. The Institutional Coordinator was often an academic officer, provost, dean, institutional researcher, personnel manager, or budget officer.

NSOPF-93 informational brochure. The brochure explained the purpose and content of the study and listed key findings from the 1988 study.

Institution folder. This was to be forwarded by the CAO to the individual designated as the Institutional Coordinator. It contained a cover letter to the Institutional Coordinator, similar in content to the letter directed to the CAO (the major difference was that the letter presumed that the CAO had agreed to participate in the study). The folder also contained instructions for preparing the faculty list. These included concise definitions of personnel to be included in and excluded from the lists. Unlike the 1988 study, which required institutions to screen out faculty with no instructional responsibilities, NSOPF-93 requested a list of *all* faculty and other instructional personnel for the academic term including October 15, 1992. The following information was requested for each faculty member on the list: full name, department/program (or equivalent), teaching discipline, campus mailing address and telephone number, employment status (full- or part-time), and demographic and stratification variables (race/ethnicity, gender). To facilitate contacting and locating activities, home addresses, telephone numbers, and employee IDs were also requested, in addition to an up-to-date faculty directory. A deadline of October 30, 1992 was given for return of the faculty list.

The packet to the Institutional Coordinator also included a checklist to be used by the CAO or Institutional Coordinator to ensure that all of the information, documents, and forms requested were included in the return envelope. Finally, the folder contained two prepaid business reply envelopes for the return of the confirmation form, faculty list, and supplementary materials, and an NCES Affidavit of Nondisclosure, which the Institutional Coordinator was instructed to sign and have notarized, affirming that he or she would not divulge the names and identifying information of faculty respondents released to him or her.

The contractor's fax number was provided on the cover letter and all other materials directed to the CAO and coordinator in order to allow institutions to expedite the return of certain materials. Because fax legibility varies, institutions who faxed materials were also encouraged to mail the original hardcopy.

A toll-free NSOPF-93 telephone number was prominently displayed on all forms and informational materials to ensure that institution staff had timely access to project staff to answer questions and resolve problems encountered in preparing the lists. Incoming calls were handled by the project's Task Coordinator, and forwarded to the Project Director when necessary. During the list collection process, 679 calls were received. Questions were asked about the instructions and problems encountered in preparing the lists, including staff shortages, scheduling problems, and difficulties in providing all the requested faculty information.

4.1.1 Initial Mailout and Remailings

All 789 initial recruitment packets were sent via first-class mail on October 7, 1992. None of the list collection packages were returned as undeliverable; however, 465 of the 974 institutions (48 percent) in the total sample requested a remail of the initial packet of CAO materials. In some instances, remails were requested because of a change in CAO or a minor address correction; for the most part, however, the remails were necessary because the mail intended for the CAO was frequently routed to other institution staff and, therefore, never received by the CAO. To minimize further delays, all remails were sent by two-day priority mail, and directed whenever possible to the Institutional Coordinator (if identified at the time of the remail request) or to the attention of a gatekeeper or other institutional contact.

Concurrently with the mailouts to the CAO, postcards requesting course catalogs were mailed to the Office of Admissions at each institution. In a small number of instances, institutions requested payment for mailing a course catalog. Whenever it was requested, a payment (generally less than $5) was mailed to these institutions. Information on the number of institutions submitting catalogs is found in section 4.4.

4.1.2 Mail Follow-up Procedures

About two weeks after the initial mail-out, a follow-up postcard was sent to all CAOs, thanking them for their cooperation if they had already returned the Confirmation Form, or if they had not returned the form, urging them to fax or mail the form by the deadline. Once again, they were encouraged to call the NSOPF-93 toll-free number with any questions or concerns.

On January 4, 1993, a follow-up packet was sent via two-day priority mail to the CAOs of approximately 250 nonresponding institutions, containing a letter signed by the Project Director reiterating the importance of the study, and an additional Confirmation Form. It asked once again that the CAO return the Confirmation Form, and call the Project Director at the toll-free number with any questions or concerns.

4.1.3 Mailouts to Supplemental Sample

Twenty-six institutions were finalized as refusals and replaced in the sample prior to March 1, 1993. An initial mailout to seven replacement institutions was done on December 1, 1992 and 19 replacement institutions were mailed packets on January 22, 1993. On March 9, 1993, 159 additional institutions were selected to ensure an adequate sample of institutions across strata, given an anticipated non-participation rate of up to 20 percent. An initial mailing to these institutions was conducted on March 10, 1993. All mailouts to supplemental institutions were sent by two-day priority mail. Telephone follow-up for supplemental institutions took place one week after the initial mailing to speed response time.

4.2 Telephone Follow-up Procedures

Telephone follow-up was coordinated with mail follow-up to minimize unnecessary calls to the CAOs and coordinators. The starting date for telephone follow-up was November 9, 1992, approximately one week after the follow-up postcards to the CAO were mailed. Full-scale telephone follow-up continued through June 1, 1993, at which time the follow-up effort focused on institutions in under-represented strata. Telephone follow-up efforts concluded on June 25, 1993.

4.2.1 Selection and Training of Prompters

Prompters were selected for the CAO prompting effort on the basis of their telephone skills and ability to work with a professional population. A training manual was developed by project staff that contained an overview of the project, and scripts for communicating with CAOs, coordinators, gatekeepers, and other institutional staff. A five-hour training was conducted on November 9, 1992.

4.2.2 Initial Telephone Contact and Follow-up

Telephone prompting of approximately 635 institutions commenced on November 8, 1992, two weeks after the prompting postcard had been mailed. The prompting effort concentrated on nonresponding institutions as well as those who had agreed to participate but for whom a faculty list had not been received. The general purpose of this first telephone contact was to confirm receipt of the recruitment and list collection packet and to urge the institution's CAO to comply promptly with NCES' request. Prompters were trained to do the following:

- Confirm receipt of the recruitment packet
- Introduce the CAO to NSOPF-93 and to the contractor's role
- Answer any questions about NSOPF-93, the confidentiality provisions, and related questions about the study
- Obtain institutional cooperation and request the names of the Institutional Coordinator and institution respondent for the institution questionnaire
- Avert potential refusals
- Establish an expected date for the return of the Confirmation Form or complete the form over the telephone
- Identify any institutional restrictions or problems that could hinder timely compliance with the request for faculty lists
- Remind institutional staff to follow the instructions for compiling the faculty lists and reviewing the checklist in completing the return envelope
- Request the supplementary information (e.g., institution catalog or bulletin, staff directory)
- Prompt the Institutional Coordinator for completion of the list of faculty (i.e., if the packet had been forwarded to him or her by the CAO)

If an institution had not yet received the recruitment packet, the prompter noted any necessary address corrections and submitted a request for remailing. Requests for remails were usually processed on the same day they were received.

4.2.3 Additional Telephone Follow-up for Nonresponse

Follow-up of nonresponding institutions was resumed once the expected date for receipt of the institution's materials had passed. During this call, the telephone prompter once again prompted for the return of materials (or offered to collect the Institutional Coordinator and institution respondent names over the telephone), attempted to establish an anticipated date for receipt of the materials, and answered questions. Prompters were trained to identify and avert "hidden" refusals (i.e., CAOs who verbally agreed to comply with the request, but who in fact had no intention of doing so) and to document explicit refusals for conversion efforts.

4.2.4 Refusals and Problem Cases

Initial refusals were reviewed by the Task Coordinator, who called refusing institutions, forwarded them to another supervisor, prompter, or senior staff, or in some instances, to the NCES Project Officer. The most often cited reasons for refusing to participate include multiple survey requests, fiscal constraints, and decreases in staff. The overall conversion rate, if all nonresponding institutions are considered as final refusals, was 42 percent; 103 refusals were successfully converted for an overall participation rate of 85 percent.

When necessary, special arrangements were made with individual institutions to enlist their participation. For example, nine institutions agreed to participate only if the institution released faculty information by an identifying number only, rather than releasing the names of sampled faculty. In these instances, the institution was responsible for mailing questionnaires and conducting follow-up with faculty.

4.2.5 Telephone Follow-up of List Discrepancies/Retrieval

Upon receipt, each list of faculty was reviewed for completeness and adequacy. Although almost 70 percent of the faculty lists were submitted in electronic form (see Exhibit 4-3), intensive effort was still required to correct problems in the electronic lists before they could be processed and sampled. The most prevalent problems were lists that could not be read or were incorrectly formatted. Other serious obstacles to sampling were lists that were missing key sampling data, appeared with incorrect information, or contained faculty names more than once. Programming staff were needed to create utilities to deal with the most frequently occurring problems, and to assist in reading, evaluating, and de-duplicating machine-readable lists. If sampling or address information was missing from the lists, sampling staff consulted the course catalog, if available, or any other material sent by the institution to attempt to retrieve the information before calling the institution. However, approximately 10 percent of the institutions had to be recontacted to resolve errors in their faculty lists.

Once the faculty lists were processed, and prior to sampling, they were reviewed to compare the faculty totals from the list supplied by the institution with numbers of faculty from IPEDS data. The lists were initially subjected to a rigorous review; institutions whose list counts were discrepant by more than five percent were called and an attempt was made to reconcile the numbers. However, after 71 institutions were contacted, only 15 percent of these calls were effective in reducing the difference between institution and IPEDS counts. Even then, discrepancies could not be resolved altogether. Due to the ineffectiveness of these calls, and the increase in list processing time needed to wait for institution personnel to resolve these problems, further review was made more lenient. List counts were compared with IPEDS numbers and only very gross and obvious errors were resolved, such as full-time and part-time staff being lumped together as full-time, part-time staff being omitted completely, or full-time and part-time counts being reversed. Sampling staff forwarded systematic discrepancies clearly requiring explanation or correction to telephone staff. Two prompters were trained expressly to handle recontacting institution staff to retrieve missing information and resolve list discrepancies.

4.3 Revised Data Collection Plan

An overall institutional participation rate of 85 percent for list collection was achieved for NSOPF-93. The overall participation rate dropped from 89 percent in the NSOPF-93 field test (and 94 percent in the 1988 NSOPF study). The recruitment effort required almost 34 weeks to complete—almost 6 weeks longer than in the field test. The longer field period can be partly accounted for by the interruption of winter break—no follow-up was conducted for two weeks between December 23, 1992 and January 7, 1993. More significant, however, was the continuation of a trend that was evident in the field test results: compared to 1988, institutions were simply taking longer to prepare faculty lists, and were initially more resistant to participating in large-scale research projects. Prominent among the factors causing this were:

Survey saturation. A wide array of studies compete for the attention of already overburdened institution staff. (This is particularly true of large institutions, which have a higher probability of being selected into national samples.) Some institution personnel complained that they were being asked to participate in "too many surveys." Others required assurance that NSOPF-93 did not duplicate other studies, and did not burden faculty unnecessarily.

Fiscal constraints. NSOPF-93 went into the field at a time when many institutions were experiencing severe financial constraints and downsizing. As a result, a large proportion of the institutional representatives complained that, because of downsizing or other fiscal constraints, there were no staff available to process the NSOPF request on time. They typically reported that they were already overburdened with their own work and that external requests would not receive priority.

Uncertain faculty/administration relations. As a result of the fiscal constraints cited above, some institutions had asked faculty to perform more work—sometimes at less pay. Many of these institutions had expressed concern that requesting faculty participation in a study at a time when many faculty were overworked would strain relations between faculty and administration. Ameliorating this concern, particularly at larger institutions, was the fact that NSOPF-93 only sampled an average of 41.5 faculty at each institution.

Difficulties in compiling lists of part-time faculty. Despite increasing reliance on part-time faculty at many institutions, readily accessible files of part-time and temporary faculty and instructional staff do not exist at many institutions. At some institutions, these faculty are listed only in personnel files where they are not easily distinguishable from other kinds of institutional staff. Many institutions required additional time to compile this data; others were simply unwilling or unable to commit staff time and resources to this effort.

Additional information requested. As indicated earlier, NSOPF-93 requested more detailed information about each faculty member, including home telephone number and address, and employee IDs along with a machine-readable version of the faculty list. This information proved vital to the success of the faculty component of the study. For institutions unable to provide such information easily, however, these requests often slowed response time for providing a faculty list. In addition, requests for identifying information, such as home addresses and employee IDs, sometimes had to be cleared through legal departments, or occasionally, voted on by a faculty senate. These institutions were concerned not merely about applicable federal law, but also about a growing number of state and local regulations, as well as the individual institution's own policies and agreements with faculty. Institutions were assured that lists would be accepted without data items whose release was prohibited by institutional policy; however, the decision-making process at each institution about whether to include such items sometimes considerably delayed receipt of the list.

To adjust for the slow rate of participation, a total supplemental sample of 185 institutions was drawn to replace and supplement institutions whose characteristics were comparable to those of non-participating institutions.

Telephone staff continued follow-up and refusal conversion activities with institutions in the original sample, while, at the same time, recruiting institutions in the supplemental sample with the goal of obtaining a representative sample across all strata. The progress of list collection efforts across strata was monitored on a weekly basis. Based on this review of participating institutions' data collection, staff were able to focus their efforts on under-represented strata. On April 6, 1993, a revised data collection plan was

submitted to NCES, which included the addition of the supplemental sample, and which extended the deadline for participation to June 11, 1993. The deadline was later extended to June 25, 1993 to allow additional time to recruit "certainty" institutions.

4.4 Results of Institution Recruitment

As shown in Exhibit 4-1, faculty lists were collected from 817 institutions, an overall participation rate of 85 percent.[22] However, the data collection period was significantly longer than in the 1992 field test and the 1988 study. Exhibit 4-2 provides faculty list collection rates by type of institution.

Exhibit 4-1: Institutional participation rates for NSOPF cycles

NSOPF cycle	Institutional sample	Number participating	Participation rate (percent)	Length of effort
1987 field test	103	94	91	9 weeks[a]
1988 main study	480	449	94	24 weeks
1992 field test				
Core	54	50	93	28 weeks
Revised core	54	53	98	16 weeks
Augmentation	82	71	87	28 weeks
Combined	136	121	89	28 weeks
1993 main study				
Initial eligible sample	780	663	85	34 weeks
Supplemental eligible sample	182	154	85	16-24 weeks[b]
Combined eligible sample[c]	962	817	85	34 weeks

[a] Does not include time expended by NCES staff in recruiting institutions before this task was transferred to the previous contractor.

[b] Range includes institutions drawn on a flow basis.

[c] The number of eligible institutions in Pool 1 (the initial sample), plus the number of eligible institutions selected from Pool 2. Twelve institutions (nine in the initial sample and three in the supplemental sample) were deemed ineligible for the NSOPF-93 main study.

[22] Of the 974 institutions in the total sample, 12 were found to be ineligible during the list collection process, reducing the eligible sample to 962.

Exhibit 4-2: NSOPF-93 institution participation rates by type of institution

Institution type	CONTROL					
	Public		Private		Total	
	Total	Participating (percent)	Total	Participating (percent)	Total	Participating (percent)
Research	71	66 (93.0)	33	30 (90.9)	104	96 (92.3)
Other Ph.D. granting	63	56 (88.9)	46	40 (87.0)	109	96 (88.1)
Comprehensive	159	141 (88.7)	82	67 (81.7)	241	208 (86.3)
Liberal Arts	3	3 (100)	68	57 (83.8)	71	60 (84.5)
Medical	25	21 (84.0)	10	10 (100.0)	35	31 (88.6)
Religious	0	0	18	14 (77.8)	18	14 (77.8)
Two-year	317	258 (81.4)	10	8 (80.0)	327	266 (81.3)
Other	7	6 (85.7)	24	18 (75.0)	31	24 (77.4)
Unknown	19	17 (89.5)	7	5 (71.4)	26	22 (84.6)
Total	**664**	**568 (85.5)**	**298**	**249 (83.6)**	**962**	**817 (84.9)**

Although emphasis was placed on collecting faculty lists from institutions, Exhibit 4-3 provides information on the collection of other requested materials, such as course catalogs and faculty directories. Of the 817 institutions participating in NSOPF-93, 83 percent also submitted a confirmation form. While 75 percent of these institutions provided a course catalog as requested, only 33 percent sent a faculty directory. Exhibit 4-3 also shows the types of faculty lists provided. The majority (67 percent) of the lists were in some type of electronic format.

Exhibit 4-3: Items provided by participating institutions

Item	Number of participating institutions providing item	Percent of 817 participating institutions
Confirmation forms	679	83.1
Signed affidavits	549	67.2
Course catalog	611	74.8
Staff directory	273	33.4
Faculty lists provided as:		
Hardcopy	263	32.2
Diskette	31	3.8
Tape	8	1.0
Combination hardcopy & electronic	510	62.4
Other	5	0.6

Exhibit 4-4 examines the content of the faculty lists provided. The list preparation instructions (see Appendix K) asked the institution to supply several types of data concerning their faculty: sampling information, such as full-or part-time status, discipline, gender, and race/ethnicity; and locating information, such as campus address, home address, and employee ID.

Exhibit 4-4: NSOPF-93 faculty list content

Data item	Number of participating institutions providing data	Percent of 817 participating institutions
Sampling information:		
Gender	731	89.5
Race/ethnicity	608	74.4
Discipline	717	87.8
Full/part-time status	718	87.8
Locating information:		
Home address	512	62.7
Campus address	734	89.8
Employee ID	437	53.5

5. Data Collection Procedures and Implementation

5.1 Overview

Institutions were recruited for NSOPF-93 from an initial sample of 974 postsecondary institutions. (See Chapter 3 for a discussion of sample selection and eligibility. See Chapter 4 for a discussion of the recruitment process and results.) Of these 974 institutions, 962 were eligible and 817 agreed to participate in the study by supplying a list of their faculty. The NSOPF-93 faculty questionnaire collected data from a sample of full- and part-time faculty, both instructional and non-instructional, and other staff with instructional duties at participating institutions. The final sample of faculty was 31,354 (the original sample of 33,354 less the subsample of 2,000) drawn from lists supplied by the 817 participating institutions. The NSOPF-93 institution questionnaire collected data from eligible institutions. The institution sample consisted of the 817 institutions who supplied faculty lists and 145 who did not provide lists. Exhibit 5-1 contains the final schedule for all three NSOPF-93 study components; list collection, faculty questionnaires and institution questionnaires.

A supplemental memorandum describing changes to the faculty questionnaire was submitted to OMB on December 18, 1992 and OMB approval was received on January 7, 1993. A multi-modal data collection design was approved. This involved a mailed, self-administered questionnaire, followed by mail and telephone prompting, and supplemented by computer-assisted telephone interviewing (CATI) for nonresponding faculty. The self-administered faculty questionnaire took about 45 minutes on average to complete. A commercial software package called AutoQuest was used to program the CATI version, which involved minor wording and format changes to the self-administered instrument in order to facilitate interviewing by telephone. The CATI version also took about 45 minutes to complete.

A supplemental memorandum describing changes to the institution questionnaire, along with respondent cover letters, was submitted to OMB on June 28, 1993 with a request for expedited approval. OMB approval was received on July 30, 1993. Revisions to the institution questionnaire were finalized in consultation with NCES at the request of OMB. The NSOPF institution questionnaire was mailed to institutional representatives at all 962 eligible institutions, including those that did not supply a list of faculty for the study. Data were collected principally by self-administered questionnaires, although a small number of cases were completed with interviewer assistance.

The Chief Administrative Officer (CAO) of each institution named the Institutional Coordinator as institution respondent for the institution questionnaire at 44.2 percent of the sampled institutions. The number of institution staff required to complete the self-administered institution questionnaire varied from a low of one to a high of five, with an average of slightly fewer than two respondents (1.78) per institution. Over one-half (460) of the institutions had a single representative complete the questionnaire; over one-quarter (229) were completed by two respondents; 116 by three respondents; 47 by four respondents; and 20 by five respondents.

For the faculty and institution questionnaires, the response rate is defined as the ratio of the number of completed questionnaires to the number of sample units minus the number of ineligible units. For faculty, the response rate is calculated as 25,780/(31,354 € 1,590 ineligibles) = 86.6 percent (84.4 percent, weighted). The response rate for the institution questionnaire is: 872/(974 € 12 ineligibles) = 90.6 percent (93.5 percent, weighted). The overall faculty response rate (institution list participation multiplied by faculty questionnaire response rate) was 73.5 percent, and 70.4 percent, weighted.

Exhibit 5-1: Chronology of NSOPF-93 data collection

YEAR	Institution List Collection	Faculty Questionnaire	Institution Questionnaire
1992	*October:* Recruitment packets mailed to 789 institutions *November:* Telephone follow-up begins		
1993	*January:* Follow-up packets mailed *March:* Recruitment packets mailed to supplemental sample of 185 *April:* Revised data collection plan submitted to NCES *June:* Institution list collection completed	*January:* Wave 1 mailing *February:* Wave 2 mailing *March:* Wave 3 mailing *April:* Wave 4 mailing *April-December:* Telephone prompting of faculty *May-December:* Follow-up conducted by Institutional Coordinator *July:* Waves 5 and 6 mailings *November-December:* Faculty refusal conversion, use of abbreviated questionnaire *November-December:* Follow-up with specific faculty subgroups; faculty questionnaire data retrieval	*September:* Institution questionnaire mailing *October:* Second institution questionnaire mailing; Institution questionnaire data retrieval begins *November:* Telephone prompting begins for non-responding institutions
1994		*January:* Faculty questionnaire data retrieval completed	*February:* Third institution questionnaire mailing *February-March:* Interviewer-assisted data collection *May:* Institution questionnaire data collection and retrieval completed

5.2 Faculty Survey

Faculty data were collected from January to December, 1993 with a two-month hiatus in July and August. At that time data collection was temporarily suspended because most faculty were on summer break. Because of the difficulty in reaching faculty during the summer months, no telephone follow-up was performed during these two months. Faculty questionnaires were mailed in waves as faculty lists were received and processed. Mailings were sent to the home address of the respondent whenever it was provided by the institution.

5.2.1 Faculty Mail and Telephone Follow-up

Mail follow-up included reminder postcards, periodic questionnaire remails, and follow-up targeted to specific populations, including research faculty, part-time faculty, faculty who initially refused to

participate, and faculty who had specific concerns (such as confidentiality). All initial mailings and scheduled follow-up mailings were sent by third class bulk mail; first class and two-day priority mail were used for targeted follow-up mailings to ensure that mail would be promptly forwarded to faculty. Appendix L includes copies of initial and follow-up letters sent to faculty sample members.

The letter which accompanied all faculty mailings included a toll-free telephone number for faculty to call to ask questions about the survey. Staff were available to monitor this number during normal business hours and were able to address any concerns or questions that faculty had. Any messages left after business hours were promptly answered the next day. Approximately 4 percent of the faculty sample called the toll-free number.

Initial telephone calls to faculty asked for prompt return of the self-administered questionnaire by mail. After the second prompting call, interviewers were trained to conduct a telephone interview. Exhibit 5-2 displays the schedule for both the mail and telephone follow-up efforts. Note that only percentages of faculty in each mailout are displayed, as the initial and subsequent mailings were sent to the entire faculty sample of 33,354. (Subsampling of the faculty sample occurred after questionnaires had been mailed.) The data provided are helpful in determining the approximate proportion of faculty needing second and third mailings of the faculty questionnaire.

Exhibit 5-2: NSOPF-93 faculty questionnaire mail and telephone schedule (dates mailed and percent of original sample targeted)

Mail wave	Initial Mailing (percent)	Postcard prompt (percent)	Second mailing (percent)	Third mailing* (percent)	Telephone prompt (percent)
One	1/29/93 (100)	2/19/93 (100)	3/5/93 (87)	3/26/93 (65)	4/28/93 (50)
Two	2/26/93 (100)	3/19/93 (100)	4/2/93 (88)	4/30/93 (53)	5/15/93 (44)
Three	3/26/93 (100)	4/16/93 (100)	4/30/93 (89)	5/21/93 (53)	6/4/93 (43)
Four	4/23/93 (100)	5/7/93 (100)	5/21/93 (87)	6/11/93 (58)	6/18/93 (40)
Five	7/2/93 (100)	7/23/93 (100)	8/6/93 (90)	8/27/93 (59)	9/10/93 (58)
Six	7/23/93 (100)	7/30/93 (100)	8/13/93 (100)	8/27/93 (62)	9/10/93 (57)

* For Waves 2 through 6, the third questionnaire was mailed directly only to nonresponding faculty with home addresses. Questionnaires for nonresponding faculty without home addresses were sent to the Institutional Coordinator (see section 5.2.5).

As this exhibit shows, an increasingly higher percentage of faculty required second and third mailings for the last mailout waves. This was due, in part, to an accelerated follow-up schedule for the later waves.

5.2.2 Faculty Locating and Eligibility Screening Procedures

Locating of faculty was performed by specially trained interviewers. Locators were trained to follow a protocol for each respondent for which no productive contact was made. The following sources of information were used to find hard-to-reach respondents:

- name of the institution at which the individual was employed in the fall of 1992
- any available home or campus address or telephone numbers
- faculty member's department
- employee ID (oftentimes the employee's social security number)

Cases selected for the locating staff included cases to locate and refusals, as well as any respondent who had not received a successful prompt or who had not made firm arrangements to complete a telephone interview. The locating team compiled institution-by-institution lists of pending respondents. The folder for each institution (including course catalogs, faculty directories, lists and print-outs of locating information) was searched for any helpful information, and these data were entered onto a hardcopy call record for each faculty member. Commercially published directories of faculty were also searched for this information. Institutions which did not supply home phone numbers were prioritized for look-up. Locators were then instructed to attempt to contact sampled faculty using any of the available addresses or telephone numbers, calling the institution directly, calling the Institutional Coordinator, or calling the appropriate department secretary or chairperson.

In the event that these sources were not helpful in locating faculty, alternate sources were used, such as directory assistance and the state department of motor vehicles. When necessary, the locating team performed CBI/Trans Union searches of locating information. As information was found and confirmed, the case was forwarded for data entry and placed into the telephone center calling queue. Locators were trained to conduct telephone interviews (on hardcopy) with respondents they located.

In order to concentrate locating efforts on eligible faculty, calls were initiated to institution personnel to confirm eligibility of pending faculty. Institutions with large numbers of pending part-time faculty and institutions likely to have large numbers of ineligibles (medical schools, institutions with low participation rates, etc.) were prioritized. All interviewers and locating staff (including data entry specialists) received brief training in determining eligibility and were provided with a job aid to assist them in assessing respondent eligibility.

Interviewers were supplied with a list of Institutional Coordinators and the status of each institution's Affidavit of Nondisclosure. If a signed affidavit was currently on file for the coordinator, the interviewer was instructed to call the coordinator directly and ask for the eligibility status, the current employment status, and, if possible, additional locating information (such as home addresses or phone numbers, forwarding information, etc.) for all pending faculty listed on the "look-up" sheet provided by the locating shop. Interviewers could only request information from coordinators who had signed the affidavit and had it notarized. If no affidavit was on file, the interviewer had the option of asking for completion of the affidavit, or contacting personnel or payroll for further information. Contacts to institution personnel other than the coordinator were conducted within confidentiality constraints. To protect respondent confidentiality, interviewers were not allowed to identify themselves as representing NSOPF-93, or to reveal that the people they were asking about were in the NSOPF-93 faculty sample.

Combined institution questionnaire prompts and eligibility calls. To maximize efficiency and to minimize the number of calls to each institution, eligibility calling was combined with the institution questionnaire prompt. This occurred with those institutions where the institution respondent was the same

as the Institutional Coordinator, and an institution questionnaire prompt was required. Combined calls continued until the first round of institution questionnaire prompting was completed on December 18, 1993.

Eligibility calls to institutions with low faculty participation rates. After January 3, 1994 eligibility calls were resumed only to those 75 institutions with a faculty participation rate of 60 percent or less. These calls were combined with institution questionnaire prompts whenever a prompt to the institution was required. However, all institutions with a participation rate of less than 60 percent were contacted—not merely those for whom a prompt was required.

5.2.3 Faculty Refusal Conversion

During November and December, 1993, a number of new strategies were employed. A team of field staff especially skilled in working with refusals and hard-to-locate cases, and with experience working with institutions, were recruited for this phase of the data collection effort. Call histories were produced for respondents who initially refused to answer the survey. Refusals were reviewed, grouped, and appropriate follow-up strategies and supervisor reinforcement put into place for field and office interviewers. Special tools were designed to aid in refusal conversion. One was a fact sheet to help refusal conversion specialists answer refusers' specific objections to participation in the study. Issues on which the fact sheet focused included the survey's confidentiality and purpose and concerns of particular groups of faculty (part-time faculty, retired faculty, research faculty, faculty at religious institutions and faculty who said they were not typical of faculty at their institution).

Another tool that aided refusal conversion was an abbreviated faculty questionnaire designed for use in a telephone interview. This questionnaire consisted of critical items and other items selected on the basis of analytical needs where NCES required unimputed data for the faculty questionnaire. The abbreviated questionnaire was specifically used only for refusal conversion. It was not designed for refusal aversion. During the intensive data collection period of November 11, 1993 and December 31, 1993, 636 abbreviated questionnaires were completed with respondents who initially refused to participate in the NSOPF-93 faculty survey. After gaining respondent cooperation in answering the abbreviated faculty questionnaire, refusal conversion specialists were trained to ask respondents for their cooperation in completing the full questionnaire.

For purposes of data entry and imputation, completed abbreviated questionnaires were treated like all other questionnaires. Items excluded from the abbreviated questionnaire were considered missing data. A copy of the abbreviated questionnaire appears in Appendix H.

5.2.4 Follow-up with Specific Subgroups of Faculty

Throughout the follow-up phase of the data collection process, special attention was paid to increasing absolute numbers of respondents in particular faculty subgroups: for black, non-Hispanics; Hispanics; Asian/Pacific Islanders; those whose race was unknown (i.e. missing a racial identification on the faculty sampling list); research institution faculty; and part-time faculty. In order to focus on the research target, case lists prioritizing these faculty subgroups were provided to field staff and to phone shop staff. In addition, a special mailing was sent in November, 1993 to the following subgroups of nonresponding faculty: Wave 5 and Wave 6 faculty; and Wave 1 through Wave 4 faculty in medical or research schools and two-year colleges. These special efforts, particularly those taken in November and December, 1993, increased response rates for minority and part-time faculty, largely because of an increase in completed cases in which race or part-time/full-time status was initially unknown.

5.2.5 Faculty Follow-up by Institutional Coordinators

All Institutional Coordinators who had signed the NCES' Affidavit of Nondisclosure and had it notarized were asked to carry out three tasks vis-a-vis nonresponding faculty. Coordinators who did *not* supply home addresses for their faculty were asked to mail the third questionnaire packet to the home (or summer) address of nonresponding faculty. The questionnaire packets were prepackaged and prestamped in advance, so that the coordinator's task was limited to writing in the faculty member's address. Coordinators who supplied home addresses were given a list of nonresponding faculty and asked to prompt them for the return of their questionnaires. Coordinators were also asked to identify faculty who were listed in error and not eligible for the study. The initial mailout of these materials, for institutions in faculty mailout Waves 1-4, occurred on May 7, 1993. These materials were mailed in August, 1993 for institutions in all faculty mailout waves. Appendix N includes a copy of the letter accompanying the packet mailed to Institutional Coordinators.

To assure that these follow-up requests received prompt attention from coordinators, telephone prompting staff contacted each coordinator's office to alert them to the packet and its contents and to answer any questions about their role. Additional contact with coordinators to confirm eligibility of nonresponding faculty continued through January, 1994.

For the May mailing, out of 439 coordinators, 131 were asked to prompt and to send questionnaires to the homes of 3,355 nonresponding faculty. The other 308 coordinators were asked only to prompt 7,475 nonresponding faculty.

The second mailing to coordinators occurred prior to the resumption of interviewer follow-up. Coordinators for Waves 1-4 institutions were mailed follow-up packets on August 18-19, 1993; the coordinators for Waves 5-6 received similar packets on August 23, 1993. The telephone center staff contacted coordinators to notify them of the scheduled mailout and to request their assistance. Telephone notification began on August 11, 1993 and was completed by September 3, 1993. Of the coordinators who received packets, 109 confirmed either by telephone or in writing that they had followed up with nonresponding faculty at their institutions. Only nine coordinators explicitly refused to implement the request for help.

5.2.6 Faculty Telephone Interviews

Telephone interviewing was conducted using a CATI (computer-assisted telephone interviewing) system. Telephone prompting and interviewing of nonresponding faculty began on April 28, 1993 and ended on December 18, 1993, with a suspension of activities in the months of July and August. A total of 4,995 faculty, or 19 percent of all completed cases, completed the CATI questionnaire. The CATI version of the faculty questionnaire was programmed in AutoQuest, a commercially available software package. Telephone follow-up activities were coordinated with mail follow-up. Cases were activated for telephone follow-up in waves, according to their initial mailing date (see Exhibit 5-3). Interviewers were instructed to conduct a CATI interview only after the second telephone prompt, but were given greater discretion to conduct a telephone interview for cases mailed late in the field period.

5.2.7 Field Interviewing and Locating

Approximately 20 field interviewers who were expert locators and refusal converters and two field managers were employed during November and December, 1993, to assist with the end of the data collection effort. Almost 1,200 temporary refusal and unlocatable cases were assigned to field staff. Field production was monitored daily, and regular feedback was given in order to keep production levels high.

Staffing was reconfigured and adjusted based on the caseload and last known location of the cases. Field staff completed

approximately 500 questionnaires with faculty as telephone interviews. These interviews were then data-entered using the data entry program for self-administered questionnaires.

5.2.8 Faculty Data Retrieval

A subset of telephone interviewers were trained to conduct retrieval of missing critical information from completed faculty self-administered questionnaires. Twenty-seven percent of the 20,785 self-administered questionnaires were identified for retrieval because of missing data in one or more of the critical items. Respondents were called and asked to supply the missing data for these items. In approximately 84 percent of the cases, respondents were able to provide some or all of the missing information. The remaining 16 percent were determined to be complete based on policy decisions reviewed with NCES. All faculty questionnaire retrieval activities were completed on January 29, 1994. (Retrieval is discussed further in Chapter 6. A list of faculty questionnaire critical items appears in Appendix I.)

5.3 Data Collection Results: Faculty Questionnaire

Exhibits 5-3 through 5-6 provide a summary of the NSOPF-93 data collection results for the faculty questionnaire. These exhibits report unweighted response rates.

Exhibit 5-3 illustrates the faculty response rates for each wave of questionnaires by initial mailing date. As faculty lists were received and processed, and faculty were sampled, questionnaires were assembled into large batches for mailing. The initial questionnaire packets were followed by at least two follow-up questionnaire mailings. Telephone prompting and interviewing followed for nonrespondents. As indicated, the response rates varied from a high of 90.1 percent for Wave 1 to a low of 77.9 percent for Wave 6. These data suggest that faculty who received their questionnaires early in the field period—usually when classes were still in session—had a greater likelihood of responding than faculty who received a later mailing.

Exhibit 5-3: Faculty response rates by initial mailing date

Initial mailing date (by wave)	Eligible sample	Completed questionnaires		Total completed questionnaires	Faculty response rate (unweighted percent)
		Self-administered	Telephone interview		
1. January 29, 1993	9,691	7,536	1,193	8,729	90.1
2. February 26, 1993	6,635	4,986	899	5,885	88.7
3. March 27, 1993	3,034	2,160	502	2,662	87.7
4. April 24, 1993	3,337	2,239	590	2,829	84.8
5. July 2, 1993	5,769	3,229	1,435	4,664	80.8
6. July 16, 1993	1,298	635	376	1,011	77.9
Total	**29,764**	**20,785**	**4,995**	**25,780**	**86.6**

Exhibit 5-4 illustrates the unweighted response rates for faculty by institution level and control. As the exhibit depicts, faculty at private two-year institutions returned completed questionnaires at the highest rate (90.3 percent, compared to an unweighted average response rate of 86.6 percent). Faculty at private four-year institutions responded to the faculty questionnaire at the lowest rate. Response rates for faculty at private four-year institutions were nearly 6 percentage points lower than those of faculty at private two-year institutions. Faculty at both types of public institutions (two-year and four-year) completed questionnaires at higher rates than did faculty at private four-year institutions. But response rates for public institution faculty did not attain the level that faculty at private two-year institutions attained (response rates of 87.8 percent and 87.2 percent, respectively, compared to 90.3 percent). While response rates at private institutions varied widely by type (two-year or four-year), there was hardly any difference in response rates for faculty from different types of public institutions.

Exhibit 5-4: Faculty response rates by level and control of institution

Level and control of institution*	Total sample	Sample		Faculty response rate (unweighted percent)
		Eligible	Complete	
Public four-year	11,494	11,029	9,682	87.8
Public two-year	10,525	9,913	8,646	87.2
Private four-year	8,982	8,483	7,146	84.2
Private two-year	353	339	306	90.3
Total	**31,354**	**29,764**	**25,780**	**86.6**

*The "level and control" classification does not match sampling stratum classification (Exhibit 5-5) because institutions sampled in the "unknown" categories in NSOPF-93 were reclassified after data collection was complete.

Exhibit 5-5 displays the unweighted faculty response rates across the 15 strata used for sampling institutions. Faculty at public liberal arts schools (with a 96.7 percent response rate) and faculty at private two-year institutions (92.5 percent) returned questionnaires at the highest rates. Faculty at private medical schools (73.5 percent) and faculty at other private schools (72.1 percent) returned questionnaires at considerably lower rates than faculty at other types of schools. Twelve of the 15 strata represented pairs of institution types, differing only by their public or private status (i.e., public comprehensive vs. private comprehensive; public medical vs. private medical). In five of the six pairs, faculty at public institutions returned questionnaires at higher rates. The gap in faculty response rates between public institution faculty and private institution faculty was widest (13.7 percentage points) in the paired strata for "other" institutions. Only faculty working at private two-year institutions returned questionnaires at higher rates (92.5 percent) than their colleagues working at public two-year institutions (87.3 percent). The difference in faculty response rates between public and private institutions was smallest in comprehensive institutions (a difference of 1.6 percent) and in "unknown" institutions (a difference of 1.5 percent).

Exhibit 5-5: Faculty response rates by institution sampling stratum

Institution stratum	Total sample	Sample		Faculty response rate (unweighted percent)
		Eligible	Complete	
Private other Ph.D.	1,523	1,422	1,141	80.2
Public comprehensive	5,518	5,308	4,718	88.9
Private comprehensive	2,627	2,510	2,191	87.3
Public liberal arts	91	90	87	96.7
Private liberal arts	2,370	2,281	2,067	90.6
Public medical	800	764	633	82.9
Private medical	380	321	236	73.5
Private religious	317	291	244	83.8
Public two-year	9,955	9,382	8,187	87.3
Private two-year	276	268	248	92.5
Public other	232	219	188	85.8
Private other	540	509	367	72.1
Public unknown	638	597	509	85.3
Private unknown	151	136	114	83.8
Research/public other Ph.D.	5,936	5,666	4,850	85.6
Total	**31,354**	**29,764**	**25,780**	**86.6**

Exhibit 5-6 reports unweighted faculty response rates by faculty sampling characteristics. For purposes of this table, individual characteristics were obtained from lists provided by participating institutions. As indicated, white, non-Hispanic faculty had the highest unweighted response rate (89.1 percent) and American Indian/Alaskan Natives the lowest (81.3 percent), although the difference between these groups was relatively small—only 8 percent. Females were higher responders (88.5 percent) than males (86.4

percent); full-time faculty (88.8 percent) were more likely to respond than part-time (83.5 percent) faculty. The unweighted response rate for faculty in the four NEH-selected disciplines (4,216/4,861 or 86.7 percent) matched almost identically the response rate for the entire sample (86.6 percent). Non-NEH faculty responded at a slightly higher rate than average.

Exhibit 5-6: Faculty response rates by faculty sampling characteristics

Individual characteristic*	Subgroup	Total sample	Sample		Faculty response rate (unweighted percent)
			Eligible	Complete	
Gender	Unknown	1,979	1,857	1,416	76.3
	Male	16,707	15,879	13,720	86.4
	Female	12,668	12,028	10,644	88.5
Race	Unknown	8,639	7,967	6,507	81.7
	American Indian/ Alaskan Native	99	96	78	81.3
	Asian/Pacific Islander	1,185	1,132	993	87.7
	Hispanic	1,264	1,199	1,033	86.2
	Black, non-Hispanic	2,577	2,458	2,097	85.3
	White, non-Hispanic	17,590	16,912	15,072	89.1
Full/part time status	Unknown	3,695	3,380	2,824	83.6
	Full-time	17,996	17,596	15,618	88.8
	Part-time	9,663	8,788	7,338	83.5
Discipline	Unknown	1,814	1,647	1,316	79.9
	Non-NEH	24,480	23,256	20,248	87.1
	History	941	904	804	88.9
	Foreign language	1,043	995	829	83.3
	English	2,458	2,379	2,069	87.0
	Philosophy/religion	618	583	514	88.2
	All respondents	**31,354**	**29,764**	**25,780**	**86.6**

* As reported by institutions on faculty lists.

Completion rates were higher for faculty whose home address was available (89.6 percent, unweighted) than for those faculty whose home address was unavailable (82.2 percent, unweighted). As Exhibit 5-7 shows, this relationship held for all faculty regardless of employment status. Faculty who could be followed-up at home were more likely to complete the questionnaire than those who could not be followed-up at home.

Exhibit 5-7: Response rates for faculty members whose institutions supplied their home address, by employment status

HOME ADDRESS AVAILABLE					HOME ADDRESS MISSING			
Full-time, part-time status	**Eligible**	**Complete**	**Unweighted response rate (percent)**	**Weighted response rate (percent)**	**Eligible**	**Complete**	**Unweighted response rate (percent)**	**Weighted response rate (percent)**
Unknown status	938	845	90.1	91.0	2,442	1,979	81.0	78.3
Full-time	11,186	10,117	90.4	88.6	6,410	5,501	85.8	83.3
Part-time	5,508	4,840	87.9	86.3	3,280	2,498	76.2	74.3
TOTAL	17,632	15,802	89.6	88.0	12,132	9,978	82.2	79.6

5.4 Institution Survey

5.4.1 Initial Mailing to Institution Respondent

On September 10, 1993, the NSOPF-93 institution questionnaire, addressed to the institution respondent (if one was named), was mailed to each institution that had already participated in the study by providing a faculty list, and to institutions that had not provided a list. This mailing included a cover letter (signed by the then-Commissioner of NCES, Emerson J. Elliott) and an informational brochure which described the purpose of NSOPF-93 and highlighted key findings from the previous study. If an institution respondent was not specifically named, a questionnaire was sent to the Institutional Coordinator (if formally identified by the institution) or the Chief Administrative Officer (CAO). (For 44.2 percent of the institutions who provided faculty lists, the Institutional Coordinator was named by the CAO as the institution respondent.) For non-participating institutions, or institutions which did not formally name a coordinator, the questionnaire was sent to the CAO. Separate cover letters, copies of which appear in Appendix M, were mailed to participating and nonparticipating institutions.

5.4.2 Postcard Prompts to Institutions

Two postcard prompts were mailed to institutions, thanking them for their cooperation and reminding them to complete the questionnaire, if they had not already done so. The first prompt was mailed on September 24, 1993 and signed by the project director. The second was mailed on October 22, 1993 (two weeks following a second questionnaire mailing) and signed by the task coordinator. In each instance, institutions were encouraged to call the project 1-800 number if they had any questions or anticipated any significant delays in completing the questionnaire. A copy of this postcard appears in Appendix M.

5.4.3 Second Questionnaire Mailing to Institutions

A second questionnaire was mailed to non-responding institutions on October 8, 1993, by regular first class mail. A cover letter from the project director accompanied the questionnaire. The letter assured institutions that there was still time to complete the questionnaire, and encouraged completion within the next few weeks.

5.4.4 Telephone Prompting and Follow-up of Institutions

Interviewers were given assignments from one of two groups of participating institutions: institutions which named the Institutional Coordinator as respondent, and institutions which named a separate institution respondent. Telephone prompting began on November 11, 1993. In those instances where the Institutional Coordinator was the same as the institution respondent, follow-up calls for the institution questionnaire were combined with other institutional contacts related to the faculty component of the study, including calls to determine the eligibility of nonresponding faculty, and calls to encourage coordinators to prompt faculty. Interviewers were trained in each type of follow-up activity before calling. By combining these contacts, it was hoped that any added burden to the coordinator would be minimized. Interviewers were trained to review all previous contact information (including the Record of Calls from the list collection phase of the study) prior to each call. If neither an Institutional Coordinator nor institution respondent had been designated by a participating institution, the initial call was made to the CAO's office.

The first wave of telephone prompting ended on December 23, 1993 prior to the holiday break. Prompting resumed on January 7, 1994 and continued until May 25, 1994. Institutions that failed to provide a list of faculty were treated as possible refusals. Initial follow-up to institutions which did not provide a list of faculty was conducted by the project Task Coordinator, beginning on November 10, 1993. Once the institution confirmed that they would complete the questionnaire, the Record of Calls was forwarded to interviewing staff for any additional follow-up.

Remails were requested by 226 institutions (23 percent). To eliminate unnecessary mail delays, questionnaires and other materials were faxed to institutions whenever possible. Institutions were encouraged to fax questionnaires as soon as they were completed, in addition to mailing the hardcopy. Institution respondents were also given a toll-free number to call with questions or comments; approximately 390 calls were made to the toll-free number.

The project task coordinator reviewed all refusals, and based on this review either called the institution personally, or forwarded the case to field staff for data collection by telephone. When appropriate, an offer was made to assist the institution by abstracting data from other information supplied by the institution.

5.4.5 Third Questionnaire Mailing to Institutions

On February 2, 1994 a third questionnaire mailing was sent by two-day priority mail to 383 nonresponding institutions. The third questionnaire mailing was necessary for two reasons. One was that the interruption of the holiday break, followed by the beginning of a new academic term, made it likely that the original request would be forgotten or lost. The second was that adverse weather conditions (including earthquakes on the West Coast and severe snowstorms and below-zero temperatures in the Midwest and East Coast) had caused some institutions to close for extended periods of time, further exacerbating staffing problems at these institutions. The letter informed institutions that the data collection period would be extended to accommodate institutions which had been affected by adverse conditions; other institutions were encouraged to complete and return the questionnaire by February 18, 1994. A personal, handwritten note

was added to each letter, as appropriate, thanking respondents for their cooperation and addressing any concerns the institution may have previously expressed about the study.

The Association for Institutional Research (AIR) disseminated a project update memo in February to its membership through its electronic newsletter, underscoring AIR endorsement of the study and encouraging participation of sampled institutions. The memo noted that the deadline for participation had been extended to accommodate institutions affected by severe weather conditions, and thanked those institutions that had participated in NSOPF.

5.4.6 Interviewer-Assisted Data Collection at Institutions

In February and March, 1994 three experienced field interviewers were trained to collect data directly from institutions by telephone (or, in select instances, by visits to the institution). Field staff were selected on the basis of previous success in interviewing faculty on the faculty questionnaire. Individual training, including a walkthrough of the questionnaire, was conducted with each interviewer by the task coordinator. Each training lasted two hours, with an additional two hours provided for self-study. Interviewers were trained to work with the designated respondent or coordinator to identify offices within each institution that could provide specific kinds of data, and to contact those offices directly to provide the data. Difficulties experienced by institutions in coordinating data collection between different offices was a major source of delay; direct intervention by field staff eliminated that delay, and, as a result, was very successful.

Collecting data over the telephone was considered likely to be more problematic for larger institutions—particularly those with large numbers of research faculty or a wide range of types of faculty. Therefore, only small-to-medium sized institutions from nonresearch strata were targeted for telephone data collection. Within this group, institutions from strata with comparatively low response rates were specifically targeted, including public two-year and private religious institutions. Refusals and other nonparticipating institutions were targeted as well. Four nonresponding religious institutions clustered in the same city were selected for in-person field visits to collect data. Overall, 99 interviewer assisted questionnaires (95 telephone and four in-person) were completed. Although no attempt was made to validate interviews directly with the institution, data collected by interviewers was periodically validated by comparison to other institutional data.

5.4.7 Data Abstraction at Institutions

When an institution indicated it lacked the resources to supply key questionnaire data, or indicated that to do so would pose an unrealistic burden, an offer was made to assist the institution, if possible, by abstracting information from other data the institution provided, including:

- lists of faculty
- most recent IPEDS data, if available from the institution
- policy handbooks (containing benefits information and institutional definitions of faculty)

At institutions that were confirmed to be part of a state-wide, city-wide, or multi-campus system in which institutional benefits policy was the same for all institutions in the system, benefits data could sometimes be supplied by a system-wide source; system-wide benefits information could also be abstracted from common elements of data provided by sister institutions in the system. The task coordinator reviewed lists used to compile faculty counts for completeness of relevant information. The accuracy of any data

abstracted was confirmed with the institution.

5.4.8 Institution Data Retrieval

All data retrieval was conducted by trained project staff. Retrieval was conducted on a flow basis, beginning on October 5, 1993, and ending on May 26, 1994. One interviewer was trained to perform both the initial case edit, which identified cases requiring retrieval, and the retrieval call. As the initial case edit was performed, cases with missing critical items were flagged for retrieval. "Don't know" and "refused" were considered legitimate responses and not retrieved. Additional cases were flagged for retrieval when inter-item discrepancies or out-of-range responses involving critical items were discovered during a second edit performed by the task coordinator prior to computer assisted data entry (CADE), or during CADE (which ran several consistency checks as part of its program). The data abstraction procedures outlined above were utilized when the information was otherwise unavailable from the institution. One hundred seventy-eight cases (20 percent) were identified as requiring retrieval. Retrieval calls were completed for 172 institution questionnaires (97 percent).

5.5 Data Collection Results: Institution Questionnaire

Exhibits 5-8 to 5-10 provide a summary of the NSOPF-93 data collection results for the institution questionnaire. These exhibits report unweighted response rates.

Exhibit 5-8 illustrates the unweighted institution questionnaire response rates by institution stratum and by type and control of institution. In general, the response rate of institutions to the institution questionnaire was quite high, with an unweighted response rate of 90.6 percent for all institutions. All eligible private two-year, private religious and public "other" institutions completed the questionnaire. Public institutions responded to the institution questionnaire at lower rates than did private institutions. The lowest response rate (66.7 percent), found in the public liberal arts stratum, affects so few institutions as to have little impact on the overall rate of response to the questionnaire. The stratum that included the largest number of institutions, the public two-year stratum (with 316 eligible institutions) showed one of the highest rates of response (94.3 percent) among the 15 strata.

Exhibit 5-8: Institution questionnaire response rates by institution sampling stratum

Institution stratum	Total sample	Sample		Institution response rate (unweighted percent)
		Eligible	Complete	
Private other Ph.D.	46	46	39	84.8
Public comprehensive	159	159	144	90.6
Private comprehensive	83	82	71	86.6
Public liberal arts	3	3	2	66.7
Private liberal arts	68	68	66	97.1
Public medical	25	25	20	80.0
Private medical	10	10	9	90.0
Private religious	20	18	18	100.0
Public two-year	317	316	298	94.3
Private two-year	11	10	10	100.0
Public other	7	7	7	100.0
Private other	26	24	19	79.2
Public unknown	23	19	18	94.7
Private unknown	8	7	7	100.0
Research/public other Ph.D.	168	168	144	85.7
Level and control of institution*	**Total sample**	**Sample**		**Institution response rate (unweighted percent)**
		Eligible	**Complete**	
Public four-year	332	331	292	88.2
Public two-year	337	333	314	94.3
Private four-year	290	284	252	88.7
Private two-year	15	14	14	100.0
Total	**974**	**962**	**872**	**90.6**

*Sampling stratum classification does not match the "level and control" classification because institutions sampled in the "unknown" categories in NSOPF-93 were reclassified after data collection was completed.

Exhibit 5-9 breaks down the institution response rate by mode of administration. Ninety-nine questionnaires were completed with the assistance of an interviewer. This figure represented 10.3 percent of the total eligible institution sample and 11.4 percent of completed questionnaires.

Exhibit 5-9: Institution questionnaire response rates by mode of administration

Mode of administration	Faculty list participating (unweighted percent)	Faculty list non-participating (unweighted percent)	Total responding (unweighted percent)
Self-administered questionnaires (percent of total sample)	688 (84.2)	85 (58.6)	773 (80.3)
Field data collection (percent of total sample)	72 (8.8)	27 (18.6)	99 (10.3)
Total completed (percent of total sample)	760 (93.0)	112 (77.2)	872 (90.6)
Total sample	817	145	962

Exhibit 5-10 compares the institution questionnaire response rate on the NSOPF-93 full-scale study with the NSOPF-93 field test and the 1987-88 field test and full-scale study. As the exhibit shows, there was a 2.3 percentage point improvement in the response rate of the NSOPF-93 institution survey from the NSOPF-88 institution survey.

Exhibit 5-10: Institution response rates by cycle

NSOPF cycle	Number eligible	Completed questionnaires	Response rate (unweighted percent)
1987 field test	50	40	80.0
1988 main study	480	424	88.3
1992 field test (Expanded core) (Augmentation)	120 (49) (71)	94 (40) (54)	78.3 (81.6) (76.1)
1993 main study (Participating) (Non-participating)	962 (817) (145)	872 (760) (112)	90.6 (93.0) (77.2)

The data collection period for NSOPF-93 lasted 10 weeks longer than the data collection period for NSOPF-88 (34 weeks, compared to 24 weeks). This reflects the larger sample size as well as the impact of severe weather conditions previously described. But the data collection effort also revealed that institutions feel increasingly burdened by research requests. In some instances, institutions had downsized the institutional staff that would normally process such requests. The 91 percent response rate achieved for the NSOPF-93 full-scale study would not have been possible without the direct involvement of interviewing staff in data collection and other efforts to minimize institutional burden.

6. Data Control and Data Processing

6.1 Overview

This chapter describes the procedures used to process and to prepare faculty list data for sampling and to transform responses from the faculty and institution questionnaires into computerized data files. A total of 872 institution questionnaires (all hardcopy) and 25,780 faculty questionnaires were processed, including 20,785 self-administered and 4,995 computer-assisted telephone interviews. NORC used commercially-available software, AutoQuest, for all data capture.

The procedures to be discussed include: receipt control and processing of faculty list data for sampling, monitoring the receipt of completed questionnaires, preparing self-administered questionnaires for data entry, editing self-administered questionnaires for overall adequacy and completeness, data-entry, flagging cases with missing or inconsistent data through automated consistency checks, retrieving missing data, coding responses, quality control of data entry, and preparing documents for archival storage.

6.2 Faculty List Processing and Preparation for Sampling

The sampling frame for the faculty survey was drawn from faculty lists provided by 817 participating institutions. Each participating institution was asked to provide a hard-copy list, a machine-readable list, documentation of the list format, and the names of institution staff involved in preparing the list. Upon receipt, each list was subjected to a cursory review for completeness and adequacy. Project staff were trained expressly to recontact institution staff to retrieve missing information and to resolve list discrepancies. These staff used the Faculty List Documentation Form (see Appendix K) provided by the institution to contact those persons involved in preparing the faculty list. If the institution did not provide this form, staff recontacted the Institutional Coordinator. In the event that the faculty list was incomplete—that is, some level of locating or sampling information was missing—staff explained the importance of these data to the sampling design and handled any concerns or questions which arose regarding release of these data. Special efforts were made to describe confidentiality procedures and the sampling methodology used. The missing information was then retrieved in the way most accommodating for the Institutional Coordinator (through the mail, fax, or via the Internet).

Once the list of faculty (and supporting documentation about the format and preparation of the list) was reviewed, it was receipted as complete into the NSOPF contractor's survey monitoring system (SMS), a microcomputer-based system used to track all sampled institutions and their status. A folder that contained all of the relevant materials was prepared for each institution. Processing of hardcopy lists required more effort than processing electronic faculty lists. If an institution provided a hardcopy list only, sampling staff followed these steps to create an electronic file in the required format:

1. Each line (or each faculty member listed) was numbered sequentially. Lists were inspected to see if all sampling variables were included. If not, other materials in the sampling folder were inspected to see if any information could be gleaned from them and included on the hardcopy list.

2. All sampling variables were then coded to match specifications for sampling (e.g., gender was coded as 1=male/2=female; race/ethnicity was coded numerically). The coding specifications followed the same specifications in the list preparation instructions sent to the institution (see Appendix K). In addition, faculty discipline was coded numerically to indicate NEH and non-NEH status.

3. The sampling variables, along with faculty names, addresses, and telephone numbers, were data-entered into an electronic file for that institution. (If addresses were not already on the hardcopy file, but were available elsewhere, this information was not entered until the sampling step had been completed and then only for the sampled faculty.)

If an institution provided an electronic file, sampling staff inspected the file on-line to ensure that all coding specifications were followed for the sampling variables and that the file layout was correct. Programming staff created utilities which enabled the automated reformatting of those files with incorrect layouts, and the recoding of sampling variables when necessary. In addition, an automated utility was employed to streamline the coding of NEH/non-NEH teaching disciplines, although this step still required more detailed effort on the part of sampling staff. This utility searched the electronic file for the verbatim entry of teaching discipline, and created a collapsed codeframe of each unique discipline along with the number of occurrences (or, number of faculty in each discipline). Sampling staff then inspected the codeframe and assigned a numerical code to each unique teaching discipline to indicate its NEH/non-NEH status. Once the collapsed frame was coded in this way, the utility then assigned these numerical codes to each faculty member on the faculty list.

When all sampling data were coded, an automated program captured list counts and entered them into a discrepancy module of the SMS. Sampling staff then reviewed discrepancy reports, comparing the faculty totals from the lists with data from the most recent IPEDS (NCES's Integrated Postsecondary Education Data System). In some instances, the numbers of faculty on the list differed greatly from those from the IPEDS. The discrepancy reports allowed sampling staff to investigate possible areas of discrepancy by breaking down the faculty totals by gender and full- or part-time status. In this way, it was easy to identify, for example, institutions who had left part-time staff completely off of their list, or those who had reversed the gender code. Resolution of list discrepancies also involved recontacting the list preparer or Institutional Coordinator (see section 4.2.5). If the source of the discrepancy was identified by sampling staff, an attempt was made to confirm the diagnosis of the source of the discrepancy and to retrieve from the institution corrected sampling information. On the other hand, if no obvious source of error was identified, the staff explained the problem to the Institutional Coordinator and attempted to find a reason for the discrepancy.

Machine-readable lists (whether data-entered from hardcopy or provided on diskette or tape) which had passed through discrepancy review were uploaded directly into an electronic sampling program, which selected the sample members based on programmed selection algorithms. Lists of sampled faculty at participating institutions in the field test were cross-checked against lists of field test participants at those institutions to ensure that they were not selected again. To minimize respondent burden, OMB restrictions prohibited NSOPF-93 from resampling and reinterviewing individuals who participated in the 1992 field test.

Sampling and data collection information for sampled respondents was uploaded into an AutoQuest program, which then generated respondent tracking files for coordinated mail and telephone follow-up. The program assigned a unique identification number to each sampled record. All pertinent information was also uploaded into the Survey Monitoring System (SMS)—faculty IDs, names and locating data, and sampling information—for purposes of tracking and case management.

6.3 Receipt Control and Monitoring of Institution and Faculty Questionnaires

When completed faculty and institution self-administered questionnaires (SAQs) were received, receipt control staff checked each document for completeness and assigned a disposition code indicating that the case was complete. If a questionnaire was returned as undeliverable, faculty directories and/or address

information supplied by each institution were reviewed for an alternate address. If none was available, it was forwarded to telephone staff for locating. If a package was returned as undeliverable with a forwarding address, the new address was entered into the SMS tracking and monitoring system for future follow-up.

Case dispositions for the faculty questionnaire were updated directly into the TNMS (Telephone Number Management System) component of AutoQuest, which delivered pending cases to interviewers for telephone prompting and interviewing. Respondents who had completed self-administered questionnaires (SAQs) were, therefore, removed from the queue for telephone follow-up once the questionnaire was receipted. Case dispositions were updated to indicate whether the questionnaire was complete or contained items that required retrieval. The TNMS was linked through weekly updates to the SMS tracking and monitoring system.

Computer-assisted telephone interviewing was not used for the institution questionnaire; therefore, institution questionnaire dispositions were entered directly into the SMS tracking and monitoring system.

6.4 Data Entry and Coding

6.4.1 Data Entry

Both CADE (computer-assisted data entry) and CATI (computer-assisted telephone interviewing) were performed using AutoQuest. Separate CADE programs were developed for the self-administered faculty and institution questionnaires. A CATI program, equivalent to CADE, was also developed for the faculty questionnaire, allowing online data entry of telephone interviews by interviewers. The CADE/CATI systems were designed to:

- ensure that all entries conformed to valid ranges of codes defined for the particular question stem;
- enforce skip patterns automatically;
- conduct inter-item consistency checks where appropriate; and
- display the full question and answer texts for verbatim responses.

As part of the statistical quality control program, 100 percent verification was conducted of a randomly selected subsample of 10 percent of all faculty and institution questionnaires entered in CADE. These cases were randomly pre-selected before each set of questionnaires was data-entered. When a questionnaire was flagged for verification, it was then re-keyed by a different data entry operator than had originally keyed the data. A data entry supervisor then independently reviewed and compared the results of both data entry events; any discrepancies were resolved by referring to the hardcopy questionnaire and making corrections to the final questionnaire data. The error rate was less than one-half of one percent for all items keyed.

Quality assurance for faculty interviews entered in CATI consisted of random online monitoring by supervisors. On a daily basis, a set of times for monitoring and stations to be monitored was automatically generated for each monitor. The program for creating these lists took as inputs the IDs of active prompting, retrieval, and CATI stations; the duration of each monitoring session; the sampling rate; and the total length of time to schedule. The monitor station allowed the supervisor to listen to the interview and to view the data the interviewer entered on screen. Any errors or omissions (including deviations in

reading questions, failure to probe or follow instructions, or errors in recording of data) were recorded. The outcome of each monitoring event was entered into the system via an AutoQuest application.

6.4.2 Faculty Questionnaire Coding

Coding of faculty questionnaires was conducted using a computer-assisted coding (CAC) system, which also used AutoQuest software. Coding of academic discipline was performed online during interviewing or data entry. All other faculty questionnaire coding was performed as a post-processing step. Three kinds of coding were performed for the faculty questionnaire:

Academic discipline. Coding of academic discipline for the respondent's principal teaching field, principal area of research, degree fields, and courses taught (Questions A12, A13, B16C, and C23A-E) was performed online during interviewing or data entry. Online coding for the self-administered questionnaires took place *only* if the respondent had not already provided a code, but had written some sort of codable text. In these cases, the data entry clerk was prompted to enter verbatim the name of the discipline and follow the same procedure as telephone interviewers who performed online coding of academic discipline.

A two-step coding process was designed so that interviewers and data entry staff would not have to page down through the entire list to find an appropriate code. The first step was to select the major category or area. Categories included were those shown in upper case letters on the hardcopy questionnaire, many of which have subcategories. After the major category was selected, the second step was to select the specific discipline from the subcategories displayed in the second screen. The appropriate code was then selected and entered next to the verbatim entry.

Quality assurance checks for coding of academic discipline were performed as part of the regular quality control procedures for CADE and CATI. However, coding of academic discipline for CADE cases in which the respondent had not supplied a code was subjected to a 100 percent verification. Erroneous codes were recoded to a valid code after examination of the case and its verbatim entry. Cases in which the respondent (or interviewer) had selected a code of "900" ("Other") were also reviewed and coded to a more specific value whenever possible.

IPEDS codes. Coding of institution names from which respondents received their academic degrees was a multi-stage process performed after data entry in CADE or CATI was complete. Institution names were reported at Question B16E, where respondents had the opportunity to report as many as four academic degrees received. Coding was performed using an electronic file of the 1991-92 IPEDS directory, which included IPEDS code, city, two-letter state abbreviation, and institution name for 10,258 less-than-two-year, two-year, and four-year or more institutions. After both CADE and CATI production had been completed, a file of responses to institution name and location was created for each of the four opportunities to report on an academic degree. These files contained a total of 61,759 institution name mentions. The respondent data file from the first line of Question B16, highest degree, was electronically compared to the IPEDS directory file and all exact matches on both institution name and city were automatically coded. Thirty-four percent of the institutions in this file were matched and automatically coded.

A combination of techniques was used to code the remaining institutions. First, the uncodable institutions were sorted by state and institution name, and obvious variations of institution names, for which IPEDS codes were available, were identified and coded. In addition, an automated system was designed for coders to access IPEDS data by city or by institution name. The coders entered a search string at each level, and the program searched each database for possible matches. This combination of techniques

enabled the coding of an additional 61 percent of the highest degree institutions, bringing the total to 95 percent. Finally, the remaining five percent of highest degree institution mentions were reviewed individually and coded when possible. The final total coding rate was 97.8 percent. The remaining 2.2 percent of highest degree institutions remained uncoded or received codes for "Non-U.S. unknown" or for "U.S. not listed."

After confirming the accuracy of coding in this file, the verbatim responses and their selected IPEDS codes were added to the IPEDS directory. The expanded frame was used to code the remaining responses (Question B16, lines 2-4). This increased the frequency of finding exact matches for the automated coding of the

remaining files. After all four degree files had been coded, the remaining institution names that had not yet been coded were examined individually and coded when possible.

If respondents reported the name of a multi-campus university system without specifying the particular branch from which the degree was obtained, the flagship institution of that system was coded. For example, if respondents wrote "University of Wisconsin" without specifying a branch campus, their institution was coded as the University of Wisconsin at Madison. If respondents reported the name of a graduate or professional institution without specifying the name of the larger IPEDS institution of which it was a part (e.g. "John F. Kennedy School of Government" rather than "Harvard University"), other means were employed. Staff consulted reference books, university catalogs and cross-checked respondents' answers to find the name of the institution to which to assign the answer. NCES materials were consulted to check for institutions which had closed or had changed their names.

The file was then sorted by IPEDS code and checked against an NCES-supplied electronic master list of IPEDS codes. The file was scanned to find discrepancies between verbatims and expected IPEDS codes. Discrepancies were reconciled by attaching the correct IPEDS code to the verbatim naming the institution. After the entire coding effort was completed, all institution data were exported and sorted by IPEDS code. All institutions were checked in this manner and corrected whenever errors were encountered. The final product contains a negligible error rate of 0.2 percent or less.

Coding of foreign institutions was also handled automatically. During the coding process described above, institutions outside the U.S. were identified as uncodable using the IPEDS frame and flagged as foreign institutions in the database. The verbatim text for the name of country was then electronically compared to the list of codes for countries in the NSOPF-88 faculty data file. Nearly all non-U.S. institutions were automatically coded in this manner. The remaining uncodable institutions were manually coded after hardcopy inspection by coding staff. The weighted proportions of respondents who received degrees from non-U.S. institutions were as follows: 5.3 percent for the highest degree listed, 6.3 percent for the second highest degree, 10.9 percent for the third highest degree, and 19.9 percent for fourth highest degree.

Country. Country was coded at Question B16E(1-4) when the institution reported was foreign and could not be coded within the IPEDS codeframe and at Questions F56 and F57, which asked for the respondent's country of birth and/or citizenship. Geo-coding of foreign countries was also performed automatically after data entry of the questionnaire in CADE or CATI was complete. The codeframe was constructed using the codes compiled for NSOPF-88, with additional codes added as necessary. A few foreign institutions were manually coded based on city (for example, Moscow) or institution name (for example, The Sorbonne).

"Other specify" and verbatim text. Coding of text entered at Questions A2, A9, E47P, was performed after CADE and CATI were complete. In most cases, the text was coded to the existing codes. For Questions A2, A9, and E47P, the codeframes were expanded to accommodate verbatim responses that could not be coded to the existing options.

€ Question A2—codes added for administrative titles or positions listed as respondent's principal activity during the 1992 Fall Term are:

9. Dean, acting/interim/associate/assistant dean
10. Chair, acting/associate/assistant chair
11. Director/head/coordinator (of a program, group, field of study)
12. President, chief
13. Assistant to the president
14. Vice president, associate/assistant vice president
15. Administrator, manager
16. Chancellor, provost
17. Chaplain
18. Advisor, counselor
19. Librarian, library director
20. Registrar
21. Secretary, miscellaneous clerical
23. Athletic director, coach
24. Other

€ Question A9—respondent's academic rank, title, or position during the 1992 Fall Term. Codes added to the codeframe are:

7. Visiting faculty/teacher/unspecified
8. Professor emeritus
9. Dean
10. Chairperson
11. Director, head, coordinator, executive
12. Administration, administrator
13. Management, supervisor
14. Postdoctoral
15. Research fellow/scientist/professor
16. President, chancellor
17. Chaplain
18. Counselor, mentor, advisor
19. Librarian, curator
20. Research associate/assistant
21. Secretary, miscellaneous clerical
22. Adjunct faculty/teacher/unspecified
23. Coach
24. Other

€ Question E47P—respondents recorded income from two additional "other" sources. All verbatim entries were then reviewed and additional codes were created:

P1. Grants/fellowships (local/state/federal)
P2. Retirement/pension/Social Security/unemployment
P3. Military/pension/retirement/other military
P4. Alimony/child support/spouse income
P5. Dividends/annuities/trust fund/stocks
P6. Government (local/state/federal)

P7. Loans
P8. Real estate, rental properties
P9. Other income

An additional 28 items with "other specify" response choices were eligible for coding based on verbatim responses, but were not coded. Several of these items retained only a small percentage of codable items. Others had key data missing, making them impossible to code. One question, F53B, which included verbatim responses to the "other specify" option for respondent race/ethnicity, was left unchanged on the data file. No effort was made to code the verbatim responses for Question F53B.

6.4.3 Faculty Questionnaire Eligibility Review

At the close of data collection for the faculty survey, all completed faculty questionnaires were reviewed to determine if any respondents were ineligible. This review was done on several levels. First, the responses to Question A9 in the faculty questionnaire, "Which of the following best describes your academic rank, title, or position at this institution during the 1992 Fall Term?" were examined. Verbatim responses to Question A9 were reviewed for evidence of ineligibility. These generally consisted of cases in which the respondent had given a title such as research assistant, graduate assistant, lab assistant, or teaching or research fellow. If a questionable case showed any sign of eligibility (for example, providing responses to the question on classes taught or indicating faculty status) the respondent was assumed to be eligible. This review uncovered 23 respondents who were deemed to be ineligible and their questionnaire data were deleted.

The second, more automated, review was performed on cases in which the respondent answered "no" to Question 1 ("Did you have any instructional duties?") *and* Question 3 ("Did you have faculty status?"). All such records were examined, using additional data from the questionnaire to guide the determination of eligibility. As a result of this review, some additional respondents were deemed ineligible and their questionnaire data were deleted.

6.4.4 Institution Questionnaire Coding

Coding for the institution questionnaire was performed for verbatim definitions of full-time and part-time faculty, both instructional and non-instructional, and permanent and temporary faculty listed on page 2 of the questionnaire. The codeframe used to code institutional definitions of faculty was constructed based on responses from a sample of 100 questionnaires, selected to represent all institutional strata. Codes were then fine tuned for each individual category to include relevant variations and responses unique to each category.

Once the codeframe was created, a computer-assisted coding system was used to code the verbatim responses to faculty definitions for all completed institution questionnaires. Verbatim responses were data-entered into the system, and then coded on a case-by-case basis using the established codeframe. Responses to questionnaire items A1A-D and A2A-D (numbers of different types of staff employed during the 1992 Fall Term) and B15 and C31 (availability of benefits to temporary staff) appeared on-screen to assist in the interpretation of responses, particularly when a category was left blank.

Once all definitions were coded, a hardcopy printout of responses by category was reviewed for accuracy and consistency. Errors were marked on the printout and corrections were made to the file. After all corrections were made, the code file was merged with the institution questionnaire datafile.

Faculty codeframe. Most responses made reference to workload (number of hours worked, etc.) as part

of the definition for full or part-time faculty. However, a response was coded as “defined by workload” only

when no other factors were mentioned in the definition; other codes include "workload" as an implicit part of the definition.

Responses were coded as matching IPEDS definitions when the institution specifically said it used the IPEDS definition (or the glossary definition), or the response closely matched the glossary definition. If an institution mentioned additional factors not in the IPEDS/glossary definition, or if it was unclear that the definition matched IPEDS, it was coded in another appropriate category. Missing responses were coded as "not applicable" if answers to A1A-D, A2A-D, B15 or C31 clearly indicated that there were no faculty in a given category. The following are codes and definitions for each type of faculty/staff:

Full-time instructional faculty and staff:

1. defined by compensation or benefits (and teaching load)
2. defined by length or terms of contract (and teaching load)
3. defined by teaching load and/or other duties and responsibilities only (number of courses per term or year/number of hours or week/student contact hours/days worked per term or year)
4. defined by rank/title/faculty status/voting privileges or senate membership (and teaching load)
5. IPEDS/matching IPEDS definition
6. defined by funding source or type of funding/legislative body/other governing body (private or public) and teaching load
7. defined by tenure status—tenured or tenure track—and teaching load
8. other governmental or organizational definition used
9. other
10. not applicable/no faculty in this category

Full-time non-instructional faculty:

1. defined by compensation or benefits (and workload)
2. defined by length or terms of contract (and workload)
3. defined by workload and/or other duties and responsibilities only
4. defined by rank/title/faculty status/voting privileges or senate membership (and workload)
5. IPEDS/matching IPEDS definition
6. defined by funding source or type of funding/legislative body/other governing body (private or public) (and workload)
7. defined by tenure status (and workload)
8. other governmental or organizational definition used
9. other
10. not applicable/no faculty in this category

Part-time instructional faculty and staff:

1. defined by compensation or benefits (and teaching load)
2. defined by length or terms of contract (and teaching load)
3. defined by teaching load and/or other duties and responsibilities only (number of courses per term or year/number of hours or week/student contact hours/days worked per term or year)
4. defined by faculty status(including adjunct)/rank/title/level of privileges (and teaching load)
5. IPEDS/matching IPEDS
6. defined by funding source or type of funding/legislative body/other governing body (private or public) (and teaching load)

7. defined by tenure status (tenured/tenure track)
8. defined by lack of tenure status or ineligibility for tenure (and teaching load) (i.e., not tenured or tenure track)
9. other governmental or organizational definition used
10. defined by lack of faculty status or privileges
11. other
12. not applicable/no faculty in this category

Part-time non-instructional faculty:

1. defined by compensation or benefits (and workload)
2. defined by length or terms of contract (and workload)
3. defined by workload and/or types of duties and responsibilities only
4. defined by faculty status (incl. adjunct faculty)/rank/title/level of privileges (and workload)
5. defined by lack of faculty status (and workload)
6. IPEDS/matching IPEDS definition
7. defined by funding source or type of funding/legislative body/other governing body (private or public) (and workload)
8. defined by tenure status (and work load)
9. defined by lack of tenure status /ineligibility for tenure (and work load)
10. other governmental or organizational definition used
11. other
12. not applicable/no faculty in this category

Permanent faculty/instructional staff:

1. defined by compensation or benefits (and workload)
2. defined by length or terms of contract (and workload)
3. defined by teaching load and/or other duties and responsibilities only (number of courses per term or year/number of hours or week/student contact hours/days worked per term or year)
4. defined by rank/title/faculty status/voting privileges or senate membership (and workload)
5. IPEDS/matching IPEDS definition
6. defined by funding source or type of funding/legislative body/other governing body (private or public) (and workload)
7. defined by tenure status—tenured /tenure track (and workload)
8. defined by tenure status—tenured only
9. other governmental or organizational definition used
10. other
11. not applicable/no faculty in this category

Temporary faculty/instructional staff:

1. defined by compensation or benefits (and workload)
2. defined by length or terms of contract (and workload)
3. defined by work load and/or other duties and responsibilities only (number of courses per term or year/number of hours or week/student contact hours/days worked per term or year)
4. defined by faculty status (incl. visiting faculty)/rank/title /level of privileges
5. defined by lack of faculty status
6. IPEDS/matching IPEDS
7. defined by funding source or type of funding/legislative body/other governing body (private or public) (and workload)

8. defined as tenure track faculty only/faculty not yet tenured (but not ineligible for tenure)
9. defined as non-tenure track faculty only/not eligible for tenure
10. other governmental or organizational definition used
11. other
12. not applicable no faculty in this category

"Other specify" and verbatim text. In addition to the six questions from which the faculty codeframe was developed, six other institution questionnaire items were eligible for verbatim or "other specify" responses. Of these, only the answers to Questions B10C1 and C26C1, which asked for a description of "any other actions" taken to lower the percent of tenured faculty (for full-time instructional faculty and for full-time non-instructional faculty, respectively) provided consistent verbatim responses. For both Questions B10C1 and C26C1, the most frequently cited actions taken to reduce the percent of tenured faculty involved downsizing, redefining positions as non-tenured, and offering early retirement incentives. The complete listing of all "other specify" and verbatim responses is stored in electronic text form at NCES.

6.5 Scan Editing, Machine Editing, and Imputation

6.5.1 Faculty Questionnaire Editing and Imputation

Prior to data entry, editors scanned faculty questionnaires for readability, completeness, and overall adequacy. Problems (e.g., eligibility questions, incomplete questionnaires, etc.) were identified and forwarded to an edit/coding supervisor for resolution.

Range errors, logical inconsistencies, erroneous skip patterns, and any missing critical items were identified by a computer-based cleaning and editing system specifically developed for NSOPF–93. Whenever a case had one or more critical items missing, CADE operators were notified of the specific items that required retrieval and prompted to route the case to the telephone retrieval supervisor for follow-up. Moreover, the program identified out-of-range responses during data-entry and did not allow them to be keyed without confirmation that the response was accurately entered.

For erroneous skip patterns, values were logically assigned as feasible on the basis of the presence or absence of responses within the skip pattern, given the responses provided. For errors that could not be corrected in this fashion, the hardcopy questionnaire was inspected and if necessary, the respondent was called to try to resolve the problem. Questionnaires with missing critical items were forwarded to telephone interviewers for retrieval.

Range errors were examined and corrected through hardcopy examination, which involved reviewing a sample of cases with out-of-range responses in order to determine whether the responses were caused by something other than random variation or unique respondent situations. Following the examination, variables were treated in one of two ways. In some cases, the out-of-range response was topped off at the highest value encompassing 99.9 percent of the responses. There were no out-of-range values at the low end of the value range. As part of the cleaning and editing process, out-of-range values in a series or set of related items were "scaled" proportionally to an overall total.

On the fewer than 1 percent of the cases for which data on gender, race, and employment status of faculty were missing, the data were directly imputed whenever possible. This information had already been collected for most faculty on the sampling lists supplied by participating institutions. Additional editing and consistency checks were run to enforce ranges, skip pattern rules, and logical consistency among questionnaire items.

Because of the large amount of questionnaire data, a system of algorithms was developed to check and, if possible, to correct the validity of data elements. The principal rule was to preserve data collected from the questionnaires while correcting logical inconsistencies between related data elements. After cleaning, those data elements that remained missing were subsequently imputed.

Depending on the scale of the variable being imputed, one of two methods were used: 1) Regression imputation was used for continuous and dichotomous variables; and 2) Hotdeck imputation was used for unordered polytomous variables. The regression method incorporated in NCES's PROC IMPUTE was used to impute missing values for approximately 90 percent of the 395 items on the faculty questionnaire[23]. Of the total of 395 items, 353 were imputed using the regression-based imputation procedures only.

After a first round of imputation using PROC IMPUTE, the distributions and values of imputed items were compared to distributions and values for recorded items (i.e. non-missing data). These comparisons helped to pinpoint variables needing special treatment in order to produce credible imputed values. Special steps were taken to address particular problems arising during imputation. These were:

"Spikes" at zero values. A number of variables showed "spikes," where the same value was imputed to a number of cases within an imputation cell. To address the problem of spikes at the zero value, these variables were reimputed in two steps. First, a dummy variable to flag cases as containing a zero value or a value greater than zero was modeled. Second, only those cases which received the imputed dummy value greater than zero were modeled using the standard regression-based imputation procedures. This two-step process "smoothed out" the distribution of imputed values, eliminating the spikes at zero.

Illogical/implausible imputed values. The first round of regression-based imputation assigned values to items B20A and B20B (faculty productivity measures, i.e. books and articles published, presentations, patents, etc.). However, this imputation produced inappropriate imputations for particular types of faculty. For example, records of faculty members whose reported teaching and research fields had nothing to do with artistic performance were imputed to have performed artistic presentations. Likewise, faculty members whose reported areas of activity included teaching, but no research, were imputed to have performed research activities. In order to address these cases, another regression model including eight more predictors—in addition to the five "core predictors"—was specified for PROC IMPUTE to impute values for questionnaire sections whose items depended on proper specifications of teaching and research activities.

Imputing DKs. Two imputations were performed for selected items in the faculty questionnaire with "don't know" responses, where this caused 30 percent or more of the responses to be eligible for imputation. In the first imputation, "don't knows" were treated as legitimate responses. For these items, in the first imputation, missing responses were imputed across all response categories, including the "don't know" category. In the second imputation, "don't knows" were set to "missing" before imputation was performed. Two imputations were done to allow researchers to choose how to treat "don't knows" in their analyses. Two variables were used to signal these different approaches to imputation. The first, the survey variable, preserved "don't know" as a legitimate response. The second, identified by the letter "Y" preceding the variable name, includes imputation for "don't know" as well as "missing." The following faculty variables had two imputations performed:

[23]For a description of this technique, see American Institutes of Research, *Guidebook for Imputation of Missing Data* (August, 1980). AIR prepared this guidebook for the National Center for Education Statistics, under contract #300-78-150.

Survey variables	Imputed-DK variables	Variable description
D42	YD42	Age most likely to stop working at a postsecondary institution
D44	YD44	Draw on retirement and continue working at institution part-time
D45	YD45	Take early retirement option at institution
D46	YD46	Age most likely to retire from paid employment
F58A	YF58A	Mother's education
F58B	YF58B	Father's education
F60A-F60I	YF60A-YF60I	Opinion questions about institution, faculty and students

"Sequential nearest neighbor" hotdeck imputations were used on 42 items, the majority of them polytomous or categorical variables. Three items used both regression-based and hot deck imputations. To carry out the hotdeck imputations, the faculty file was first sorted by the following variables: ISTRATUM (institution sampling stratum), A4 (full-time/part-time stratus), OSGROUP (faculty oversampling stratum), F51 (faculty member gender), X01F52 (faculty member age) and a random number variable. Then the computer program proceeded sequentially through the sorted file, replacing each missing value by the last non-missing value.

All imputation was followed by a final series of cleaning passes that resulted in generally clean and logically consistent data. Some residual inconsistencies between different data elements remained in situations in which it was impossible to resolve the ambiguity as reported by the respondent.

6.5.2 Institution Questionnaire Editing and Imputation

Two manual edits were conducted for the institution questionnaire: the first checked for missing critical items, while the second, performed immediately prior to data entry, checked for filter questions that could be coded based on subsequent responses and responses that could be coded or corrected based on verbatims or documentation accompanying the questionnaire. Questionnaires were also reviewed for valid responses that did not fit into existing categories and for inter-item consistency.

As with the faculty questionnaire, a computer-based editing system was employed to check data for range errors, logical inconsistencies, and erroneous skip patterns. Any missing or inconsistent critical items were identified for retrieval. Hardcopy questionnaires were reviewed to resolve logical inconsistencies or skip pattern errors; out-of-range responses were reviewed to determine if they were legitimate. If necessary, the institutions were recontacted to try to resolve the problem.

After data entry was completed, institution data were run through additional consistency checks designed to flag data entry errors and inter-item inconsistencies; data entry errors were corrected based on a review of the hardcopy questionnaire; inter-item discrepancies that were clearly the result of systematic error were corrected through programmed cleaning statements.

Because the faculty counts (at Questions A1A-A1D, B2 and C20) and counts of tenure/tenure-track faculty (at Questions B6 and C22) that institutions provided were often estimated or provided by multiple offices (whose records may not match precisely), a small margin of error was allowed for inter-item discrepancies.

Responses falling outside this range were individually reviewed and corrected, if possible, based on other questionnaire data. Discrepancies outside this margin of error were reviewed again, and, as appropriate, set to missing.

On the NSOPF-93 institution file, substantive responses were imputed for missing data using the regression method. "Don't know" responses were also imputed to distribute "don't know" across all response categories. Following imputation, a number of inter-item consistency checks and post-imputation cleaning procedures were implemented to produce logically consistent and valid data.

Imputed values at A2A-2F (counts for instructional faculty) and C20A-F (counts for non-instructional faculty) were corrected whenever possible by performing the math for non-imputed values to arrive at a contextually accurate amount. When multiple items were imputed, variables were corrected by using mean values to arrive at values proportionate to faculty totals. Errors in counts of tenured/tenure track faculty were similarly cleaned by using mean values to arrive at values proportionate to the total number of permanent faculty (at Question A2A) in the questionnaire. Those values replaced imputed values that caused the total number of tenured/tenure track faculty to be larger than the total number of temporary and permanent faculty reported at Question A1A.

A small number of discrepancies at Questions A2A-F and C20-F resulting from non-imputed data were allowed to stand. In these instances, discrepancies could not be corrected by using relevant questionnaire data. Hardcopy data for each case was reviewed to check for data-entry errors, or other problems indicating whether the value should be corrected or set to missing and imputed.

Answers at Question B17 (percent of undergraduate instruction carried out by full-time faculty) were cleaned so that the total of Questions B17 and D41 (percent of undergraduate instruction carried out by part-time faculty) was not greater than 100 percent. Responses totaling less or more than 100 percent were reviewed individually and cleaned on a case-by-case basis.

6.6 Retrieval of Missing Data

Appendices I and J contain lists of the items deemed critical for both survey questionnaires. If one or more of these items were missing, calls were made to retrieve the missing information. For the faculty questionnaire, out of the 20,785 self-administered instruments, approximately 5,705 (27 percent) were identified for retrieval. Retrieval was completed for 5,483 (96 percent) of these questionnaires. Of the 5,483 cases for which retrieval was completed, respondents provided some or all of the missing data required in approximately 84 percent of the cases. The remaining 16 percent of the 5,483 cases were determined to be complete without retrieval based on policy decisions reviewed with NCES. All faculty retrieval activities were completed by January 29, 1994.

Faculty self-administered questionnaires (SAQs) identified through the edit program as having missing data on critical items were forwarded to interviewers for additional follow-up. Case records were routed to a special location within CADE. Telephone retrievers were provided with the hardcopy SAQ, accompanied by a retrieval form listing items to be retrieved. The interviewer reviewed the hardcopy before calling to confirm that the case needed retrieval. "Don't knows" and "refusals" were considered legitimate responses for retrieval purposes and not followed up. Interviewers accessed contact information and updated case dispositions through the CATI system. New data were recorded directly on the hardcopy questionnaire and entered by data preparation staff.

For the institution questionnaires, 178 (20 percent) were identified for retrieval. Retrieval was completed for 172 (97 percent) of these cases. All institution retrieval activities were completed by June 8, 1994.

Retrievals for the institution questionnaire were identified largely through the two manual edits prior to data entry; again, "don't knows" and "refusals" were considered legitimate responses and not retrieved. Information was obtained both over the telephone and by fax. Once retrieval efforts for a case had been completed, the questionnaire was sent to data entry. If a retrieval was identified during the data entry process, the operator discontinued data entry on that case and routed it to a supervisor for review; if the information could not be obtained from existing documentation, the supervisor then forwarded the case to an interviewer for telephone retrieval.

6.7 Storage and Protection of Completed Instruments

Whenever questionnaires were not being processed, they were stored in a restricted area; access was limited to authorized project staff who had signed the NCES Affidavit of Nondisclosure and had it notarized. The room was locked at night and protected by a surveillance system.

Data integrity was further ensured through a combination of electronic system access restrictions, screen update rules, and system maintenance and backup procedures that protected against unauthorized system access, mistakes in case information entry, and data loss. Every night all files used by the system were copied to tape and stored in a secure location. Information that identified individuals was maintained in physically separate files accessible only to authorized project staff.

Long-term storage of hardcopy documents is maintained in secure facilities with 24-hour surveillance, both at
the contractor's Central Office and off-site, with access limited to authorized project staff who signed and had the NCES Affidavit of Nondisclosure notarized.

7. Institution and Faculty Unit Response and Nonresponse

7.1 Institution Response Rates and Participation Rates

The NSOPF-93 institution sample consisted of 962 eligible institutions, 780 from the initial sample, and 182 from the supplemental sample. Each of the eligible institutions was sent a NSOPF-93 institution questionnaire and materials requesting faculty sampling lists. A total of 872 institutions completed the institution questionnaire, 702 in the initial sample and 170 in the supplemental sample. A total of 817 institutions submitted faculty sampling lists, 663 in the initial sample and 154 in the supplemental sample. Exhibit 7-1 illustrates these data.

Exhibit 7-1 shows the institution questionnaire response rates based on the number of eligible institutions. As previously noted, 12 institutions were found to be ineligible during data collection. Therefore, the number of eligible institutions is 962, reflecting the subtraction of 12 ineligible institutions from the 974 sampled institutions. The institution questionnaire response rate is calculated as the ratio of the number of completed institution-level questionnaires to the number of institutions in the sample, minus the number of ineligible institutions, or 872/(974€12) = 90.6 percent. The institution questionnaire response rates for the separate initial and supplemental samples were 90 percent and 93.4 percent, respectively. The participation rate, defined as the percentage of eligible institutions which provide faculty sampling lists, was an overall 84.9 percent. Participation rates for initial and supplemental samples differed only slightly. The participation rate for initial sample institutions was 85 percent, and the participation rate for supplemental institutions was 84.6 percent.

Exhibit 7-1: Institution questionnaire and faculty list response rates (unweighted) by sample component

Sample component	Eligible sample (1)	Completed institution questionnaire (2)	Submitted faculty sampling list (3)	Institution questionnaire response rate (2)/(1) (unweighted percent)	Participation rate (3)/(1) (unweighted percent)
Initial	780	702	663	90.0	85.0
Supplemental	182	170	154	93.4	84.6
Initial + supplemental	**962**	**872**	**817**	**90.6**	**84.9**

7.2 Characteristics of Institution Questionnaire Response and Nonresponse

Exhibit 7-2 displays the weighted response rates for the institution questionnaire and weighted participation rates by key sampling characteristics. When control (public/private) and level of offering (two-year/four-year) are considered, public four-year institutions (89.2 percent) had lower institution questionnaire response rates than other types of institutions. While the 100 percent response rate for private, two-year institutions is likely an artifact of the small number of cases, the response rate for the much larger sample of public two-year institutions was 94.0 percent. Private four-year institutions responded at a rate of 94.2 percent. Exhibit 7-2 also displays participation rates—a measure of the institution cooperation with the faculty survey, measured by the percentage of eligible institutions submitting faculty sampling lists. Public four-year

institutions had the highest participation rate (88.2 percent), followed by public two-year (85.2 percent), private four-year (81.5 percent) and private two-year institutions (73.3 percent).

Exhibit 7-2: Institution questionnaire response rate and faculty list participation rate (weighted) by institution type and control

Level and control of institution	Eligible sample	Institution questionnaire response rate (weighted)		Faculty list participation rate (weighted)	
		Complete	Percent	Complete	Percent
Public four-year	331	292	89.2	295	88.2
Public two-year	333	314	94.0	273	85.2
Private four-year	284	252	94.2	238	81.5
Private two-year	14	14	100.0	11	73.3
Total	**962**	**872**	**93.6**	**817**	**83.4**

Exhibit 7-3 reports weighted institution questionnaire response rates and weighted faculty list participation rates for institutions grouped according to institution sampling strata. Institution questionnaire response rates ranged from a low of 80 percent, for public medical schools, to a high of 100 percent in four strata with comparatively small samples: private religious, private two-year, public other and private unknown institutions. For the three largest strata, response rates were 85.7 percent for the research/public other Ph.D. strata (where all institutions were selected with certainty), 89.9 percent for public comprehensive institutions, and 94 percent for public two-year institutions, respectively. Overall, the institution questionnaire response rate was 93.6 percent (weighted).

Institution participation rates generally fell short of institution questionnaire response rates. However, in the research/public other Ph.D. strata, the faculty list participation rate (90.5 percent) exceeded the response rate to the institution questionnaire (85.7 percent). In other words, the NSOPF-93 faculty sample was drawn from a higher proportion of eligible research/public other Ph.D. institutions than the proportion of research/public other Ph.D. institutions whose institution representatives responded to the institution survey. The lowest participation rates, ranging from 62.5 percent to 71.1 percent, occurred among institutions classified in the private two-year, the "other" (both public and private) and private "unknown" strata. The highest participation rates occurred among strata with small samples. Participation rates for the three largest strata, the research/public other Ph.D., public comprehensive, and public two-year strata were 90.5 percent, 88.5 percent and 84.8 percent, respectively.

Exhibit 7-3: Institution questionnaire response rate and faculty list participation rate (weighted) by institution sampling stratum

Institution stratum	Eligible sample	Institution questionnaire response rate (weighted)		Faculty list participation rate (weighted)	
		Complete	Percent	Complete	Percent
Private other Ph.D.	46	39	84.8	40	87.0
Public comprehensive	159	144	89.9	141	88.5
Private comprehensive	82	71	88.8	67	78.3
Public liberal arts	3	2	84.7	3	100.0
Private liberal arts	68	66	98.7	60	89.4
Public medical	25	20	80.0	21	84.1
Private medical	10	9	92.2	10	100.0
Private religious	18	18	100.0	14	77.1
Public two-year	316	298	94.0	258	84.8
Private two-year	10	10	100.0	8	71.1
Public other	7	7	100.0	6	62.5
Private other	24	19	83.2	15	68.3
Public unknown	19	18	94.5	17	92.8
Private unknown	7	7	100.0	5	67.4
Research/public other Ph.D.	168	144	85.7	152	90.5
Total	**962**	**872**	**93.6**	**817**	**83.4**

*Sampling stratum classification does not match the "level and control" classification (Exhibit 7-2) because institutions sampled in the "unknown" categories in NSOPF-93 were reclassified after data collection was complete.

7.3 Faculty Questionnaire Response Rates

Exhibit 7-4 compares the response rates for all NSOPF faculty surveys to date. Several points should be underscored in providing an appropriate context for comparing these results. First, the mode of data collection differed between the 1987-88 and 1992-93 cycles of NSOPF. The 1987 field test and 1988 full-scale study used a mail survey and relied on follow-up by mail and telephone. Institution Coordinators were responsible for distributing faculty questionnaires to their campus addresses. The 1992 field test and 1993 full-scale study used mail and interviewer-initiated telephone follow-up, and relied on Institution Coordinators only in instances when home addresses and telephone numbers for faculty were not provided on the faculty list and/or when the faculty response rate at an institution was low. Second, CATI (computer-assisted telephone interviewing) was used in the 1988 study at the end of the survey, and then only to complete 179 interviews, or 2.1 percent of the completed cases. In the 1993 full-scale study, CATI accounted for 19 percent of the completed cases. Third, the 1988 effort required more than six months to complete. The 1992 field test was completed in about four months. For the 1993 full-scale study, the first

of six waves of questionnaire mailings occurred at the end of January, 1993; the last telephone interview was completed almost one year later.

Exhibit 7-4: Faculty response rates (unweighted) by NSOPF cycle

NSOPF cycle	Eligible sample	Number with completed questionnaires	Response rate (unweighted percent)
1987 Field test	235	160	68.1
1988 Main study	11,013	8,382	76.1
1992 Field test	605	495	81.8
1993 Main study	29,764	25,780	86.6

7.4 Faculty Eligibility

For NSOPF-93, faculty were considered eligible if they were: 1) a member of the part-time or full-time instructional staff, 2) designated as having faculty status even if they were involved in other full-time activities such as administration or research, or 3) had any instructional duties whether part-time or full-time, temporary or permanent. The individual's instructional and/or faculty status had to be effective as of October 15, 1992. Eligibility was determined based on information provided by the institution or by information provided in the faculty questionnaire. (See Chapter 3 for a detailed review of sampling eligibility criteria.)

After adjusting for 2,000 faculty subsampled out, 31,354 faculty remained in the sample. Of these, 1,590, or 5.1 percent, were declared ineligible. Of the ineligible faculty, 69 were deceased and 1,521 were otherwise ineligible. Sampled faculty were ruled ineligible if they fit any of the following descriptions: honorary faculty, military personnel who teach only ROTC courses; personnel who are supplied by an independent contractor; graduate assistants; faculty on unpaid leave, or who were not employed as teaching personnel or as faculty in the fall term that included October 15, 1992.

Exhibit 7-5 shows that self-administered questionnaires were completed for 20,785 of 25,780 respondents, or for 69.8 percent of the eligible sample. Computer-assisted telephone interviews (CATI) were completed with 16.8 percent of the eligible sample. Among the specific reasons for faculty nonresponse, refusals (5.3 percent) accounted for the largest proportion, followed by locating problems (3.1 percent), and unavailable/not-at-home (1.1 percent). Two broad categories of nonrespondents are suggested by these results: refusals (5.3 percent), and other nonrespondents (8.1 percent). This suggests that the biggest nonresponse problem is the inability to contact the respondent.

Exhibit 7-5: Faculty response and nonresponse status

Final status	Total	Percent	
		Unweighted	Weighted
Sample (after subsampling)	31,354		
Ineligible (out-of-scope) (Deceased)	1,590 (69)		
Net sample (sample - ineligible)	**29,764**	**100.0**	**100.0**
Responding	**25,780**	**86.6**	**84.4**
Completed interviews —Self-administered questionnaires —CATI interviews	**25,780** 20,785 4,995	**86.6** 69.8 16.8	**84.4** 66.5 17.9
Non-responding —Refused —Unlocatable —Unavailable/not at home —Other	**3,984** 1,574 921 316 1,173	**13.4** 5.3 3.1 1.1 3.9	**15.6** 6.3 3.6 1.2 4.5

7.5 Summary: An Assessment of NSOPF-93 Faculty Response Rates

This section disaggregates faculty response rates in two ways: first, it explores if characteristics of faculty respondents' institutions affected response rates, and second, it explores whether individual/demographic characteristics of the faculty respondents affected response rates. Exhibits 7-6 to 7-7 also show the "overall response rates." For NSOPF-93 faculty members, the "overall response rate" is computed by multiplying the institution list participation rates by faculty level response rates. The weighted overall response rate for the faculty survey is 70.4, or the product of the survey's weighted list participation rate and the weighted overall faculty response rate (83.4 percent × 84.4 percent = 70.4 percent). In other words, NSOPF-93 achieved a response rate of 70.4 percent for the estimated universe of all eligible faculty and instructional staff in U.S. higher education institutions.

Exhibit 7-6 presents weighted response rates disaggregated by two institutional characteristics: by level/control, a category that combines both level of offering and control, and by institution sampling strata. As the exhibit shows, weighted faculty questionnaire response rates were nearly identical for public institutions. However, there was wide variation for private institutions. Private two-year institution faculty responded at a rate of 91.8 percent (with a 67.3 percent overall response rate), compared with 81.2 percent (66.2 percent overall response rate) for private four-year institution faculty. Faculty at private medical and private "other" institutions (including a wide array of professional and specialized degree-granting institutions) responded to the faculty questionnaire at the lowest rates (67.9 percent and 64.3 percent, respectively) of all faculty.

Exhibit 7-6 indicates that NSOPF-93 achieved above average overall response rates among institutions in the largest strata (research/other Ph.D., public comprehensive, and public two-year strata), where the majority of postsecondary faculty are found. The lowest overall response rates were among institutions which account for small numbers of postsecondary faculty (public and private "other" institutions and private "unknown" institutions). Yet, with the exception of faculty in the private "other" stratum, which showed the lowest overall response rate (43.8 percent), faculty questionnaire response rates exceeded 85

percent in these strata.

Therefore, the low institution faculty list participation rates explained the low overall response rates in the public "other" and private "unknown" strata.

Exhibit 7-7 indicates how specific individual-level characteristics (gender, race/ethnicity, academic discipline, and employment status) affected weighted response rates. In interpreting these data, two points should be kept in mind. First, categorization of individual faculty members depended on information each participating institution provided on the faculty sampling lists. These lists' validity is discussed in Chapter 9. Second, overall faculty response rates are calculated by multiplying the overall weighted institution faculty list participation rate (83.4 percent) by weighted response rates for each faculty-level category. Therefore, no adjustment to overall faculty response rates is made for institution-level variables such as institutional level and control or institutional sampling strata.

Sampled female faculty were slightly more likely to respond to the questionnaire than sampled male faculty. White, non-Hispanics showed the highest response rates among the racial and ethnic groups: 86.7 percent of white, non-Hispanic faculty members surveyed responded to the questionnaire, followed by Asian/Pacific Islanders (85.5 percent), Hispanics (84.5 percent), black, non-Hispanics (83.9 percent) and American Indian/Alaskan Natives (70.2 percent).

Academic disciplines were divided between non-National Endowment for the Humanities (NEH) disciplines and four NEH disciplines: philosophy/religion, foreign languages, English language and literature, and history. Sampled faculty in the NEH disciplines responded to the survey at a slightly higher rate than faculty in the non-NEH disciplines (85.1 percent, compared to 84.7 percent, weighted data). Therefore, the response rate for faculty in the four NEH disciplines slightly exceeded the response rate for all faculty in the sample. Faculty in the history discipline responded at 88.2 percent, nearly four percentage points higher than the average response rate for all faculty. Foreign language faculty responded at a lower-than average rate of 81.8 percent, 2.6 percentage points less than the average response rate for all faculty. Finally, sampled full-time faculty were more likely to respond to the questionnaire than part-time faculty.

As the exhibit also points out, respondents whose gender, race/ethnicity, and discipline were unknown showed the lowest response rates among each of those subgroups. Respondents whose employment status was unknown responded at about the same rate as part-time faculty. Overall response rates followed the patterns set in faculty questionnaire response rates. All categories of faculty attained a 70 percent or higher overall response rate except faculty members whose individual characteristics were unknown, American Indian/Alaskan Natives, foreign language faculty, and part-time faculty.

Exhibit 7-6: Faculty questionnaire and overall response rates by institutional characteristics

Institutional characteristic	Faculty list participation rate (weighted percent) (1)	Faculty Eligible	Faculty Complete	Faculty questionnaire response rate (weighted percent) (2)	Overall response rate (weighted percent) (1) × (2)
Institutional level/control					
Public four-year	88.2	11,029	9,682	85.7	75.6
Public two-year	85.2	9,913	8,646	85.6	72.9
Private four-year	81.5	8,483	7,146	81.2	66.2
Private two-year	73.3	339	306	91.8	67.3
Institutional sampling stratum					
Private other Ph.D.	87.0	1,422	1,141	79.6	69.2
Public comprehensive	88.5	5,308	4,718	87.2	77.2
Private comprehensive	78.3	2,510	2,191	85.6	67.0
Public liberal arts	100.0	90	87	96.0	96.0
Private liberal arts	89.4	2,281	2,067	89.5	80.0
Public medical	84.1	764	633	78.0	65.7
Private medical	100.0	321	236	67.9	67. 9
Private religious	77.1	291	244	83.0	63.9
Public two-year	84.8	9,382	8,187	85.6	72.6
Private two-year	71.1	268	248	92.6	65.8
Public other	62.5	219	188	87.0	54.4
Private other	68.3	509	367	64.3	43.8
Public unknown	92.8	597	509	85.0	78.9
Private unknown	67.4	136	114	85.1	57.3
Research/public other Ph.D.	90.5	5,666	4,850	83.1	75.2
Total respondents	**83.4**	**29,764**	**25,780**	**84.4**	**70.4**

*Sampling stratum classification does not match the "level and control" classification because institutions sampled in the "unknown" categories in NSOPF-93 were reclassified after data collection was complete.

Exhibit 7-7: Faculty response rates by individual characteristics

Individual characteristic, identified on faculty list	Subgroup	Eligible	Completed	Faculty questionnaire response rate (weighted percent)	Overall faculty response rate (weighted percent)
Gender	Unknown	1,857	1,416	76.0	63.4
	Male	15,879	13,720	84.0	70.1
	Female	12,028	10,644	87.0	72.6
Race/ethnicity	Unknown	7,967	6,507	79.1	66.0
	American Indian/Alaskan Native	96	78	70.2	58.6
	Asian/Pacific Islander	1,132	993	85.5	71.4
	Hispanic	1,199	1,033	84.5	70.5
	Black, non-Hispanic	2,458	2,097	83.9	70.0
	White, non-Hispanic	16,912	15,072	86.7	72.4
Discipline	Unknown	1,647	1,316	79.9	66.6
	Non-NEH	23,256	20,248	84.7	70.7
	History	904	804	88.2	73.6
	Foreign language	995	829	81.8	68.2
	English	2,379	2,069	85.1	71.0
	Philosophy/religion	583	514	85.7	71.6
Employment	Unknown	3,380	2,824	82.6	68.9
	Full-time	17,596	15,618	86.6	72.2
	Part-time	8,788	7,338	81.6	68.1
Total respondents		**29,764**	**25,780**	**84.4**	**70.4**

8. Questionnaire Item Nonresponse

Item nonresponse may create two impediments to the successful analysis of survey data. Item nonresponse may bias survey data if the values of the missing data differ from those of the known data. Item nonresponse can also diminish the number of observations that can be used in calculating statistics from affected data elements and can thus increase sampling variances. Since item nonresponse is an important source of potential bias, it is necessary to measure its extent so that analysts can properly take potential response biases into account when developing their analysis plans. This chapter reviews the item nonresponse rates for NSOPF-93 for both the faculty and institution questionnaires.

8.1 Item Nonresponse: Definition and Considerations

Item nonresponse occurs when a respondent fails to complete certain items on a survey instrument. While bias associated with unit nonresponse has been controlled by adjusting case weights, item nonresponse has generally been addressed with imputation in the NSOPF-93 faculty and institution datasets. Machine editing rectified nonresponse problems for some items by imposing inter-item consistency, particularly by forcing logical agreement between filter and dependent questions. For example, the missing response to a filter question can often be inferred if dependent questions have been answered. Because the edited files were used in the nonresponse analysis reported below, this adjustment to item nonresponse is reflected in the results of the analysis.

Note that unit nonresponse is a further source of missing item data—nonparticipating sample members complete no questionnaire items. Weights adjust for nonresponse by projecting questionnaire data to the full population, with appropriate adjustments for defined subgroups. However, nonresponse-adjusted weights cannot compensate for the bias that arises if nonrespondents and respondents would have answered the questionnaire differently. Hence "total response" to a specific item could actually be thought of as the overall survey (unit) response rate multiplied by the item response rate.

Two main objectives guide the following item nonresponse analysis. One objective is to quantify mean questionnaire nonresponse overall as well as nonresponse for the faculty and institution samples on key variables. A second objective is to describe nonresponse patterns in terms of item characteristics. In order to realize the first objective, nonresponse rates were calculated for each survey item, and average rates of nonresponse were calculated for each instrument. To fulfill the second objective, nonresponse was measured as a function of two item characteristics: position in the questionnaire and topic. The characteristics of questions with item nonresponse rates greater than or equal to 10 percent were further examined. For the faculty questionnaire, the effect of questionnaire administration mode—self-administered versus interviewer-administered (telephone and in-person)—on item nonresponse was also analyzed.

The item nonresponse rate is defined as the ratio of the total number of nonresponses among eligible respondents to the number of respondents eligible to respond to a questionnaire item. In the notation of the exhibits listing nonresponse rates, the item nonresponse rate, RATE, equals the number of item nonresponses divided by the number of eligible unit respondents ("*n*"). The standard error of the item nonresponse rate, STDERR, equals the square root of RATE × (1 - RATE)/*n*. In general, the larger the *n*, (i.e., the greater the number of eligible unit respondents for a particular item), and the further the RATE is from .5, the lower the STDERR. The standard errors assume simple random sampling. For a question composed of multiple subparts, each subpart eliciting a distinct response is counted as an item for item nonresponse purposes.

For the NSOPF-93 questionnaires, several reserve codes were used to categorize nonresponse on preliminary data files prior to imputation. The reserve code definitions were as follows:

> **Refused.** Respondent was unwilling to answer the question at the time of the questionnaire administration and upon nonresponse follow-up by survey administrators.
>
> **Don't know.** In the NSOPF-93 datasets, "don't know" is embedded as a legitimate response category in some questionnaire items. For purposes of this analysis, "don't know" was categorized as "missing."
>
> **Missing.** The response is illegitimately missing. That is, a response that should be present for this respondent is missing.
>
> **Multiple answers.** Respondent illegitimately chose more than one response.
>
> **Legitimate skip.** The response is legitimately missing. That is, owing either to responses to preceding filter questions or to other respondent characteristics, data for this item should not be present for this respondent. Such responses have been excluded from this nonresponse analysis; they were excluded from both numerator and denominator. [However, when "not applicable" (NA) is provided as a legitimate response category of an item, it is treated as an item response. When the "not applicable" response is circled, it is included in the denominator, but not the numerator, of the item nonresponse rate formula.]

All means reported in the following analysis are unweighted. The unweighted means ignore variability among items in the number of eligible unit respondents.

8.2 Faculty Questionnaire Item Nonresponse

Faculty questionnaires were administered to 25,780 respondents. The faculty questionnaire consisted of six sections and 395 items, which required approximately 45 minutes to complete. Exhibits 8-1 through 8-3, show descriptive statistics for item nonresponse for the faculty questionnaires overall and for items grouped into categories depending upon position in the questionnaire and topic addressed. The mean item nonresponse rate was .103 for the faculty questionnaires.

8.2.1 Nonresponse by Item Placement, Item Topic, and Administration Mode

Nonresponse by questionnaire position. Exhibit 8-1 indicates that nonresponse in the middle third of the questionnaire contributed the greatest portion to the overall nonresponse rate. The first third of the questionnaire had a mean item nonresponse rate of .029, the middle third showed a mean item nonresponse rate of .155, and the last third of the questionnaire produced a mean item nonresponse rate of .066. This nonresponse pattern differs from the pattern that would be expected if respondent fatigue accounted for the bulk of questionnaire item nonresponse. Typically, item nonresponse due to respondent fatigue increases monotonically from the beginning to the end of the questionnaire.

Exhibit 8-1: Mean item nonresponse rates for faculty questionnaire by thirds (unweighted data)

Questionnaire by thirds	Mean	STDERR
First third: Questions 1-20	0.029	0.002
Middle third: Questions 21-40	0.155	0.013
Last third: Questions 41-60	0.066	0.004
Entire questionnaire	0.103	0.007

A closer look at the questionnaire items reveals that Questions C32 and C33, asking respondents to detail the grants and contracts they administered or received in the 1992 fall term, account for the bulk of the nonresponse. More than three-quarters of respondents did not answer Question C32, which asked them to provide the number of individuals *other than the respondent* supported by grants and contracts for which the respondent was principal or co-principal investigator. Nonresponse on Question C33, which included 54 subparts, ranged from 12.4 percent to 74 percent.

These high rates of nonresponse appear to stem from two factors. First, the number of eligible respondents to these questions ranged from 1,176 to 13,935. Second, the questions asked respondents to list the precise number and dollar amounts of grants and contracts they administered. Because of the detail involved in answering these questions accurately, most respondents would presumably have had to consult their records. Presented with this time-consuming research task, many respondents eligible to answer the questions may have skipped them instead. The combination of these factors greatly increased nonresponse rates on these specific items. For example, the number of eligible faculty who administered state or local government grants or contracts (Questions C33B4 to C33E4_3) was 1,176. Faculty classified as nonrespondents to these questions ranged from 534 to 547, for a nonresponse rate that varied between .457 and .465.

Questions C35A1-C35A6 also contributed to the higher item nonresponse in the middle third of the questionnaire. "Don't know" was provided in the questionnaire as a response choice for these items, treated as missing for this analysis. The imputation flags in Appendix P show the range of "don't knows" for these items.

The .066 mean item nonresponse rate for the last third of the questionnaire is affected by "don't know" responses to items D42, D44, D45, D46, F58, and F60, which ranged from 25 to over 30 percent. Imputation treated these items in two ways discussed in Chapter 6. One imputation treatment preserved "don't know" as a valid response, since "don't know" was a response category for each of these items, though treated as missing in this item nonresponse analysis.

Item nonresponse by topic. The NSOPF-93 faculty questionnaires are organized topically. Each section represents a different theme, as Exhibit 8-2 shows. Average item nonresponse rates and standard errors for each instrument and section are presented in the exhibit as well.

Exhibit 8-2: Mean item nonresponse rates for faculty questionnaire by topic (unweighted data)

Questionnaire content area	Section and questions	Mean	STDERR
Employment	Section A: Questions 1-13	.046	.005
Professional background	Section B: Questions 14-20	.025	.001
Institutional responsibilities and workload	Section C: Questions 21-37	.160	.014
Job satisfaction	Section D: Questions 38-46	.072	.008
Compensation	Section E: Questions 47-50	.091	.004
Sociodemographic characteristics	Section F: Questions 51-60	.051	.006

Section C, "Institutional Responsibilities and Workload," returned the highest mean item nonresponse rate (.16). Section C's high rate appears to stem from the impact of Questions C32 and C33, discussed above. This figure is 1.76 times greater than for section E, "Compensation," which shows the next largest mean item nonresponse rate at .091. The lowest rate (.025), appeared in section B, "Professional Background." The mean rate was .046 for section A, "Employment," followed by .051 for section F, "Sociodemographic Conditions," and by .072 for section D on "Job Satisfaction."

Nonresponse by critical items. Since a complete edit with data retrieval for *all* missing items would be prohibitively expensive for most surveys, the conventional strategy is to identify a subset of "key" or "critical" items for each survey instrument, which, if not answered, triggers an attempt to recontact the respondents to obtain the missing data. See Appendix I for a list of all critical items on the faculty questionnaire.

Exhibit 8-3 displays the mean critical and noncritical item nonresponse rates for the faculty questionnaires. Nonresponse on critical items ranged from almost none (.0003 percent on Question_1, the screener determining if the respondent performed instructional duties) to 8.5 percent (on Question F57C, listing the country of citizenship for non-U.S. citizens). In contrast, the mean item nonresponse rate for noncritical items amounted to .112, about six times the critical item nonresponse rate.

Exhibit 8-3: Mean item nonresponse rates for critical items on the faculty questionnaire (unweighted data)

Item type	Mean	STDERR
Critical	0.019	0.003
Noncritical	0.112	0.008

The item nonresponse rate for each of the critical items in the faculty questionnaires is shown in Appendix I.

Nonresponse by questionnaire administration mode. The faculty questionnaire was administered in two ways: self-administered questionnaire and telephone interview. In total, 20,785 respondents completed

self-administered questionnaires. Another 4,995 respondents completed the questionnaire by telephone interview. More than 600 of the telephone interviews were completed on the abbreviated questionnaire exhibited in Appendix H. Since the majority of questions were not asked in the abbreviated questionnaire, many items on these questionnaires contributed to item nonresponse.

The mean item nonresponse rate on self-administered surveys differed little from the mean rate item on interviewer-administered surveys, as is illustrated in Exhibit 8-4. In fact, the mean rate of nonresponse showed remarkable consistency across survey modes. The mean nonresponse rate for self-administered surveys (.102) closely matched the mean rate for interviewer assisted surveys (.100).

Exhibit 8-4: Mean item nonresponse rates for faculty questionnaire, by questionnaire third and mode (unweighted data)

Questionnaire section by thirds	Self-administered		Interviewer-administered		All modes	
	Mean	STDERR	Mean	STDERR	Mean	STDERR
First third: Questions 1-20	.028	.001	.035	.004	.029	.002
Middle third: Questions 21-40	.158	.014	.14	.011	.155	.013
Last third: Questions 41-60	.061	.004	.086	.007	.066	.004
Entire questionnaire	.102	.008	.100	.006	.103	.007

There is no clear association of mean nonresponse with the method of survey administration. Interviewer-administered surveys produced a lower mean nonresponse than self-administered questionnaires in the questionnaire's middle third, but self-administered surveys produced lower mean nonresponse in the first and final thirds. Nevertheless, as Exhibit 8-4 shows, the differences in mean nonresponse between survey modes are slight.

When viewed by questionnaire section, however, self-administered surveys produce a lower mean nonresponse rate on four of six sections. Particularly noticeable is the difference on the demographic characteristics section of the questionnaire, shown in Exhibit 8-5. The mean item nonresponse rate for interviewer-administered surveys is almost three times the rate for self-administered questionnaires. For the job satisfaction questions, the mean item nonresponse rate for interviewer-administered surveys is almost twice the rate for self-administered questionnaires. These differences may reflect respondent reluctance to disclose demographic details and/or specific attitudes and opinions in an interview setting.

Because four-fifths of the respondents used self-administered questionnaires, the level of nonresponse for the entire survey more closely mirrored the rates of nonresponse obtained on self-administered questionnaires. Patterns of item nonresponse in both completion modes are similar. On both self-administered and interviewer-administered questionnaires, levels of nonresponse were lowest in the first two sections and last sections of the questionnaire. This pattern suggests that fatigue was not as significant a factor in determining nonresponse as were the requirements necessary to answer the questions authoritatively. Again, section C on "Institutional Responsibilities and Workload," which involved answering many detailed questions, produced the highest level of nonresponse in both survey modes.

Exhibit 8-5: Mean item nonresponse rates for faculty questionnaire by section and mode (unweighted data)

Section	Section content	Questions	Self-administered		Interviewer-administered		All modes	
			Mean	SE	Mean	SE	Mean	SE
A	Employment	Questions 1-13	.040	.004	.067	.013	.046	.005
B	Professional background	Questions 14-20	.024	.001	.026	.003	.025	.001
C	Institutional responsibilities and workload	Questions 21-37	.163	.014	.138	.012	.160	.014
D	Job satisfaction	Questions 38-46	.064	.008	.105	.014	.072	.008
E	Compensation	Questions 47-50	.094	.005	.077	.005	.091	.005
F	Demographic characteristics	Questions 51-58	.038	.005	.105	.015	.051	.006

8.2.2 Items with High Item Nonresponse

For purposes of this analysis, high item nonresponse was deemed to be nonresponse greater than or equal to 10 percent; given the high rate of unit response in the study, this 10 percent threshold for identifying items displaying high nonresponse is relatively conservative. Appendix I displays questions, number of eligible respondents, nonresponse rates, and standard errors for faculty questionnaire items with nonresponse greater than or equal to 10 percent.

As discussed earlier, the question whose subparts showed the highest level of nonresponse was Question C33, with most of its subparts displaying item nonresponse levels of more than 20 percent. Question C25, requesting numbers of students receiving individual instruction from the respondent and an estimate of time per week spent with them, shows a consistent pattern of nonresponse of around 20 to 22 percent for each of the question's two parts. This suggests that nonresponse may be interpreted largely as an indication that these respondents did not engage in individualized instruction with students.

8.3 Institution Questionnaire Item Nonresponse

Institution respondents completed 872 institution-level questionnaires. Each questionnaire included 283 items. Anecdotal evidence suggests that completion of the institution questionnaire required several hours of university staff time, sometimes spread over several weeks, and at times, spread over several months. On average, completion of the questionnaire involved input from more than one institution respondent. Exhibit 8-6 displays questionnaire sections and descriptive statistics for item nonresponse for the institution-level questionnaires. Since 89 percent of the institution questionnaires were self-administered, no breakdown of nonresponse by mode of questionnaire administration is presented. The NSOPF-93 institution questionnaire, like the faculty questionnaire, is organized topically; each section of the questionnaire represents a different

theme. Exhibit 8-7 lists the instrument's sections by thirds of the questionnaire, and provides question number ranges for each section.

Exhibit 8-6: Mean item nonresponse rates for institution questionnaire by content area (unweighted data)

Questionnaire content area	Section and questions	Mean	STDERR
Preface	Section A: Questions AC1-A1C	.074	.023
Full-time instructional	Section B: Questions 2-19	.053	.004
Full-time non-instructional	Section C: Questions 20-33	.127	.011
Part-time instructional	Section D: Questions 34-43	.147	.015
Total		.101	.006

8.3.1 Item Nonresponse by Questionnaire Position and Topic

The mean item nonresponse rate for the institution questionnaire was .101, with item nonresponse levels increasing in the latter stages of the questionnaire. Analysis showed the questionnaire's first third produced the lowest mean item nonresponse rate (.051), as shown in Exhibit 8-7, with the mean item nonresponse rate increasing to .081 in the questionnaire's middle third, and to .161 in the questionnaire's last third. The mean item nonresponse rate also increased as the subject matter moved from questions pertaining to full-time instructional staff (.053) in section B to questions pertaining to part-time instructional staff (.147) in section D as shown in Exhibit 8-6. This pattern suggests two possible explanations: first, institutions may have had a more difficult time supplying information on part-time staff; or second, respondent fatigue.

Exhibit 8-7: Mean item nonresponse rates for institution questionnaire by questionnaire third (unweighted data)

Questionnaire section by thirds	Mean	STDERR
First third: Preface-Question 14	.051	.006
Middle third: Questions 15-29	.081	.006
Last third: Questions 30-43	.161	.013
Entire questionnaire	.101	.006

Institution survey item nonresponse by critical items. Exhibit 8-8 displays mean critical and noncritical item nonresponse rates for the institution questionnaires. The mean item nonresponse rate for the 15 critical items is .036, compared to a rate of .104 for noncritical items. Critical items are listed in Appendix J.

Exhibit 8-8: Mean item nonresponse rates for critical items on the institution questionnaire (unweighted data)

Item type	Mean	STDERR
Critical	.036	0.01
Noncritical	.104	0.01

Nonresponse on individual critical items ranges from none to 7.3 percent across the institution questionnaires. As in critical items on the faculty questionnaire, "don't know" was not offered as a legitimate response category in the critical item questions. Moreover, because of their access to institutional information, most respondents (college or university administrators) possessed greater ability to provide the information the critical items solicited. The item nonresponse rate for each of the critical items in the institution questionnaires is shown in Appendix J.

8.3.2 Items with High Item Nonresponse

For purposes of this analysis, high item nonresponse was deemed to be nonresponse equal to or greater than 10 percent; given the high rate of unit response in the study, this 10 percent threshold for identifying items displaying high nonresponse is relatively conservative. Use of a more liberal threshold, such as 20 percent, yields a considerably smaller number of problematic questionnaire items.

Appendix J displays the number of eligible respondents, nonresponse rates, and standard errors for institution questionnaire items with nonresponse greater than or equal to 10 percent.

Questions C27, C32, C33, D35, D37 and D40—all of them soliciting information on the range of benefits for part-time, non-instructional, and temporary employees—showed rates of item nonresponse greater than 20 percent. Low eligible sample sizes (in some cases, with $n < 100$) characterized these items, suggesting that only a small number of institutions offered the full range of benefits for either type of faculty. To take an example, item D40C2 reports an item nonresponse rate of 53 percent. However, this rate is based on a ratio of 93 nonrespondents to only 174 eligible respondents. This low *n* of eligible respondents stems from, first, the fact that only 493 of the 872 responding institutions offer benefits to part-time faculty; and second, that only 375 institutions have specific requirements for part-time instructional faculty to receive benefits. Other filters in the questionnaire lowered the number of eligible respondents to 174.

Item nonresponse appears to be high for this set of questions for two reasons: first, the questions dealt with subsets of faculty (i.e. full-time non-instructional, part-time and temporary employees) about whom it may have been difficult to provide information; second, these questions were positioned later in the questionnaire; and third, the questionnaire consisted of almost 300 questions and subquestions. These explanations for high item nonresponse could have reinforced each other.

Perhaps the most extreme illustration of the first explanation can be observed at Question C32, where respondents were asked to provide information about "temporary, full-time, non-instructional faculty." The difficulty of specifying answers for this group (as opposed to, say, full-time non-instructional faculty or full-time faculty) may have contributed to high item nonresponse.

The institution questionnaire had the potential of requiring more than 120 individual entries by the end of Section B; an additional 100 entries by the end of Section C; and yet another 67 entries by the end of Section D. For the benefits questions (B15, B16, C31, C32, D35, D37, D40) and the assessment of teaching performance questions (B18 and D42), "don't know" was pre-printed as a response for many of

the sub-items. In 1988, benefits questions were asked only about full-time instructional faculty in the institution questionnaire, and the assessment questions were asked only in the department questionnaire. In the 1992 field test, no questions were asked about temporary faculty. As a result, "don't know" was provided as a response category for benefits questions for temporary full-time faculty and instructional staff, and for part-time instructional faculty/staff, and for the performance assessment questions.

Appendix P contains the imputation flags for all missing items, with separate flags for "don't know" responses that were set to missing before imputation. For B15 and B16 (benefits for temporary full-time instructional faculty/staff) six respondents did not answer either B15 or any sub-items at B16A-O; the "don't know" responses ranged from 20 to 30 for B15, and for the 15 sub-items of B16. Out of 872 respondents to the questionnaire, 584 were eligible to answer B16.

For C31 and C32 (benefits for temporary full-time non-instructional faculty), and at C35-C37 (benefits for part-time instructional faculty and staff) more respondents did not answer at all, rather than select a "don't know" response. At this point, respondents may have found it burdensome to select a response for each sub-item.

In the benefits questions, sub-items that asked whether a particular benefit was fully subsidized, partially subsidized or not subsidized at all, appeared to be difficult to answer as well. These sub-items were added after the field test for the majority of the benefits questions. "Don't know was not provided as a response choice, and several sub-items had nonresponse rates greater than 10 percent, with sub-items such as subsidization of housing, and cafeteria-style benefits plans having higher nonresponse rates even for full-time permanent instructional faculty/staff. For other faculty groups, the nonresponse rates were higher for more of these sub-items. This again is likely to indicate respondents did not know the answers.

"Don't know" responses were offered as a response choice at the sub-items of Questions B18 and B22 (methods used to assess teaching performance). There were fewer "don't knows" than unanswered for these sub-items, but the total number of missings suggests that these questions may not be easily answered at the institution level.

9. Faculty Questionnaire Data Quality

This chapter reviews the results of a validity and reliability evaluation of faculty questionnaire items. For purposes of NSOPF-93, "validity" is defined as the correlation or association between the measured and true values of a characteristic or attribute. "Reliability" expresses the correlation or association between repeated measurements of the same item.[24] The goals of the validity and reliability evaluations are to identify faculty questionnaire items that yield data of low quality and to identify characteristics of items (question wording, context, and unclear or ambiguous response categories) that cause response problems. The NSOPF-93 field test used different research designs to evaluate the validity and reliability of faculty questionnaire items. Validity was also evaluated for the full-scale study.

9.1 Validity and Reliability in the NSOPF-93 Field Test

To evaluate validity in the NSOPF-93 field test, faculty responses to selected items of the faculty questionnaire were compared with data obtained from the postsecondary institution in which the faculty member was employed during the fall of 1991 for the field test. Each sampled institution was requested to provide data on the gender, race/ethnicity, employment status (full-time versus part-time), principal field or teaching discipline, and tenure status (tenured versus not tenured) of sample faculty at their institution (Tenure status was used only in the field test). These institutional data were used to evaluate faculty members' self-reports of the same characteristics.

To evaluate reliability for the field test, a subsample of faculty who responded to the original interview were reinterviewed. The reinterview was conducted via telephone, while all field test faculty were asked, initially, to complete a self-administered questionnaire. A small number of respondents who failed to complete a self-administered interview completed a computer-assisted telephone interview (CATI). The reinterview questionnaire (see Appendix D) included a subset of the same items that were administered in the original interview, including items on instructional duties, principal activities, field or discipline, degrees and honors, previous jobs, publications and presentations, funded research, allocation of time, and salary. These items were selected in part because they were identified to be potentially problematic for respondents. The reliability of each reinterview item was evaluated by comparing faculty members' responses to the reinterview with their responses to the original interview. The sample size for the reliability evaluation was 117 cases.

The conclusions of the field test validity evaluation were as follows:

- For gender, race/ethnicity, and employment status, the faculty questionnaire and institutional data were consistent in more than 90 percent of the sample cases.

- For principal discipline or field, the percentage of consistent cases for the field test was slightly below 70 percent.

[24]See Robert M. Groves, *Survey Errors and Survey Costs* (New York: John Wiley, 1989), pp. 19, 22. The terms validity and reliability are variously defined in the scientific literature. For other definitions, see Edward G. Carmines and Richard A. Zeller, *Reliability and Validity Assessment* (Beverly Hills: Sage Publications, 1979); and Judith T. Lessler and William D. Kalsbeek, *Nonsampling Error in Surveys* (New York: John Wiley, 1992), pp. 238-239.

- Inconsistencies between the institutional and questionnaire data do not necessarily point to low validity of the questionnaire data. This is true for several reasons: errors are possible in both data sources; the questions that were posed to faculty and to institutions were not exactly identical; and high rates of missing data, especially missing institutional data, vitiate several of the comparisons. In particular, and as might be expected, institutions reported principal discipline as "unknown" much more frequently than do faculty.

The conclusions of the field test reliability evaluation are as follows:

- For each of eight categorical variables that were evaluated, that is, instructional duties (Question 1), credit or noncredit courses (Question 1[A]), principal activity (Question 2), principal field (Question 14), last degree (Question 18), level of students in classes (Question 23), and funded research (Question 29), the interview and reinterview responses are consistent in more than 70 percent of the cases. Given the high standard errors associated with a sample of 117 cases, we do not have evidence of poor reliability.

- Most of 19 continuous variables that were evaluated have correlations greater than .70 between the original and reinterview responses. The interview-reinterview correlations are low for the following variables:

Hours per week—unpaid activities (Question 37[C]):	r = .31.
Percentage of hours—professional growth (Question 38[E-F]):	r = .13.
Percentage of hours—research (Question 38[G-J]):	r = .29.
Percentage of hours—other activities (Question 38[K-P]):	r = .47.
Income from outside consulting (Question 51[H]):	r = .40.

- Low associations or correlations between interview and reinterview responses do not necessarily indicate poor reliability of the self-administered questionnaire (SAQ), because the reinterview was conducted by telephone rather than by SAQ. It is plausible that some of the characteristics were measured more reliably by SAQ than by telephone. The different questionnaire contexts of the items in the interview and reinterview may be an additional cause of discrepancies, since the reinterview asked only a subset of the original items. Finally, the small sample size and high rates of missing data also attenuate some of the conclusions based on the reliability evaluation.

A more detailed description of validity and reliability tests performed during the field test is available in the *1992-92 National Study of Postsecondary Faculty Field Test Report* [NCES 93-390].

9.2 Changes to the 1993 Full Scale Study

The low reliability noted on a number of items in Question 38 on the field test faculty questionnaire resulted in a decision to revise this question for the full-scale study. This question, asking respondents to document the percentage of their time they spent performing 16 different job-related and non-teaching activities, was revised to reduce to six the number of job-related and non-teaching activities.

For purposes of cost-saving and efficiency, only five faculty discipline codes were recorded on the electronic faculty list. These were the National Endowment for the Humanities-designated disciplines (philosophy/
religion, foreign languages, English language and literature, and history) and one "non-NEH" category. Data were coded in this form because the NSOPF-93 oversampled four specific humanities departments.

The validity tests discussed in the following section take this change in the faculty list into account.

9.3 Validity in the 1993 Full Scale Study

The sample size for the field test validity study was 495 cases. The full-scale study validity sample sizes varied from 19,273 pairs of cases (on the comparison of racial/ethnic data) to 24,362 pairs of cases (for the comparison of faculty gender). Data obtained from the NSOPF-93 instrument and data supplied by institutions were compared on four respondent characteristics: gender, race/ethnicity, employment status (full-time or part-time) and academic discipline. Exhibits 9-1 to 9-4 summarize the direct comparisons of faculty list data with faculty questionnaire data. Exhibit 9-5 compares these data and assesses the consistency in responses between faculty list and questionnaire data. Measures of association (chi square, Cramer's V) and measures of inconsistency (percent inconsistent and the index of inconsistency) were used. All statistical tests of validity indicated that the data obtained from the NSOPF-93 instrument provided valid measures of respondent gender, race/ethnicity, employment status and academic discipline.

The inconsistency index is defined as "the ratio of [simple response variance] to the total variance of the [characteristic being measured], where 'total variance' includes the variability in the population of the characteristic being measured."[25] The index of inconsistency gives a more accurate reading of data quality than the percent inconsistent, because it adjusts for the prevalence of an attribute in the population. The index is standardized by adjusting for marginal distributions of responses in the two datasets (institution-provided and NSOPF-93 faculty questionnaire data). It is more accurately comparable across different items allowing generalizations about levels of inconsistency observed. Index values of .20 or lower are considered to represent low inconsistency, values between .20 and .50 are considered moderate, and values of .50 and higher are considered to represent high levels of inconsistency.

Exhibits 9-1 to 9-4 report comparisons on four faculty characteristics: gender, full-time/part-time status, discipline and race/ethnicity. In each table, the row variable is the faculty list variable and the column variable is the faculty questionnaire variable. In general, each exhibit shows a high degree of correspondence between faculty list and faculty questionnaire data. The measures of association reported in the tables are generally high (greater than .70)—even for multiple-cell comparisons (e.g., race/ethnicity).

The consistency noted between the faculty list data and faculty questionnaire data equal or exceed the consistency of faculty list and faculty questionnaire data noted in the *1992-93 National Study of Postsecondary Faculty Field Test Report* [NCES 93-390]. For example, faculty list data and faculty questionnaire data for employment status (full-time/ part-time) diverged only in 5.7 percent of the cases in the NSOPF-93 full-scale study, compared to a 8.2 percent of the cases that were inconsistent in the field test data. On the race/ethnicity comparison, faculty list data and faculty questionnaire data results were almost identical, showing agreement between the faculty list and the faculty questionnaire 96.1 percent of the time in the full-scale study compared to 96.6 percent in the field test.

The faculty sampling list showed great accuracy in accounting for the employment status of sampled faculty, with 94.3 percent of faculty self-reports of status matching their institutions' reports. Of the 5.7 percent of cases that did not match, 870 faculty whose institutions identified them as part-timers classified themselves as full-timers. In contrast, 437 faculty whose institutions identified them as full-timers classified themselves as part-timers.

[25]U.S. Bureau of the Census, *Evaluating Censuses of Population and Housing* (Washington, D.C., 1985), p. 70.

Nevertheless, Exhibit 9-2 illustrates higher reporting variability with regard to part-time faculty. Institutions and full-time faculty agreed on their classification of employment status 97.2 percent of the time. In comparison, institutions and part-time faculty agreed on their classification of employment status 88.1 percent of the time.

Although the consistency between faculty list data and faculty questionnaire data is generally high for other variables, a few anomalies can be noted in other tables. For example, 32.4 percent of faculty whose institutions classified them in the "philosophy/religion" disciplines placed themselves in the "non-NEH" fields (Exhibit 9-3). It is possible that faculty members whom institutions identify as teaching in religion departments do not hold religion degrees (e.g. sociologists teaching "Sociology of Religion" courses). These faculty members may have listed their teaching discipline as something other than "religion/religious studies."

Exhibit 9-1: Comparison of faculty list data and faculty questionnaire data, by gender

	Gender (NSOPF-93 faculty questionnaire) (percent of cases)		
Gender (faculty list)	**Male**	**Female**	**Total**
Male	13,475 (98.2)	244 (1.8)	13,719 (56.3)
Female	200 (1.9)	10,443 (98.1)	10,643 (43.7)
Total	13,675 (56.1)	10,687 (43.9)	24,362 (100.0)

Effective Sample Size: 24,362
Frequency Missing: 1,418

Statistic	**DF**	**Value**	**Prob.**
Chi-Square	1	22591.762	.001
Likelihood Ratio Chi-Square	1	28969.580	.001

Phi Coefficient	.963
Contingency Coefficient	.694
Cramers' V	.963

Exhibit 9-2: Comparison of faculty list data and faculty questionnaire data, by full-time/part-time status (percent of cases)

	Status (NSOPF-93 faculty questionnaire)		
Status (faculty list)	**Full-time**	**Part-time**	**Total**
Full-time	15,181 (97.2)	437 (2.8)	15,618 (68.0)
Part-time	870 (11.9)	6,468 (88.1)	7,338 (32.0)
Total	16,051 (69.9)	6,905 (30.1)	22,956 (100.0)

Effective Sample Size: 22,956
Frequency Missing: 2,824

Statistic	**DF**	**Value**	**Prob.**
Chi-Square	1	17290.137	.001
Likelihood Ratio Chi-Square	1	18746.712	.001

Phi Coefficient	.868
Contingency Coefficient	.655
Cramers' V	.868

Exhibit 9-3: Comparison of faculty list data and faculty questionnaire data, by faculty discipline

Discipline (NSOPF-93 faculty questionnaire) (percent of cases)						
Discipline (faculty list)	**Non-NEH**	**History**	**Foreign language**	**English**	**Philosophy/ religion**	**Total**
Non-NEH	18,581 (95.1)	122 (0.6)	128 (0.7)	631 (3.2)	78 (0.4)	19,540 (82.4)
History	136 (17.2)	638 (80.5)	2 (0.3)	11 (1.4)	6 (0.8)	793 (3.3)
Foreign languages	57 (7.0)	6 (0.7)	684 (83.7)	65 (8.0)	5 (0.6)	817 (3.4)
English	167 (8.1)	7 (0.3)	40 (1.9)	1,839 (89.4)	4 (0.2)	2,057 (8.7)
Philosophy/ Religion	166 (32.4)	13 (2.5)	1 (0.2)	5 (1.0)	327 (63.9)	512 (2.2)
Total	19,107 (80.6)	786 (3.3)	855 (3.6)	2,551 (10.8)	420 (1.8)	23,719 (100.0)

Effective Sample Size: 23,719
Frequency Missing: 2,061

Statistic	**DF**	**Value**	**Prob.**
Chi-Square	16	57131.212	.001
Likelihood Ratio Chi-Square	16	20039.422	.001

Phi Coefficient	1.552
Contingency Coefficient	.841
Cramers' V	.776

Exhibit 9-4: Comparison of faculty list data and faculty questionnaire data, by race/ethnicity

Race/Ethnicity (NSOPF-93 faculty questionnaire) (percent of cases)						
Race/ethnicity (faculty list)	**White, non-Hispanic**	**Black, non-Hispanic**	**Hispanic**	**Asian/ Pacific Islander**	**American Indian/ Alaskan Native**	**Total**
White, non-Hispanic	14,769 (98.0)	63 (0.4)	110 (0.7)	73 (0.5)	57 (0.4)	15,072 (78.2)
Black, non-Hispanic	102 (4.9)	1,947 (92.9)	23 (1.1)	19 (0.9)	6 (0.3)	2,097 (10.9)
Hispanic	85 (8.2)	3 (0.3)	892 (86.4)	36 (3.5)	17 (1.7)	1,033 (5.4)
Asian/Pacific Islander	79 (8.0)	8 (0.8)	10 (1.0)	890 (89.6)	6 (0.6)	993 (5.2)
American Indian/ Alaskan Native	38 (48.7)	0 (0.0)	1 (1.3)	9 (11.5)	30 (38.5)	78 (0.4)
Total	15,073 (78.2)	2,021 (10.5)	1,036 (5.4)	1,027 (5.3)	116 (0.6)	19,273 (100.0)

Effective Sample Size: 19,273
Frequency Missing: 6,507

Statistic	**DF**	**Value**	**Prob.**
Chi-Square	16	47902.600	.001
Likelihood Ratio Chi-Square	16	22554.377	.001

Phi Coefficient	1.577
Contingency Coefficient	.844
Cramers' V	.788

The comparison between institution-supplied data and respondent answers on the instrument showed a very high level of consistency. The question ascertaining faculty academic discipline (Question A12) produced the highest level of inconsistency, with about 7 percent of answers failing to match information on institutional records. However, this represented a nearly five-fold improvement in consistency noted on a similar question in the *1992-93 National Study of Postsecondary Faculty Field Test Report* [NCES 93-390]. The lowest level of inconsistency was observed on questions regarding race/ethnicity and gender.

As noted in Exhibit 9-5, the inconsistency index roughly paralleled the patterns observed in the percent inconsistent measure. Inconsistency was lowest on sociodemographic questions (race/ethnicity and gender) and highest on employment-related questions (employment status and discipline). The discipline question showed the highest level of inconsistency (21.4 percent), when measured on this index. This compared to the 6.96 percent figure obtained in the raw percent inconsistent measure, in which faculty discipline also exhibited the highest level of inconsistency. The percentage of consistent cases for principal discipline or

field increased from 69.5 percent on the field test to 93 percent on the full-scale study.

Exhibit 9-5: Comparison of faculty and institution data, NSOPF-93: various measures

Item	Base *n*	Cramer's V	Percent inconsistent	Inconsistency index (standard error)**
Gender	24,362	.963*	1.82	3.70 (.176)
Race/ethnicity	19,273	.788*	3.39	10.41 (.374)
Employment	22,956	.868*	5.69	13.31 (.368)
Discipline	23,719	.776*	6.96	21.4 (.510)

*Significant at .001.
**Standard errors assume simple random sampling.

9.4 An Assessment of Validity for the 1993 Full Scale Study

A look at the cross-tabular distributions of the institution-provided and respondent-provided data suggest the sources of inconsistency (Exhibits 9-1 to 9-4).

Gender. Only a small number of cases, 1.8 percent of the total, showed inconsistency between institution and respondent. This level of inconsistency is probably to be expected from such factors as clerical error or chance.

Race/ethnicity. The greatest source of inconsistency resulted from respondents, identified by their institutions as white, non-Hispanic, identifying themselves as Hispanic, Asian/Pacific Islander, or American Indian/Alaskan Native. Fully 49 percent of self-identified American Indian/Alaskan Natives were classified by their institutions as white, non-Hispanic. However, since these cases of inconsistency total only 1.2 percent of cases in the sample, they have little impact on the overall levels of inconsistency noted in Exhibit 9-5.

Employment Status. Slightly more than 6 percent (6.3 percent) of faculty members who identified themselves as part-time on the survey instruments were classified as full-time faculty by their institution. Likewise, 5.4 percent of institution-classified part-time staff gave their employment status as "full time."

Discipline. The majority of inconsistencies arose when respondents listed their disciplines as one of the four National Endowment for the Humanities-designated disciplines (philosophy/religion, foreign languages, English language and literature, and history) while their institutions listed their disciplines as "non-NEH." Almost one-quarter (24.7 percent) of self-identified English faculty were classified by their institutions as "non-NEH." The comparable figures for other disciplines were as follows: philosophy/religion (18.6 percent), history (15.5 percent), foreign languages (15.0 percent).

All indices reviewed here exhibit much lower levels of inconsistency in the institution-respondent comparison than were observed in the field test report. The much larger sample size for the full-scale study decreased the impact of the small number of inconsistent responses. Moreover, on one comparison (faculty discipline), available data allowed for a comparison on five, rather than 14, discipline choices. Therefore, the decreased inconsistency in the discipline comparison may simply reflect decreased variability in responses due to the decision to restrict the number of disciplines recorded.

9.5 Data Quality and Faculty Population Estimates

Preliminary investigations using the original NSOPF-93 faculty data file produced national faculty population estimates that did not match expectations. As Chapter 10 and Appendix R explain in detail, a recontacting and reconciliation effort was performed to check the accuracy of estimates of the national population of faculty derived from original faculty lists. This reconciliation procedure helped to create "best estimates" of faculty counts at participating NSOPF-93 institutions. The best estimates were then used to establish national population estimates of full-time and part-time faculty.

The two-step process of compiling the original faculty list and confirming "best estimates" in the recontact and reconciliation effort can be likened to a test-retest exercise used in standard reliability studies. Moreover, the establishment through the recontacting effort of the "true value" for the count of faculty at each institution aided in judging the validity of the original faculty list. Exhibit 9-6 presents four statistics for establishing the validity and reliability of the original list. Statistics are presented for all participating institutions in the NSOPF-93 sample and for the subset of reconciled institutions.

To calculate the inconsistency measures (percent inconsistent and aggregate index of inconsistency), which usually apply to categorical data, a four-level scale for the best estimates dataset was created by partitioning the unweighted best estimates for total faculty (a continuous variable) into quartiles. The original list data was then recoded into a similar four-level scale, using the same cutpoints used to partition the best estimates data. This procedure allowed the use of inconsistency measures to validate the original faculty list against the "true values" the best estimates represent. As Exhibit 9-6 illustrates, the original faculty list showed a moderate level of inconsistency compared to the "true" values. However, even this moderate level introduced a divergence from true values and, thus, inaccuracy into estimates of faculty population. Data gathered during the reconciliation effort were used to poststratify national population estimates to the "true" values. Chapter 10 explains reconciliation procedures and post-stratification.

Exhibit 9-6: Measures of reliability and validity (unweighted data)

	Reconciled institutions (*n*=492)	Total institutions (*n*=817)
Mean original LIST (standard error)	771.1 (44.1)	659.1(28.9)
Mean BEST estimate (standard error)	802.7 (42.0)	678.3 (27.8)
Percent inconsistent* (standard error)	26.4 (2.0)	18.4 (1.4)
Index of inconsistency* (standard error)	35.2 (2.7)	24.5 (1.8)

*Based on comparison of institutions assigned to quartiles.

10. Institution Recontact, Best Estimates, and Post-Stratification

10.1 Accuracy of National Population Estimates

In the spring and summer of 1995, exploratory analysis using the NSOPF-93 faculty dataset produced faculty estimates that diverged, in some cases significantly, from expectations. Gaps appeared between faculty counts reported on the faculty list (or sampling frame) and faculty counts that institution administrators reported in the institution questionnaire. Discrepancies were also apparent in the estimates of faculty in the health sciences—though they appeared across other faculty disciplines as well—and in estimates of part-time faculty. Statistical and anecdotal evidence on higher education for the period in question (1987 to 1992) predicted an increase, rather than a decrease, in part-time faculty. Results from the NSOPF-93 institution questionnaire supported this expectation, as Exhibit 10-1 shows. But, as Exhibit 10-1 also demonstrates, weighted national estimates of faculty teaching for-credit courses derived from the original NSOPF-93 faculty dataset showed no change in the distribution of full-time and part-time faculty from the NSOPF-88 faculty dataset. The NSOPF-93 institution questionnaire estimated that part-time instructional faculty and staff accounted for 9 percent more of the total number of instructional faculty in the U.S. than did estimates derived from the original NSOPF-93 faculty dataset. The NSOPF-93 institution questionnaire also estimated that part-time instructional faculty accounted for nearly 5 percent more of the total number of instructional faculty in the U.S. in the fall of 1992 than the NSOPF-88 institution questionnaire reported for the fall of 1987.

Exhibit 10-1: Estimates of total, full-time and part-time faculty teaching for-credit courses from four NSOPF sources (weighted)

	NSOPF-88				NSOPF-93			
	Institution questionnaire		Faculty questionnaire		Institution questionnaire		Original faculty questionnaire	
	Total	Pct.	Total	Pct.	Total	Pct.	Total	Pct.
Total faculty	824,685	100	769,825	100	940,192	100	712,858	100
Full-time faculty	513,663	62.3	515,138	66.9	539,210	57.6	474,788	66.6
Part-time faculty	311,022	37.7	254,687	33.1	400,981	42.4	238,070	33.4

Sources: NSOPF-93 Restricted-use Faculty Data, 1988 and 1993 (1995); Preliminary Delivery of Restricted-use NSOPF-93 Faculty Data File (October 14, 1996); NSOPF-88 Institution Dataset

In the health sciences, estimates of the total number of faculty showed a decline of approximately 48,000 from estimates produced for NSOPF-88, as presented in Exhibit 10-2. A check with the Association of American Medical Colleges (AAMC) and other health sciences professional organizations cast doubt on the accuracy of the NSOPF-93 data. Their data suggested that health sciences faculties had not declined sharply. While the AAMC definitions of faculty do not match NSOPF definitions exactly, the 1994 *AAMC Data Book*

reported that paid faculty (both full-time and part-time) in pre-clinical and clinical sciences in U.S. medical schools increased from 75,156 in 1987-88 to 94,641 in 1992-93.[26]

NSOPF-88 estimated a population of health sciences faculty nearly 54,000 greater than the 1987-88 AAMC estimate. But NSOPF-93 estimated a population of health sciences faculty nearly 14,000 less than the 1992-93 AAMC estimate. In the 1987-88 to 1992-93 period, the NSOPF estimate of the health sciences faculty population declined, while the AAMC estimate of faculty in pre-clinical and clinical sciences increased.

These observations may have indicated a problem in the NSOPF-88 dataset. The difficulty of obtaining and rechecking sampling and weighting datafiles prepared for the 1987 survey forestalled further exploration of that dataset. While the possibility of a problem in NSOPF-88 cannot be ruled out, the fact that the estimates showed a substantial *decline* in 1992-93 health sciences faculty that was unsupported by external sources suggested it was more prudent to begin the investigation with the later cycle of NSOPF.

This chapter discusses the extent of discrepancies in faculty counts in NSOPF-93 and summarizes the procedures used to reconcile discrepancies to calculate "best estimates" of full-time, part-time, and total faculty in the NSOPF-93 faculty dataset.

Exhibit 10-2: Changes in health sciences faculty between NSOPF-88 and NSOPF-93 (weighted)

Principal Fields	NSOPF-88 faculty dataset			NSOPF-93 original faculty dataset		
	Total #	Pct. full-time	Pct. part-time	Total #	Pct. full-time	Pct. part-time
Health technology	8,904	56.6	43.4	10,101	64.2	35.8
Dentistry	9,403	46.0	54.0	5,684	57.9	42.1
Health svc. admin.	1,295	61.8	38.2	1,137	49.9	50.1
Medicine/psychiatry	52,865	83.4	16.6	19,136	80.3	19.7
Nursing	25,902	74.7	26.3	25,573	77.0	23.0
Pharmacy	3,958	72.4	27.6	2,215	78.3	21.7
Public health	7,301	63.7	36.3	2,554	77.3	22.7
Veterinary medicine	2,816	97.9	2.1	1,994	85.2	14.8
Other health sciences	16,567	61.1	38.9	12,522	68.9	31.1
ALL HEALTH SCIENCES	129,011	72.7	27.3	80,916	73.5	26.5

[26]Table C1, "Number of Full-Time, Part-Time, and Volunteer Faculty in U.S. Medical Schools," *AAMC Data Book* (Washington, D.C.: Association of American Medical Colleges, 1994). The AAMC data report faculty in U.S. medical schools. NSOPF tracks health sciences faculty at postsecondary institutions, whether or not they work in medical schools.

10.2 Discrepancies in Faculty Counts[27]

Estimates of the total number of faculty in the target population were based on reports from two different sources within the same sampled institutions. One of these sources was the faculty lists provided by the participating institutions for sampling purposes (hereafter, referred to as "LIST"). Another source was the institutional representatives' survey responses to the NSOPF-93 institution questionnaire (hereafter, referred to as "QUEX") regarding the number of faculty in these same institutions. A third source of validation, the National Center for Education Statistics' Integrated Postsecondary Education Data System (hereafter referred to as "IPEDS"[28]), provided a benchmark by which to check faculty estimates from the other two sources. The study intended to enumerate eligible faculty employed in the academic term including October 15, 1992.

Discrepancies in faculty estimates from the three sources (LIST, QUEX, and IPEDS) were to some extent inevitable because of variations in definitions used by IPEDS and the two NSOPF-93 sources. NSOPF-93 used a broader and more inclusive definition of postsecondary faculty than IPEDS uses. See the discussion on comparisons between NSOPF and IPEDS in section 3.10 and in Appendix R, section 1.2. Moreover, postsecondary institutions use different data systems to account for faculty. To check the quality of the faculty lists during the 1992 list collection effort, discrepancies between the numbers of total faculty enumerated among these three sources were monitored. This institution-level comparison of unweighted data found that faculty counts from the LIST and QUEX data generally exceeded those reported on IPEDS. This pattern was in the anticipated direction, indicating that the original listing operation accounted for a greater number of faculty than institutions reported in the 1991-92 IPEDS (the most current data available when the study was fielded). Exhibit 10-3 summarizes the total number of faculty enumerated on these datasets.

[27]The analysis presented here concentrates on the discrepancy in faculty counts between those reported on the faculty list provided for sampling purposes and those reported on the NSOPF-93 institution questionnaire. For a more detailed discussion of the discrepancy analysis and of the recontacting effort, see Appendix R: *Technical Report: Discrepancies in Faculty Estimates in the 1992-93 National Study of Postsecondary Faculty***.**

[28]The National Center for Education Statistics (NCES) coordinates with the Equal Employment Opportunity Commission (EEOC) to obtain biennial data (such as race, gender, salary levels, job classifications, etc.) from postsecondary institutions on their employees. NCES publishes these data in its Integrated Postsecondary Education Data System (IPEDS).

Exhibit 10-3: NSOPF counts of total faculty (unweighted) by source and year

(LIST-IPEDS) Comparison	Faculty Counts (Matched Observations*)	
	NSOPF-88	**NSOPF-93**
LIST	232,618 (*n*=410)	490,935 (*n*=718)
IPEDS	231,376 (*n*=410)	419,903 (*n*=718)
(QUEX-LIST) Comparison		
QUEX	236,121 (*n*=410)	495,235 (*n*=760)
LIST	232,618 (*n*=410)	477,692 (*n*=760)
(QUEX-IPEDS) Comparison		
QUEX	236,121 (*n*=410)	484,611 (*n*=746)
IPEDS	231,376 (*n*=410)	405,636 (*n*=746)

* The numbers under the faculty counts represent the number of "matched" institutions, i.e. institutions which provided data from both sources. For example, in the NSOPF-93 QUEX/IPEDS comparison, 746 institutions had both QUEX and IPEDS data available for comparison.

Later comparisons[29] of QUEX counts with both IPEDS and LIST counts revealed that the QUEX counts consistently exceeded those reported on the other two sources. This analysis concentrates on the QUEX/LIST comparison, because the definitions of faculty used for both sources were identical. A comparison of faculty lists and institution questionnaires should indicate whether institutions accounted for the same faculty populations on their faculty lists and on their institution questionnaires.

Faculty lists furnished counts for total faculty, full-time faculty, and part-time faculty. The institution questionnaire reported separate counts of each of four types of faculty in the institution: full-time instructional faculty, full-time non-instructional faculty, part-time instructional faculty, and part-time non-instructional faculty. For the discrepancy analysis, institution questionnaire (i.e., QUEX) counts for full-time and part-time faculty were derived by adding together instructional and non-instructional faculty for each type of employment status (i.e., full-time, part-time). Then total faculty counts were derived by adding together QUEX counts for full-time and part-time faculty.

The analysis identified institutions with QUEX/LIST discrepancies of 10 percent or more in their total faculty counts by calculating the percentage discrepancy between LIST totals and QUEX totals [specifically, 100(QUEX-LIST)/LIST] for each institution. Negative discrepancies signified that LIST

[29]Because data collection for the institution questionnaire began after the first faculty lists were received and concluded after the last faculty list was received, discrepancies between these two sources of faculty counts (i.e., discrepancies between QUEX and LIST) could not be assessed during the faculty list collection process. Moreover, fewer than one-half of the individuals named as respondents to the institution questionnaire were the same individuals who oversaw preparation of faculty sampling lists.

counts exceeded QUEX counts. Positive discrepancies signified the opposite, that is, that QUEX counts exceeded LIST counts. A total of 450 of 760 institutions (or 59 percent) for which total faculty data for *both* QUEX and LIST were available (i.e., "matched observations") had discrepancies of 10 percent or more.

To identify systematic sources of discrepancies in faculty counts between questionnaire data and faculty lists, a number of institutional characteristics were considered. These were: size (smaller or larger number of faculty members than the median), control (public or private), type (two-year versus four-year), and stratum. Exhibit 10-4 presents paired t-tests in faculty estimates for small and large institutions, for public and private institutions and for two-year and four-year institutions. Exhibit 10-5 presents the results of paired t-tests for institutions in different sampling strata. If there is no difference between QUEX and LIST (i.e., the null hypothesis), the institution's discrepancy is equal to zero. These t-tests indicate whether the mean difference between faculty counts provided on the institution questionnaire and the number of faculty enumerated on the faculty list are significantly different from zero.

Institution size. Institutions were divided into "small" and "large" at the median LIST count of 363 faculty members. The analysis found significant differences between small and large institutions in the QUEX/LIST comparison. Smaller institutions tended to provide higher faculty counts on the NSOPF-93 institution questionnaire than they did on the faculty list. Conversely, larger institutions tended to provide lower faculty estimates on the institution questionnaire than they did on the faculty list. On average, smaller institutions reported 68 more faculty members on their institution questionnaires than on their sampling lists. This difference was the only one which met a significance level of p=.05. The observation that larger institutions tended to report 23 fewer faculty members on their institution questionnaires than on their lists, was not statistically significant.

Control. The direction of the sign for the mean difference suggests that private institutions tended to account for larger numbers of faculty members on their sampling lists than did public institutions. However, the public/private control dimension was not a statistically significant predictor of the magnitude of differences between LIST and QUEX.

Type. Discrepancies for four-year institutions were negligible, with the mean faculty counts from the institution questionnaire exceeding those on the faculty lists by only 1.8 percent (calculation of mean percent differences are not shown). For the two-year institutions in the sample, however, the mean discrepancy of 40.9 indicated that two-year institutions reported a greater number of faculty members on their questionnaires than on their lists, perhaps reflecting their greater reliance on a more transient population of temporary and part-time faculty. Still, the mean difference for two-year institutions was not significant at the .05 level.

Exhibit 10-4: Discrepancies by institution characteristics: size, type and control mean differences (matched pairs t-tests), fall 1992

Comparison	**Institution questionnaire—faculty list (QUEX - LIST)**		
Institution characteristic	***n***	**Mean difference (standard error)****	**Probability**
Size			
Small	382	68.3 (12.1)[a]	.00
Large	378	-22.6 (31.3)	.47
Control			
Public	529	38.2 (22.4)	.08
Private	231	-11.5 (20.7)	.58
Type			
Two-year	267	40.9 (23.2)	.08
Four-year	493	13.4 (22.7)	.55

[a]Significant at .05.
**Standard errors assume simple random sampling.

NOTE: "Large" and "small" institutions are divided at the median faculty count of 363 faculty members in the LIST count.

Sampling Stratum. Paired t-tests were conducted on institutions classified into the 15 sampling strata described in Chapter 3. Public two-year institutions stood out. Discrepancies calculated for these institutions (a mean discrepancy of 45.7 for public two-year institutions) came closest to registering a significant difference.

Exhibit 10-5: Discrepancies by sampling stratum mean differences (matched pairs t-tests), fall 1992

Sampling stratum	Institution questionnaire € faculty list (QUEX € LIST)		
	n	**Mean difference (standard error)***	**Probability**
Private, other Ph.D.	37	11.3 (48.4)	.82
Public comprehensive	131	17.0 (24.7)	.49
Private comprehensive	62	35.2 (28.3)	.22
Public liberal arts	2	968.5 (968.5)	.5
Private liberal arts	58	-8.3 (5.4)	.13
Public medical	18	11.5 (249.8)	.96
Private medical	9	-454.9 (354.9)	.24
Private religious	14	-4.5 (5.7)	.45
Public two-year	248	45.7 (24.9)	.07
Private two-year	8	16 (13.8)	.29
Public other	6	85.7 (80.4)	.34
Private other	12	53.3 (51.3)	.32
Public unknown	17	-16.0 (32.3)	.63
Private unknown	5	94.6 (104.5)	.42
Research/public, other Ph.D.	133	-17.9 (64.5)	.78
TOTAL	760	23.1 (16.8)	.17

*Standard errors assume simple random sampling.

These observations provide some evidence for the hypothesis that some institutions' faculty lists, specifically those of smaller and two-year institutions, do not account for all the faculty members reported on the institution questionnaire. There may be several reasons for this phenomenon. Smaller institutions are more likely to rely on part-time faculty—who are less likely to be accounted for on institution records—than larger institutions. Public two-year institutions employ the highest number of part-time faculty of all types of institutions in the NSOPF-93 sample. Almost one-half (48 percent) of all part-time instructional faculty and staff work for public two-year institutions, according to the 1993 National Study of Postsecondary Faculty, *Institutional Policies and Practices Regarding Faculty in Higher Education* [NCES 97-080]. Smaller institutions are also less likely than large institutions to have sophisticated personnel databases or institutional research offices. These characteristics of smaller and two-year institutions could account for the fact that these institutions listed fewer faculty on their sampling lists than they reported on their institution questionnaire.

Exhibit 10-6 profiles the 760 matched institutions and the 100 institutions that possessed the largest discrepancies (expressed in percentage terms). The exhibit illustrates the significance of smaller, two-year institutions in contributing to the problem of discrepancies noted above. While public two-year institutions represent about one-third of the 760 matched institutions, they represent slightly less than one-half of the institutions (46 percent) with the largest discrepancies. Nearly nine of 10 institutions with the greatest discrepancies listed fewer faculty members on their faculty lists than on their institution questionnaires. In comparison, 55.5 percent of matched institutions showed a similar pattern.

While this analysis suggests that some institutional variables are associated with significant discrepancies (particularly size), most were found not to be significant at €=.05 level. Yet the mean differences reported in Exhibits 10-4 and 10-5 can understate the impact of discrepancies on the institution level. The large standard errors reported in the tables indicate the wide variation in discrepancies at the institution level. Institution-level discrepancies expressed in percentage terms ranged from -86.2 percent to 1,827.4 percent. Validity studies of item-level response on surveys have noted that "Because of the possibility of compensating errors in the data, an acceptable aggregate-level comparison is not necessarily associated with high individual-level accuracy."[30]

Exhibit 10-6: A comparison of matched institutions and the 100 institutions with the largest discrepancies (unweighted frequencies)

Characteristic	Matched institutions (*n*=760) (percent)	Largest discrepancies (*n*=100) (percent)
Sampling stratum		
Private, other Ph.D.	4.9	6.0
Public comprehensive	17.2	9.0
Private comprehensive	8.2	11.0
Public liberal arts	.3	1.0
Private liberal arts	7.6	0.0
Public medical	2.4	5.0
Private medical	1.2	2.0
Private religious	1.8	2.0
Public two-year	32.6	46.0
Private two-year	1.1	2.0
Public other	.8	1.0
Private other	1.6	3.0
Public unknown	2.2	3.0
Private unknown	.7	1.0
Research/public, other Ph.D.	17.5	8.0
Size		
Small (Less than 363 faculty)	50.3	70.0
Large (363 faculty or more)	49.7	30.0
LIST/QUEX comparison		
LIST > QUEX	42.1	11.0
QUEX = LIST	2.4	0.0
QUEX > LIST	55.5	89.0

[30]E.J. Wentland and K.W. Smith, *Survey Responses: An Evaluation of Their Validity* (San Diego: Academic Press, Inc., 1993), pp. 124-125.

10.3 Obtaining Verification from Institutions

To determine which faculty counts more accurately reflected institutions' "true" population estimates, a large subset of institutions were recontacted. Institutions that showed a difference of 10 percent or greater between their QUEX faculty totals and their LIST faculty totals were selected. As mentioned earlier, 450 of the 760 "matched" institutions[31] (59 percent) showed a discrepancy of 10 percent or more between the institution questionnaire and the faculty list. Moreover, to document institutions' accounting for their health sciences faculty, all 120 institutions which NCES identified as operating medical schools or hospitals were also included in the recontacting effort. Of those 120 institutions, 61 were already included among the 450 institutions with discrepancies of 10 percent or greater.

The objective in recontact was to determine which set of faculty counts was correct (QUEX, LIST or, in some instances, a third set of counts), and to determine the reasons for the original reporting discrepancies. In telephone follow-up calls, institution administrators were presented with QUEX and LIST figures and asked to choose which of the two most accurately reflected the true population estimate of their faculty in the fall term of 1992. In most cases, administrators were able to choose either the QUEX or the LIST figure. However, in some cases, administrators supplied a different set of estimates.

Of the total of 509 institutions selected for recontact, verification was obtained for 492 (or 96.7 percent) of the institutions. A total of 402 (81.7 percent) of the institutions reported, at a minimum, which set of counts—those from the faculty sampling list or those from the institution questionnaire—provided the most accurate faculty estimates. In 280 of the 492 (56.9 percent) cases, institutions reported that the institution questionnaire data provided the most accurate faculty estimates.

One hundred twenty-two (24.8 percent) institutions reported that the faculty list they supplied for sampling purposes (i.e., LIST) provided the most accurate accounting of their faculty and instructional staff population. Only 56 of the 492 institutions (11.4 percent) provided an entirely different set of estimates that did not correspond either to the list or to the questionnaire estimates originally submitted. Five institutions (1 percent)—all institutions operating medical schools or hospitals—chose IPEDS as their best estimate. The remaining 29 institutions (5.9 percent) were unable to provide a definitive rationale for changing their original LIST estimates. For these, the original LIST estimate was used to derive best estimates.
Exhibit 10-7 illustrates the results of the recontacting effort for the 492 institutions providing verified data.

[31]Although 817 institutions provided faculty enumerations in the NSOPF-93 full-scale study, only 760 (93 percent) of this total had matched data available (i.e., also completed an institution questionnaire).

Exhibit 10-7: Sources for verified estimates from reconciliation effort, fall 1992 (*n*=492)

Source for verified estimate	Number of institutions	Percentage of responses
QUEX correct	280	56.9
LIST correct	122	24.8
Neither LIST nor QUEX correct, new data provided	56	11.4
Institution unable to choose, LIST estimate accepted	29	5.9
Other source (i.e., IPEDS) correct	5	1.0

Institutions were allowed to offer as many as three explanations for the discrepancies between their LIST and QUEX estimates. Exhibit 10-8 reports the frequencies of the first- and second- most common explanations institutions offered for these discrepancies. Data for the third most common explanation are not reported, as they represented only 11 institutions.

The most commonly cited reason for discrepancies was the omission of some part-time or full-time faculty from the faculty list provided for sampling. Of institutions that were able to provide an explanation for the discrepancies, nearly one-fifth of them (19.3 percent) reported that some part-time or adjunct faculty were excluded from their list. For institutions that offered at least two reasons for the discrepancy, 12.2 percent of them reported that they excluded some full-time faculty from the original faculty list. The 12.2 percent figure is somewhat deceptive, however, because if institutions that either offered no reason for the discrepancy or that offered no second reason for the discrepancy are omitted, then almost half of the remaining institutions (49.7 percent) reported as their second reason the exclusion of some full-time faculty. These explanations accord with the general pattern of institution acceptance of QUEX estimates as the most reliable estimate for total faculty. Yet, it is also important to point out that 159 reconciled institutions refused or were unable to provide a specific reason for the discrepancies. However, as will be demonstrated later in this chapter, the verified data from these institutions had little impact on the calculation of best estimates.

Another factor in the discrepancies was the time interval (in some instances a year or more) between the time the faculty list was compiled and the time the questionnaire was completed. Therefore, the list did not always include new hires for the fall term. In fact, for institutions that provided an explicit explanation, 10.8 percent of them attributed their discrepancy to the fact that the faculty list they compiled and the institution questionnaire they completed were based on data collected during different academic terms. The retrieval and verification effort indicated that some institutions excluded their medical schools from their lists of faculty, preferring to consider them as separate institutions. This resulted in sizable discrepancies at two major institutions, which included medical school faculty in one set of estimates, but not in the other. Nevertheless, systematic exclusion of medical faculty did not seem to account for the 1987-1992 decline in health sciences faculty noted in the original estimates. Downsizing affected faculty counts at several institutions, although this explanation accounted for only about 2 to 3 percent of discrepancies.

Exhibit 10-8: Explanations institutions gave for discrepancies between LIST and QUEX, fall 1992 (*n*=492) (unweighted frequencies)

Explanation	1st reason (percent cited)	2nd reason (percent cited)
Different academic base years for LIST & QUEX	1.6	—
Different academic terms used for LIST & QUEX	10.8	—
Layoffs or downsizing	1.6	0.2
All part-time or adjunct faculty excluded from LIST	4.3	0.2
All part-time or adjunct faculty excluded from QUEX	1.6	—
Some part-time or adjunct faculty excluded from LIST	19.3	1.8
Some part-time or adjunct faculty excluded from QUEX	4.7	1.8
Some full-time faculty excluded from LIST	2.4	12.2
Some full-time faculty excluded from QUEX	0.8	2.2
Higher QUEX figure is an aggregate of all campuses	3.3	—
Higher LIST figure is an aggregate of all campuses	1.2	0.2
Medical school excluded from LIST	0.4	0.2
Medical school excluded from QUEX	0.6	0.8
Unpaid/Honorary faculty excluded	1.2	—
Ineligible faculty included in error	4.7	0.4
Data entry error by institution	2.0	0.4
Different definitions of full-time faculty used for LIST & QUEX	2.2	0.8
Different definitions of part-time faculty used for LIST & QUEX	1.6	1.8
FTEs used instead of headcount	0.6	—
Other	2.6	1.2
Refusal/no explanation given/no answer	32.3	75.6

The reconciliation effort uncovered an unanticipated explanation for discrepancies. Three institutions provided "full-time equivalents" (FTEs) on the institution questionnaire rather than the actual headcount of part-time faculty. Because the number of part-time instructional faculty an institution employs is a sensitive issue at some campuses, some institutions may prefer to report FTEs rather than individuals employed.

In some instances in which part-time faculty were over reported (on either the faculty sampling list or on the institution questionnaire) the reason involved confusion between the pool of part-time or temporary staff employed by, or available to, the institution during the course of the academic year, and the number actually employed during the fall term.

10.4 Deriving Unweighted "Best Estimates" of NSOPF-93 Faculty

Using the original faculty list data and the data gathered during the reconciliation effort, a "best estimate" of the number of total, full-time and part-time faculty was created for each of the 817 institutions whose faculty members participated in the NSOPF-93 faculty survey. "Best estimates" were defined as each institution's estimate of the faculty population for the 1992 fall term defined by: 1) an estimate verified in the reconciliation and recontact process; or 2) or the original list estimate, if no other verified estimate was available. Procedures for deriving best estimates for total faculty, full-time faculty and part-time faculty are described below.

Total Faculty

The method for calculating best estimates for total faculty at each institution began with the substitution of verified data from the 492 recontacted institutions. Verified data were defined as institution confirmation that either the original list data or the institution questionnaire data were correct or that neither count was correct, and new counts were provided. If the institution verified the QUEX data as a more accurate estimate, the verified QUEX data was substituted for the original list data. If the institution provided a different set of estimates, these new estimates were treated as verified data and substituted for original list data. If an institution verified its original list data, or was unable to confirm LIST or QUEX data or provide new estimates, then the original faculty list total was considered verified data.

The reconciliation effort was able to eliminate ineligible faculty from institution-level totals. This happened when recontacted institutions reported that original faculty lists included ineligible faculty. Twenty-three institutions (4.7 percent) reported that they had included ineligible faculty on their original faculty lists. These institutions' final "best estimate" faculty count reflected the removal of ineligible faculty. In calculating best estimates, it was assumed that all verified faculty counts consisted of eligible faculty only.

Four-hundred and ninety-two institutions provided verified data. Additionally, 16 institutions that had 10 percent or greater LIST/QUEX discrepancies were nonrespondents during reconciliation. Best estimates for these 16 institutions were derived by multiplying the original faculty list data by a ratio adjuster, R_L, defined by:

$$R_L \quad \frac{(VERIFIED\ \ DATA)}{(ORIGINAL\ \ LIST\ \ DATA)} \quad \frac{394943}{379402} \quad 1.04096.$$

Calculation of ratio R_L used data from all 492 reconciled institutions.

Faculty lists were provided by 817 institutions. For the 308 institutions not selected for recontact, and one nonresponding institution in the recontacting effort whose QUEX/LIST discrepancy was less than 10 percent, faculty totals reported on the original faculty lists were used for the best estimate of total faculty.

Full-Time Faculty

Although data for the total number of faculty were available for all 817 institutions, some institutions did not break down their totals into full-time and part-time faculty. A series of steps taken in order, or an "imputation hierarchy," was used to impute "best estimates" of full-time faculty from external sources—data supplied during the reconciliation effort, the faculty list supplied for sampling purposes, or the NSOPF-93 institution questionnaire.

The imputation hierarchy for the 492 verified institutions was:

1. Use verified full-time faculty data, if available

2. Else, use original full-time faculty list data, if available

3. Else, use reported data on full-time faculty from the institution questionnaire, if available

4. Else, use imputed data on full-time faculty from the institution questionnaire

5. For all remaining institutions, multiply the best estimate of the institution's total faculty by the ratio of full-time faculty to total faculty computed over all institutions for which verified or list data are available. The result of this calculation was a ratio adjustment factor of .64202**.**

For the 16 ratio-adjusted institutions, the imputation hierarchy was:

1. Use verified full-time faculty data, if available

2. Else, use original full-time faculty list data, if available × R_L

3. Else, use reported data on full-time faculty from the institution questionnaire, if available × R_Q

4. Else, use imputed data on full-time faculty from the institution questionnaire, if available × R_Q

5. For all remaining cases, multiply the best estimate of the institution's total faculty by the ratio of full-time faculty to total faculty.

The ratios used in these steps are R_L, the ratio described above, and R_Q, a ratio using unweighted data represented in the following equation:

$$R_Q \quad \frac{(VERIFIED\ \ DATA)}{(INSTITUTION\ \ QUEX\ \ DATA)} \quad \frac{358181}{357584} \quad 1.00166$$

Calculation of ratio R_Q used data from the 476 reconciled institutions with available reported institution questionnaire data. No imputed data were used to calculate this ratio.

The imputation hierarchy for the 309 remaining institutions was:

1. Use original full-time faculty list data, if available

2. Else, use reported data on full-time faculty from the institution questionnaire, if available

3. Else, use imputed data on full-time faculty from the institution questionnaire, if available

4. For all remaining institutions, multiply the best estimate of the institution's total faculty by the ratio of full-time faculty to total faculty.

In summary, four data sources were used to derive best estimates of full-time faculty. A total of 481 cases used verified data; 307 cases used original list data; 12 cases used reported institution questionnaire data. Finally, 17 cases were assigned a best estimate for full-time faculty derived by multiplying the institution's best estimate of total faculty by the ratio adjustment factor of .64202. No imputed institution questionnaire data were used to create best estimates for full-time faculty because no cases met the selection criteria for that treatment.

Part-Time Faculty

Best estimates of part-time faculty were calculated simply by subtracting the best estimate of full-time faculty from the best estimate of total faculty at each institution.

10.5 The Impact of the "Best Estimates"

The recontacting and verification effort increased the unweighted total number of faculty enumerated by 15,541. When these best estimates were weighted by the first-stage institution weight for institutions that provided faculty sampling lists, they produced an increase in the estimate of total faculty population in the 492 reconciled institutions of 54,298 faculty members nationwide. Exhibit 10-9 illustrates this increase. It shows the difference between weighed estimates of total faculty from the original faculty list and weighted estimates of total faculty calculated from the "best estimates" based on the verified data for all reconciled institutions. Moreover, differences in weighted estimates are crossed with the explanations institutions provided for their discrepancies. The figures cited in the column marked "institutions" are the weighted frequencies of figures cited under "1st reason" in Exhibit 10-8. Therefore, Exhibit 10-9 provides a graphic illustration of the relative importance of each explanation to the increase or decrease in the faculty population for the reconciled institutions.

By far, the most significant contribution to this increase in total faculty came from those institutions that reported they had failed to enumerate some part-time or adjunct faculty on their original faculty lists. As the exhibit illustrates, these institutions accounted for an increase of 37,183 faculty members in the national faculty population estimate. The institutions that reported they had excluded all part-time faculty from their original lists contributed an additional estimated 14,544 faculty members to the weighted total.

The reconciliation effort also called attention to institutions that included ineligible faculty on their original faculty lists. Almost 6 percent of institutions reported that they included ineligible faculty on either the list or the questionnaire. As a result, these institutions lowered their "best estimate" of total faculty, producing a drop in weighted population estimates for these institutions of 6,167 faculty members. Definitional problems—accounting for different populations of full-time faculty on the list and on the institution questionnaire—meant that, for 2.4 percent of the institutions, the original list included ineligible faculty. The best estimate correction lowered the national population estimate derived from these institutions by

4,475. An almost identical number of faculty (4,514) were dropped from total population estimates due to institution downsizing.

Even more striking were the institutions that explained their discrepancy by reporting that unpaid or honorary faculty were excluded from either their institution questionnaire or their faculty list. Although these institutions accounted for fewer than 1 percent of the weighted total number of reconciled institutions, they accounted for subtraction of an estimate of 9,597 faculty members from the original faculty list. These institutions tended to depend on large numbers of faculty employed by other institutions, such as hospitals or the military. Future cycles of NSOPF-93 will need to take special cases, such as these institutions, into account when describing faculty eligibility rules for institution list preparers.

More than one in four institutions (29.7 percent, weighted) could not supply an explanation for the discrepancy. However, these institutions accounted for a weighted estimate of only 3,206 faculty members toward the net increase of 54,298 in faculty population estimated.

Exhibit 10-9: Difference between verified data and original faculty list by first reason for discrepancy, fall 1992 (weighted data)

Explanation	Institutions	Increase or decrease in faculty population estimate (national)	
	Percent	Number of faculty	Percent
Different academic base years for LIST & QUEX	1.7	505	0.9
Different academic terms used for LIST & QUEX	10.9	4,637	8.5
Layoffs or downsizing	2.5	-4,514	-8.3
All part-time or adjunct faculty excluded from LIST	3.3	14,544	26.8
All part-time or adjunct faculty excluded from QUEX	1.3	-15	0.0
Some part-time or adjunct faculty excluded from LIST	21.7	37,183	68.5
Some part-time or adjunct faculty excluded from QUEX	5.5	-538	-1.0
Some full-time faculty excluded from LIST	2.6	3,255	6.0
Some full-time faculty excluded from QUEX	1.0	396	0.7
Higher QUEX figure is an aggregate of all campuses	3.3	9,934	18.3
Higher LIST figure is an aggregate of all campuses	0.7	494	0.9
Medical school excluded from LIST	0.1	1,742	3.2
Medical school excluded from QUEX	0.2	0	0.0
Unpaid/Honorary faculty excluded	0.5	-9,597	-17.7
Ineligible faculty included in error	5.7	-6,167	-11.4
Data entry error by institution	2.3	82	0.2
Different definitions of full-time faculty used for LIST & QUEX	2.4	-4,475	-8.2
Different definitions of part-time faculty used for LIST & QUEX	1.5	308	0.6
FTEs used instead of headcount	0.3	0	0.0
Other	2.5	3,319	6.1
Refusal/no explanation given	29.7	3,206	5.9
Summary	**100.0**	**54,298**	**100.0**

10.6 Poststratification to Best Estimates

The procedures outlined in section 10.5 allowed best estimates to be calculated for total, full-time and part-time faculty for each of the 817 institutions whose faculty members responded to the NSOPF-93 faculty questionnaire. Weighting these best estimates by the first-stage institution weight produced the national population estimates reported in Exhibit 10-10.

Following the available “best” estimates, the poststratification adjustment was determined separately for full-time and part-time faculty within each of 15 institution sampling strata. A deeper poststratification defined by instructional/non-instructional status was considered, but after investigation, determined that

the sample sizes were too small to support this additional poststratification. Chapter 3 provides a technical description of the final poststratification adjustment.

Poststratification to the best estimates alleviated much of the discrepancy between the national faculty population estimates produced from the NSOPF-93 institution questionnaire and those produced from the NSOPF-93 faculty questionnaire. More importantly, the best estimates increased the number of part-time faculty for whom the faculty questionnaire accounted. Exhibit 10-11 compares totals and proportions for total, full-time and part-time instructional faculty derived from the NSOPF-88 faculty questionnaire, the NSOPF-93 institution questionnaire and the revised NSOPF–93 faculty questionnaire. The proportions of full-time and part-time instructional faculty derived from the best estimates nearly matched the proportions derived from the NSOPF-93 institution questionnaire and more closely matched expectations for national faculty population estimates. A comparison of totals and proportions reported in Exhibit 10-11 with those reported in Exhibit 10-1 demonstrates the impact of the post-stratification on estimates of total, full-time and part-time instructional faculty.

Exhibit 10-10: NSOPF-93 faculty questionnaire best estimates*

Stratum	**Total faculty**		
	Total	**Full-time**	**Part-time**
TOTAL	1,033,966	598,232	435,735
Private, other Ph.D.	33,494	19,099	14,395
Public comprehensive	151,839	101,238	50,601
Private comprehensive	79,228	40,746	38,481
Public liberal arts	3,240	1,974	1,265
Private liberal arts	63,785	41,997	21,788
Public medical	25,110	17,327	7,783
Private medical	15,540	10,524	5,015
Private religious	7,129	4,398	2,731
Public two-year	303,272	112,538	190,735
Private two-year	11,646	4,667	6,979
Public other	9,196	6,855	2,341
Private other	19,814	8,992	10,821
Public unknown	17,556	6,981	10,575
Private unknown	11,015	6,748	4,267
Research /public, other Ph.D.	282,105	214,147	67,958

*Because of rounding, best estimates of full-time and part-time faculty do not sum to best estimates of total faculty.

Exhibit 10-11: Estimates of total, full-time and part-time faculty teaching for-credit courses from four NSOPF sources

	NSOPF -88				NSOPF-93			
	Institution questionnaire		Faculty questionnaire		Institution questionnaire		Revised faculty questionnaire	
	Total	Pct.	Total	Pct.	Total	Pct.	Total	Pct.
Total faculty	824,685	100	769,825	100	940,192	100	821,700	100
Full-time faculty	513,663	62.3	515,138	66.9	539,210	57.6	478,458	58.2
Part-time faculty	311,022	37.7	254,687	33.1	400,981	42.4	343,242	41.8

10.7 Comparability Issues Regarding NSOPF-93 Faculty Questionnaire Data

10.7.1 Definition of Instructional Faculty

As discussed in Chapter 1, NSOPF-93 and NSOPF-88 defined slightly different target populations. Unlike NSOPF-88, NSOPF-93 included noninstructional faculty. Therefore, to compare similar populations between the two NSOPF rounds requires comparing instructional faculty only.

Analysts wishing to compare NSOPF-93 questionnaire data for instructional faculty with NSOPF-88 questionnaire data for instructional faculty should consider comparing the entire sample of 1988 faculty with the subset of the 1993 faculty who responded "yes" to Question 1, and then responded in Question 1A that "all" or "some of [their] instructional duties related to credit courses or advising or supervising academic activities for credit." These questions are almost identical to the first two questions on the NSOPF-88 faculty questionnaire. This definition of instructional faculty selects approximately 90 percent of the NSOPF-93 sample for analysis. The proportion of total faculty that instructional faculty represents is consistent with that reported on the institution questionnaire (see Table 2.3 of *Institutional Policies and Practices* [NCES 97-080]). The most efficient way to select these faculty from NSOPF-93 is to use the derived variable X01_1, selecting cases where X01_1=1. X01_1 has been created to flag the faculty members meeting the two conditions discussed above: those who responded "yes" to Question 1, and responded in Question 1a that "all" or "some of [their] instructional duties were related to credit courses or advising or supervising academic activities for credit."

However, comparisons based on this variable should still be made cautiously. The respondents who received questionnaires in the two rounds were very different. For NSOPF-88, instructions to institutions that supplied faculty lists used for sampling asked that only the names of instructional faculty be supplied. For NSOPF-93, a listing of all faculty was requested. Thus, for NSOPF-88, each institution was allowed to make its own decision about which faculty members belonged in the sample, thereby creating a situation that does not allow subsequent researchers to precisely match the *de facto* sample definition used by institutions in NSOPF-88.

A look at the distribution of faculty across institution types (defined by the modified NSOPF-88 stratification variable, X02_0) indicates that the selection criteria described above yield comparable faculty population estimates. Exhibit 10-12 compares the numbers of faculty in 1988 and in 1993. Exhibit 10-13 compares the percentage distribution of faculty in each institutional stratum in 1988 and in 1993. The percentages are not very different across the two years, although a larger proportion of faculty in two-year

institutions in 1993 is observed.

Exhibit 10-12: Number of instructional faculty (X01_1=1), by modified NSOPF-88 stratum

	All		Full-time		Part-time	
	NSOPF-88	NSOPF-93	NSOPF-88	NSOPF-93	NSOPF-88	NSOPF-93
Public research	119,334	132,717	102,150	107,358	17,184	25,359
Private research	53,120	49,423	41,593	32,164	11,527	17,259
Public doctoral	67,678	73,570	56,308	52,808	11,370	20,762
Private doctoral	39,793	46,699	25,070	28,684	14,723	18,015
Public comprehensive	130,341	141,533	97,104	94,477	33,237	47,056
Private comprehensive	60,457	75,085	36,818	38,561	23,639	36,524
Private liberal arts	55,391	58,961	38,441	38,052	16,950	20,909
Public two-year	200,663	276,292	96,118	109,957	104,545	166,335
Other	43,047	50,654	21,524	26,200	21,524	24,454
All	769,824	904,934	515,125	528,261	254,699	376,673

Exhibit 10-13: Percent of instructional faculty by institution type (X01_1=1), by modified NSOPF-88 stratum

	All		Full-time		Part-time	
	NSOPF-88	NSOPF-93	NSOPF-88	NSOPF-93	NSOPF-88	NSOPF-93
Public research	16	15	20	20	7	7
Private research	7	5	8	6	5	5
Public doctoral	9	8	11	10	4	6
Private doctoral	5	5	5	5	6	5
Public comprehensive	17	16	19	18	13	12
Private comprehensive	8	8	7	7	9	10
Private liberal arts	7	7	7	7	7	6
Public two-year	26	31	19	21	41	44
Other	6	6	4	5	8	6

10.7.2 Comparison of NSOPF-93 with Other Survey Data

A comparison of NSOPF-93 data with data from the American Association of University Professors and from IPEDS confirmed that the revised faculty dataset provides valid estimates. The AAUP[32] methodology differs from that of NSOPF. AAUP collects aggregate information from over 2,000 colleges and universities. However, due to the large sample, its data provide a point of comparison. To enable comparison between the two datasets, faculty at medical schools and part-time faculty were excluded from the NSOPF-93 data. Also

[32]For a description of the survey, see "Treading water: the annual report of the economic status of the profession, 1992-93" in *Academe*, March-April 1993, pages 8-33

the "base salary" given in NSOPF-93 was converted to a nine-month salary using the same conversion factors as used in the AAUP data.[33] Exhibit 10-14 presents average salaries by rank and type of institution.

Exhibit 10-14: Comparison of 1992-93 salaries between NSOPF and AAUP surveys

	All		**Doctoral**		**Comprehensive**		**Liberal Arts**		**Two-year**	
	AAUP	NSOPF	AAUP	NSOPF	AAUP	NSOPF	AAUP	NSOPF	AAUP	NSOPF
All	$46,270	$44,916	$52,450	$52,684	$43,950	$41,739	$38,430	$36,135	$37,800	$37,599
Professor	59,520	57,795	66,780	66,964	54,760	51,429	48,390	44,690	47,310	45,867
Associate Professor	44,140	45,488	47,220	50,895	43,680	43,392	38,900	35,273	39,300	38,374
Assistant Professor	36,780	37,872	40,110	42,986	36,160	34,866	32,420	30,184	33,800	33,459
Instructor	27,660	32,308	28,240	31,926	27,590	26,163	26,230	34,360	28,460	33,929
Lecturer	31,010	32,211	33,200	32,485	27,790	33,649	29,250	22,613	25,280	31,582

The table of comparisons suggests that the two sources yield similar salary estimates for the primary academic ranks of assistant, associate and full professors. Likewise, the only type of institution that shows a consistent difference between the estimates from the two surveys is the "liberal arts" category, in which the NSOPF-93 numbers are lower than those reported by AAUP.

[33]The full NSOPF sample includes 25,780 respondents; the subset of full-time faculty consists of 18,258. If non-instructional faculty are excluded the sample size is reduced to 16,605. By further excluding medical school faculty, a sample of 15,672 is left in the NSOPF data file. To convert to a nine-month salary, if E47B (length of contract)=8-10, the base salary (E47A) was not converted. If the length of contract was 11 or 12 months, the base salary was multiplied by 9/11 (.818) as had been done with AAUP data. For the cases where the length of contract was listed as 1-7 months, the base salary was divided by the length of contract and multiplied by 9.

Comparisons can also be made between these two surveys and IPEDS data (see Exhibit 10-15), although the published numbers from IPEDS include only faculty on nine-month contracts. For the overall mean, the NSOPF-93 estimate falls between the AAUP and IPEDS estimates. In examining the data by rank, it appears that NSOPF-93 provides lower mean salary estimates for full professors, but somewhat higher mean salary estimates for other ranks.

Exhibit 10-15: Comparison of 1992-93 salaries among AAUP, NSOPF-93 and IPEDS surveys[34]

	AAUP	NSOPF	IPEDS
All	$46,270	$44,916	$44,714
Professor	59,520	57,795	58,788
Associate Professor	44,140	45,488	43,945
Assistant Professor	36,780	37,872	36,625
Instructor	27,660	32,308	28,499
Lecturer	31,010	32,211	30,543

These comparisons indicate that NSOPF-93 data are consistent with what is known from other data sources. Most of the differences are relatively small and easily due to methodological differences between the studies. The NSOPF-93 estimates are based on self-reports of individuals. The other two studies rely on institutional reports of salary means for the entire institution.

10.7.3 A Special Note about Estimates of Health Sciences Faculty

As described in section 10.1, concern for the accuracy of estimates for health sciences faculty also motivated the reconciliation effort. The reconciliation effort helped to identify some institutions that failed to list some health sciences faculty on their original faculty lists, as Exhibit 10-9 shows. But the reconciliation effort did not fully account for the shortfall in health sciences faculty discussed in section 10.1. Using the filter to select faculty with all or some of their instructional duties related to credit courses or advising or supervising academic activities for credit, the estimates of the national population of health sciences instructional faculty increased to 124,186 on the revised NSOPF-93 faculty data file. Yet, the revised NSOPF-93 population estimate for health sciences faculty fell short of expectations. Moreover, because faculty list data recorded faculty members' disciplines only for faculty in the four NEH disciplines, it was impossible to poststratify to best estimates for health sciences faculty.

In Appendix R, Chapter 5, the problem with health sciences estimates is discussed further and recommendations are made for future rounds of NSOPF.

[34]IPEDS data are taken from the *Digest of Education Statistics, 1994*, Table 225, page 236.

11. Recommendations

This chapter summarizes NORC's recommendations for future NSOPF studies, based on the results of the field test and full-scale study, and feedback from a variety of sources: NTRP members, institutional staff (coordinators and respondents), faculty respondents, project staff, and the sponsoring agencies (NCES, NEH, and NSF). These recommendations are designed to reduce institutional and faculty burden, to increase institutional and faculty participation, to enhance the quality of the data, and to make the study more cost-effective.

11.1 Changing Data Collection Time Frames and Commencing List Collection Later

To ensure that part-time staff are not missed in the list enumeration, one member of the NSOPF-93 National Technical Review Panel (NTRP) suggested beginning the list collection effort at the end of the fall term rather than its start as NSOPF-93 did. Sampled institutions would be asked to compile a list of faculty for their *fall term* (encompassing October 15 to ensure comparability between NSOPF cycles). The emphasis should be on the fall term rather than on a specific date. This recommendation should be field-tested prior to the next cycle of NSOPF. One set of sampled institutions, assigned at random, could be asked to compile a list of faculty for their *fall term*. Another set of randomly assigned sampled institutions could be asked to compile a list of faculty employed at their institution on October 15. Discrepancies between institution lists and institution questionnaire counts of faculty could be compared to determine whether one set of lists systematically enumerates a greater number of faculty than the other.

If a later deadline for list collection is established, the institution recruitment phase of data collection could be scheduled earlier: the spring before the fall term for which faculty will be sampled. In both the field test and the full-scale study, relatively few institutions could devote resources necessary to meet the deadline of October 15 given a late August/early September mailout date. The beginning of the academic year is a particularly inopportune time for institutions to make staff resources available to prepare lists of faculty. Given the constraints imposed on faculty data collection by the academic year, it is vital that list collection and processing be completed as early as possible. Therefore, the institutional recruitment phase of data collection could begin in April, with follow-up in May. Institutional staff, unlike faculty, are normally available for most of the summer months, and often have more time and resources to commit to requests for data during these months than during the regular academic year. Exhibit 11-1 presents a sample data collection schedule incorporating these recommendations.

A later start in the list collection effort has multiple implications. A delay of three to four months would mean delaying the faculty survey accordingly. Pushing back the date of the faculty survey, while maintaining the fall term as the time frame for the questionnaire, has the potential to create methodological problems for data quality. The NSOPF-93 faculty data collection effort spanned almost 11 *calendar* months (from the end of January to January, 1994 with a two-month hiatus during the summer). The data collection schedule is bound up with the list collection effort, which, in the case of NSOPF-93, spanned almost nine calendar months (October, 1992 through June, 1993).[35] These scheduling and potential methodological problems would have to be considered in changing the start date for list collection.

[35]There is a real possibility of reducing the amount of time needed, possibly from nine months to six, since the nine months required for the NSOPF-93 list collection to a large extent reflected the need to augment the NSOPF-93 sample on two separate occasions.

Exhibit 11-1: Sample data collection schedule

Data collection phase	Time
Institution recruitment: initial	April, 1998
Institution recruitment: follow-up	May, 1998-September, 1998
Institution questionnaire mailout	September, 1998
List collection: initial	November, 1998
List collection: follow-up	January, 1999-March, 1999
Faculty questionnaire mailout/start of interviewing	January, 1999-April, 1999

11.2 Increasing the Use of Telephone Interviews

The NSOPF-93 mixed-mode data collection design (mail with mail and telephone follow-up supplemented by telephone interviews) could be modified. NCES could consider beginning with telephone interviews for part-time faculty with mail and telephone follow-up, while retaining the NSOPF-93 design for full-time faculty. A design employing a significant telephone interview component can shorten the data collection period. However, locating part-time faculty would need to begin earlier, since in the current NSOPF, fewer home addresses were provided for part-time faculty than for full-time faculty. Nonresponding part-time faculty were often no longer employed at the institution when telephone follow-up began. This data collection design change has cost implications. More telephone interviews could also increase item nonresponse for certain items.

Ninety-nine of the institution-level questionnaires were completed with the assistance of an interviewer who collected some information by telephone (or, in four cases, in person). To shorten the data collection period, NSOPF could begin offering small- to medium-sized institutions the option of telephone data collection at the second prompt.

11.3 Providing Institutions with an Information Sheet at the Time of List Collection

The NSOPF-93 verification and retrieval effort described in Chapter 10 demonstrated that when institutions are supplied with discrepant faculty counts, most of them are capable of determining which set of estimates is most accurate and providing the reason(s) for the discrepancy. In view of this finding, NORC proposes providing institutional staff with an information sheet *at the time* of list collection. This information sheet would contain the most current IPEDS estimates, along with the "best estimates" reported for NSOPF-93.[36] The information sheet would also include a statement alerting staff that the NSOPF-93 definition of "faculty" may not be identical to the IPEDS definition and that, in most instances, the institution's estimate of faculty should *exceed* that of IPEDS. (It may or may not exceed the NSOPF-93 totals depending on the actions [e.g., downsizing, increasing staff, etc.] the institution has taken between NSOPF cycles.)

[36]Fifty percent or more of the NSOPF-93 institutions are expected to fall into the next NSOPF cycle. The number of institutions is likely to be higher especially if an "overlap" sample design is used in the next round cycle. Even without an overlap design, it is worth noting that 48 percent of the institutions responding to the NSOPF-88 institution questionnaire also appeared in the NSOPF-93 sample.

Institution staff should be asked to check their reported faculty list totals against the IPEDS and/or NSOPF-93 totals. Discrepancies among estimates beyond a specified threshold (say 10 percent) should be explained in a "Comments" section of the information sheet.[37] A sample information sheet, serving as a guide, could be provided . Once received, the institution's faculty list totals (both from the information sheet and from the list) could then be data-entered into a discrepancy module that would be preprogrammed with IPEDS and NSOPF-93 faculty counts to compare faculty counts. Unexplained discrepancies beyond a specified threshold would trigger a retrieval and reconciliation call to the Institutional Coordinator *before* faculty sample selection.

The information sheet will provide the Institutional Coordinator with a means of checking the work of other staff who are usually responsible for preparing the list. This new procedure will encourage the coordinator to check the list compiler's work and to produce an accurate and complete faculty list. Discrepancies can be resolved at the institution level, and this will allow the institutions, in some instances, to correct obvious errors (e.g., exclusion of non-tenure-track faculty or part-time staff) before mailing the list of faculty back to the NSOPF contractor. In other instances, where the institution is simply not equipped to provide a complete or wholly accurate list of faculty, it would alert the institution—and the NSOPF contractor—to any omissions or erroneous inclusions much earlier in the list collection process. Even under this changed procedure the NSOPF contractor would continue to recontact institutions to retrieve data and to reconcile discrepancies during the list collection operation.

Preparation for the data collection phase of NSOPF should include training of a team specializing in resolving discrepancies between faculty lists and institution questionnaires. This team would be prepared to perform necessary reconciliation between divergent faculty counts and to ascertain explanations from institution officials for discrepancies in faculty counts.

11.4 Coordinating Institution Questionnaire Mailing and List Collection

The recommendation in section 11.3 hinges on the availability of institution questionnaires at the time of list collection so that potential discrepancies can be checked and reconciled at this early stage of the operation. This recommendation offers other advantages as well. Discrepancies can be substantially reduced by mailing the institution questionnaire and the list request in the same packet, or at least timing it so that both individual requests are received at the institution at about the same time. By coordinating these requests, NCES can explicitly indicate in the instructions that the estimates requested to certain questions should be identical or very close. Whenever discrepancies are identified, the institution staff would be required to resolve or to explain them. By coupling the timing for both of these requests, the NSOPF data collection contractor will be able to enter the list and questionnaire counts (along with the IPEDS counts) into a discrepancy/verification module to immediately check for discrepancies.[38]

Though this procedure may increase the initial *appearance* of respondent burden to the institution, it also makes it much more likely that institution staff preparing the list and those completing the questionnaire

[37]A form in duplicate (or triplicate) could be used so that the institution could maintain a copy for its own records and submit the completed one-page form with its list. Of course, the form and procedures recommended should be field-tested prior to their incorporation into the next cycle of NSOPF.

[38]NORC's Survey Management System (SMS) was customized expressly for NSOPF-93 to permit it to check for discrepancies between list and IPEDS faculty totals and to check specific subgroup totals (i.e., part-time, full-time; racial/ethnic categories). The discrepancy module was initially created to check list, questionnaire, and IPEDS totals against each other, but because the NSOPF-93 institution questionnaire was delayed, only the LIST/IPEDS check was possible.

(who are often not the same person) will consult each other and will resolve any discrepancies internally. This procedure is more likely to *reduce* respondent burden at many institutions by eliminating duplication of efforts by separate offices, and by minimizing the number of callback requests.[39]

11.5 Routing Institutional Coordinator Packet to Institutional Research Director

NSOPF-93 experience showed that the individual most familiar with the data requested on the faculty sampling lists, and, therefore, the most appropriate Institutional Coordinator, is the director of institutional research. Moreover, directors of institutional research often have a high level of interest in the research topics covered by NSOPF. Therefore, whenever an institution employs an individual in the capacity of director of institutional research, the cover letter (currently sent to the institution's chief administrative officer) and the accompanying Confirmation Form could be sent directly to that person, with a copy sent to the institution's Chief Administrative Officer (CAO). Only in the absence of a director of institutional research would another individual (such as an academic dean) be named to serve as coordinator. This should speed routing of mail, reduce the number of remails required, and, in many cases, assure a knowledgeable and sympathetic review of the request.

Misrouting and delays in routing of the institutional coordinator packet were frequent problems in the list collection effort, as evidenced by the high rate of remails—over 40 percent—to CAOs and coordinators. In some instances, a CAO with limited time to personally review mail reported the package as not having been received, although it had been sent to the correct address. Often, a "gatekeeper" routed the package to another institutional official before the CAO could review the materials. Although this official may be best suited to serve as Institutional Coordinator, there is no guarantee that this is the case. If the package is routed to a person who is either unfamiliar with or unsympathetic to the aims of research studies such as NSOPF, or who lacks knowledge of what faculty data the institution has available, it becomes much more difficult to obtain the institution's participation, as well as to obtain high-quality data within set time constraints.

11.6 Changing Institution Questionnaire Instructions and Questions

Some of the questionnaire instructions and questions in the institution questionnaire may have inadvertently contributed to the discrepancies in faculty estimates noted in Chapter 10. To avoid confusion in Questions 1A-D between the total pool of part-time and temporary faculty *available* to an institution and the total *employed* (an unintended ambiguity that caused problems for some institutions because of how part-time and temporary staff are treated), we would recommend amending this question or creating separate questions to ask for *both* the total number of available staff and the number employed during the fall term. This separation would allow institutions to report the status of their temporary and part-time staff more accurately and without the confusion some institutions experienced. Even though some institutions may only be able to provide one set of these estimates, it will at least be completely clear which set of figures the institution is providing.

Another area of ambiguity appeared in the actual estimate of faculty. Some institutions provided estimates of full-time equivalents (FTEs) rather than the requested headcount of individuals. We would recommend amending the instructions to the institution questionnaire to make clear that we are seeking a *headcount of*

[39]It would be prudent to explain the reasons for this procedure to the institution in the introductory letter and materials at the time of list collection. The more participants understand at the outset, the more likely they are to "buy in" to survey procedures.

faculty, and not a count of FTEs (or positions) unless it is expressly stated in the question. (Although we would not recommend it, alternatively we could ask for both FTEs and a headcount. This approach might increase respondent burden slightly; however, some institutions may feel more comfortable providing a headcount if it is accompanied by the total number of FTEs.)

A number of institutions excluded medical or professional institutions or satellite campuses that should have been included. Explicit instructions should be provided in both the questionnaire and the list collection packet to include all such institutions and campuses that do not file separately for IPEDS; if possible, a list of institutions and campuses to be included could be printed in the packet given each institution, based on IPEDS information. The institution would be instructed to notify the data collection contractor about any changes in the status of the listed institutions and satellite campuses. If an institution has any questions about which institutions and campuses to include, that institution would be instructed to contact the data collection contractor for assistance.

A small number of institutions erroneously included all staff (including maintenance and clerical staff) at Questions 1A-D. We believe this error could have been avoided had the respondents carefully read the glossary on the front inside cover of the questionnaire. Since these individuals clearly did not make this effort, we recommend including an additional instruction to accompany Questions 1A-D and other questions that ask for counts of "faculty/staff," that would briefly repeat the general instruction and reference the glossary.

Other changes should be made to the institution questionnaire to reduce respondent burden. Information on benefits available to faculty should not be asked as part of the institution questionnaire that is mailed with the list collection packet. In NSOPF-93, these items elicited high item nonresponse, as discussed in Chapter 8. In the next NSOPF, benefits questions could be asked separately, at a later time. Ideally, such information could be obtained directly from the staff or department responsible for administering benefits programs at each participating institution, or in some cases, at the parent institution. This recommendation should be field-tested.

11.7 Eliminating Option of Sending Computer Tapes

Due to the level of effort required in their processing, we recommend deleting any reference to computer tapes in the list preparation materials. Although we do recognize that many institutions, especially those with large numbers of faculty, may need to submit their lists on computer tape, processing NSOPF-93 faculty lists in computer tape format was costly both in time and effort, and required higher levels of staff to complete. In order to load computer tapes, a programmer had to be available to convert the tape into a format that could be loaded, if necessary, and to monitor the loading process. Seven percent (61 out of 817) of the institutions sent their faculty lists as computer tapes; 8 sent only the tape and 53 sent a tape and a hardcopy printout. In general, lists submitted on computer tape either required retrieval to obtain a usable list, or the hardcopy list was used in place of the tape.

11.8 Providing Diskette or List Layout Example

List preparation instructions, which were developed in conjunction with NORC programmers and systems specialists, provided institutions with a standard layout with which to format their lists (see Appendix K**)**. By providing this convention, the number of unique problems and types of lists encountered by list processing staff were greatly reduced, thus decreasing list processing time. These changes to list preparation materials dramatically increased the ease and speed by which faculty lists were processed.

However, even with these conventions in place, institutions still varied in the individual layout of their faculty lists. Various programs were used to reformat electronic files that were not laid out correctly, or were otherwise formatted in such a way that they could not be sampled. In addition, many institutions sent diskettes that other computers were unable to read.

For the next NSOPF, list preparation instructions should be augmented by providing institutions with a formatted diskette that contains an example of the file layout requested. This diskette could also include a simple interactive database management program that could run diagnostic checks on the list data to assure that data are supplied according to specifications. Even though not all institutions are equipped with the same hardware and/or software, we believe that the availability of this aid will enhance the probability of our receiving electronic files in the preferred format. Institutions should also be given the option of submitting their faculty lists on CD-ROM.

11.9 Scanning Hardcopy Faculty Lists

NORC recommends investigating the possibility of using computer scanners to convert hardcopy lists into an easier format. With the development of new and more efficient scanning devices, it is conceivable that the need for keying/manual data entry of hardcopy lists could be eliminated by the next survey wave. Time spent on coding and keying information from hardcopy lists was reduced substantially from the field test, but was still greater than the time required to process most electronic files. Some institutions had large and time-consuming hardcopy lists of faculty that could have been electronically processed in a fraction of the time. With scanning devices, printed data could be scanned and converted into an electronic format that could then be used to sample faculty.

11.10 Using the Internet

As the use and accessibility of the "information superhighway" is increasing across organizations—especially academic institutions—the use of the Internet as a mode of transmitting and receiving information should be examined. Even though transmitting faculty lists via the Internet was not formally given as an option in the institution recruitment and list collection materials in the main study, some institutions chose to submit their lists in that fashion. NORC believes that providing this service will greatly enhance the efficiency and timeliness of list collection in the next survey wave. The NSOPF data collection contractor could set up a secure World Wide Web or "gopher" site that would include an "FAQ" (for "frequently asked questions") screen and examples of the standard faculty list that institutions should provide. NORC's experience with a Web site constructed for another education study suggests that this option facilitates list collection and insures data confidentiality and security. Institutions "upload" their lists to the site server, from which list collection is conducted. With the Internet becoming a much more common tool for research and communication, it is likely that persons ultimately responsible for creating electronic datafiles would be adept at handling, and would prefer using, this mode of information transfer.

11.11 Maximizing Early Awareness of the Study

In a time of fiscal constraints, and many competing research demands, some institutions find it necessary to limit their participation in research projects to those they deem most in their interest. It is vital that institutional officials be provided with enough information about NSOPF to make an informed decision on their participation before institutional resources are committed to other projects. Therefore, we recommend that appropriate organizations (e.g., the Association for Institutional Research, the National Education Association) be provided with ongoing information about study plans and results well in advance of the next field period. This information can be disseminated to members through newsletters, bulletins, and

NCES' participation in conferences.

11.12 Requesting Address Updates from Institutional Coordinator

The lists obtained from institutions are often out-of-date, particularly with regard to address information for part-time faculty, many of whom may have moved to other institutions. However, Institutional Coordinators are often able to update address information on sampled faculty, and can confirm their current status at the institution (as well as their faculty status as of the previous fall term). Hence, prior to telephone follow-up, we recommend sending the lists of sampled faculty back to coordinators for confirmation of locating information and faculty status. In this way, the level of locating effort required to reach faculty can be substantially reduced.

11.13 Requesting System-wide Data

Faculty benefits policies in state and city college systems (and large institutions with autonomous, but related, "satellite" institutions) are generally uniform across institutions. NSOPF should ask for (and use) system-wide sources for these institutions to minimize the burden on individual institutions. NSOPF staff can identify these sources in the initial mailing or follow-up phone call. This kind of information can also be collected earlier by assigning staff to investigate centralized sources for system-wide benefits policies.

11.14 Cognitive Research to Aid Institution Data Collection

One method to inform the next NSOPF round may be the use of cognitive research, such as focus groups, on a crossectional sample of institution officials who would be charged with completing NSOPF faculty sampling lists, institution questionnaires and other materials. The purpose of this research would be to ascertain what procedures institutions follow to gather the data that NSOPF requires and to discover problems institutions face when complying with NSOPF requests. A special effort might be focused on smaller, two-year institutions, those which showed the greatest discrepancies between their faculty lists and their institution questionnaires. The results of this cognitive research could help the NSOPF contractor to devise procedures and instructions to institutions which maximize institution participation and which minimize error.

11.15 Changes to Faculty Questionnaire

In order to develop a more complete profile of faculty, we recommend adding items that obtain more information on what constitutes advising or supervising academic activities for credit, non-credit courses, and advising or supervising noncredit academic activities. These questions should be field tested, and focus groups—particularly with health sciences faculty—should also be conducted before being incorporated in the next full-scale NSOPF. An option "none of the above" should be added to the code for academic degree for those faculty respondents who do not have a degree or formal award (Question C16).

For the Question C23 and its subparts on credit courses, some respondents in the current NSOPF reported "0" credit hours, "0" hours per week, or "0" students enrolled. Other respondents reported high numbers for these and other items at Question C23. Some respondents also reported "0" basic salary from the institution at E47, or much higher than average salaries for their academic rank. Instructions for Questions C23 and E47 may need to be modified. Focus group discussion could determine what modifications should be made for the next NSOPF field test, or if individual items in each question should be modified and field-tested.

Subparts of Question C33 and C35 had high item nonresponse in the current survey. Consideration should

be given to combining funding sources for the next NSOPF, such as combining business/industry with "other" sources, and state/local government with federal government. Items requesting information on research funding (the respondent's role as investigator or staff, total funds for the 1992-93 institution year, and how funds were used (subitems of C33) had high item nonresponse. For the next NSOPF, some consideration should be given to obtaining this information elsewhere. At Question C35, consideration should be given to asking only if different types of institution funding were used, and deleting the items asking if such funding was available.

11.16 Nonresponse Adjustment by Faculty Discipline

For NSOPF-93, nonresponse adjustments on the faculty dataset were performed for two main faculty variables: race/ethnicity and full-time/part-time status. Another possible nonresponse adjustment could be performed for faculty discipline. This recommendation should be carefully considered. It would improve the accuracy of estimates of faculty population in one of the chief means by which analysts classify faculty. Such a nonresponse adjustment would also help to overcome problems noted in such program areas as health sciences if it could be established that nonresponse contributed to shortfalls in expected estimates of faculty population in those areas. To properly carry out a nonresponse adjustment by discipline, faculty sampling lists will have to code faculty discipline for every faculty member listed. This requirement could increase institution burden. This requirement could also introduce a level of confusion into institutions' classification of their faculty members' disciplines, as institutions would have to decide how to classify faculty members with joint appointments in more than one department and other like cases. To lessen institution burden, institutions could be asked to code faculty sampling lists only on the 10 program areas reported at the faculty questionnaire derived variable X0A12. No matter how discipline codes are recorded on faculty sampling lists, they would still require very detailed and specific instructions to list preparers.

11.17 Number of Replicate Weights

Analysts should be cautious about use of BHS estimated variances that relate to one stratum or to a group of two or three strata. Such variance estimates may be based upon far fewer than 32 replicates, and thus the variance of the variance estimator may be large. Analysts who use either the faculty file or the institution file should also be cautious about cross-classifying data so deeply that the resulting estimates are based upon a very small number of observations. The accuracy of NSOPF-93 statistics should be interpreted in light of estimated standard errors and of the number of observations used in the statistics. In light of these issues, future NSOPFs may consider creating a greater number of replicate weights (i.e. greater than 32) for BHS variance estimation.

11.18 Poststratification to Institution Questionnaire Counts

The recontacting and reconciliation effort detailed in Chapter 10 and Appendix R showed that recontacted institutions most often chose institution questionnaire faculty counts as the most accurate enumeration of their faculty. The poststratification adjustment performed on the NSOPF-93 faculty questionnaire datafile brought national population estimates for the faculty file more in line with the national population estimates the institution questionnaire produced. Therefore, to reduce measurement error on the faculty datafile and to ensure consistency between the institution and faculty datasets, the NSOPF contractor could poststratify faculty questionnaire datafiles to faculty population estimates produced from the institution questionnaire. This recommendation has the added attraction of allowing for a prompt estimation of national faculty population totals without having to conduct an extensive reconciliation effort, as discussed in Chapter 10. Of course, if recommendation 11.3 helps to decrease the discrepancy between institution questionnaire totals and faculty list totals during data collection, there may be no need

for poststratification.

11.19 Overlap Sample Design for Future NSOPF Cycles

Composite estimation is not possible when comparing estimates between NSOPF-88 and NSOPF-93. An overlap design for future NSOPF cycles will increase the precision for estimates of change since NSOPF-93, even if change is estimated simply by differences between the statistics for two time points. Even greater precision can be achieved by relying on a composite estimator, which can be viewed as a weighted average of two estimates of change, one based on the overlapping institutions and one based on the nonoverlapping institutions. The amount of weight given to the overlap-based estimate of change varies directly with the correlation over time for the characteristic of interest. Overlap can be built into the next cycle of the study. At that point, it will be possible to calculate the correlations and to confidently predict the gains achievable from composite estimation, both for estimating change and also for making cross-sectional estimates. The precision of the estimates can be enhanced even if composite estimation is not used. Building in overlap will allow the use of composite estimation if desired. To that end, a machine-readable copy of the sampling frame for the NSOPF-93 institutional sample has been produced. This data file includes, for all institutions in the frame, (a) selection probabilities, (b) stratum codes, (c) indicators as to whether the institution was or was not selected, and (d) indicators as to whether the institution did or did not participate. Items (a), (b), and (c) are crucial for designing the overlap, and (d) is necessary for improving the efficiency of the overlap.