Section 5: Appointment Characteristics and Satisfaction Levels of the New Entrants

Based on the NSOPF-93 faculty survey, four aspects of the academic appointments and job satisfactions are available upon which to compare the emerging careers of the new cohort with the senior cohort. These variables include: academic rank, type of appointment, job and career satisfaction.

Academic Rank

Approximately two-fifths (42.5 percent) of the new entrants were at the assistant professor level (their modal rank), and one-fifth (20.1 percent) held the rank of instructor (table 5.1). At the higher range, one-fourth of the new entrants had already attained the ranks of either associate professor (15.0 percent) or professor (11.9 percent). There was a large difference between the two cohorts in the proportion appointed to the three traditional "ladder" ranks (assistant, associate, and full-professor): 69.5 percent of the new cohort held such appointments compared to 84.1 percent of the senior cohort.[11]

Table 5.1 shows differences among the academic fields in the proportion of new-entry faculty who were appointed in one of the three ladder ranks. The highest percentage were for the social science faculty (79.1 percent) and the natural science faculty (76.2 percent). But only 62.1 percent of the new entry humanities faculty held those ranks, probably reflecting a considerable number of non-tenure track appointments for foreign language and writing specialists.

Type of Appointment

Coinciding with the differences in rank between new and senior faculty just noted above, the two cohorts differed as well in the kind of academic appointment they held, particularly in regard to whether they were in tenurable (either tenured or tenure track) positions. Table 5.2 shows the tenure status of new entrants compared to the senior faculty. The new generation faculty were earlier in their careers and thus less likely to be tenured: 23.9 percent compared to 73.0 percent of the more experienced cohort. More significantly, the new entrants also were less likely to be in the tenure stream: fully one-third (33.2 percent) were not in tenure-eligible positions compared to one-sixth (16.5 percent) of the senior cohort. When gender is considered, female faculty (both new and senior) were more likely to be employed in non-tenure track positions than males. Moreover, the new generation of male faculty was more likely than the new female faculty to have been awarded tenure already (29.1 versus 16.5 percent, respectively). Compared to their senior counterparts, new faculty of both genders were about 17 percent less likely to be on a tenure track (that is, either already tenured or in a tenure-eligible appointment).

---

[11] Strictly speaking, it is not known what proportion of the senior cohort held ladder rank appointments during the "first seven years" of their careers. While it is possible, it is unlikely, that a large percentage of senior faculty initially did not hold ladder ranks, but were moved into the ladder ranks later in their careers.

Viewed by institutional type, lower percentages of non-tenure track appointments for new entrants were reported at public 2-year colleges than at other types of colleges and universities. Part of the reason for this is that a higher proportion of 2-year institutions than other types of institutions do not even have a tenure system in place for their faculty. In fact, if you look at new faculty who were not on a tenure track or did not have a tenure system available to them, the percentages are higher or the same for new faculty at 2-year institutions versus new faculty at other types of institutions.

New-generation faculty at 2-year colleges (28.8 percent) together with those at research universities (29.3 percent) were much more likely to have obtained tenure already than their counterparts at the other categories of institutions.

Viewed by program area, new faculty in most program areas were much more likely to hold non-tenure track appointments than senior faculty.

Job Satisfaction

Table 5.3 shows how new entrants compared with the senior cohort on several dimensions of job satisfaction. On the whole, satisfaction levels with the various dimensions of work were moderately high. Compared to their senior counterparts, new entrants were less satisfied with their current jobs in a number of respects. The biggest inter-cohort gap was in satisfaction with job security (70.5 percent very or somewhat satisfied versus 86.5 percent)—but, after all, few new generation faculty, as previously noted, had yet to obtain tenure and fully one-third held non-tenurable appointments. In most respects, however, except for salary and benefits (the two dimensions ranked lowest by both cohorts), new entrants were less satisfied than senior faculty with workload (66.7 percent somewhat or very satisfied versus 70.1 percent of the senior cohort), prospects for advancement (65.8 percent somewhat or very satisfied versus 71.2 percent of the senior cohort), freedom for outside consulting (76.4 somewhat or very satisfied versus 81.0 percent of the senior cohort), opportunities for spouse's employment (68.5 percent somewhat or very satisfied versus 75.8 percent of the senior cohort), and keeping current in their field (44.9 percent versus 50.3 percent of the senior cohort).

Taking gender into account, women in both cohorts reported less satisfaction than male faculty on all scales (except benefits and spousal employment). In both cohorts, women were less satisfied with their salaries than their male colleagues (49.0 percent somewhat or very satisfied versus 56.4 percent of the males among new faculty; 49.9 percent somewhat or very satisfied versus 57.9 of the males among the senior cohort). When institutional type is considered, new generation faculty reported lower satisfaction than senior faculty across all sectors on job security, advancement opportunities, keeping current in their field, and freedom for outside consulting. Only new faculty in the research university sector reported significantly lower satisfaction than senior faculty with the workload dimension (67.3 percent somewhat or very satisfied versus 77.3 percent of the senior cohort).

Career Satisfaction

The NSOPF-93 faculty survey contained two global measures, often used in similar surveys, that attempt to get at faculty members' overall attitude about their work and chosen career. The first item asked: "If I had to do it over again, I would still choose an academic career."   The substantial majority of faculty—male and female in both cohorts and in each institutional type and program area—either agreed somewhat or agreed strongly (table 5.4). The only differences between new and senior faculty were reported by the natural scientists, with the senior faculty more likely to replicate their academic career choice (91.7 percent somewhat or strongly agreed versus 86.6 percent of the new cohort).

The second measure asks about satisfaction with "my job here, overall."   Again, the responses across all categories were positive, but generally not as strong as with the "I'd do it again" item. Expressed in percentages, a substantial majority of faculty reported satisfaction (either "somewhat" or "very satisfied") with their job overall: 82.1 percent of the new generation and 85.3 percent of their senior colleagues.

Among women, senior faculty reported somewhat lower levels of satisfaction than their male colleagues, while among the new cohort, any such gender differences in job satisfaction disappeared. Among institutional types, new-generation faculty were found to be less satisfied overall than senior faculty only at the other doctorate-granting institutions (78 percent somewhat or very satisfied versus 85 percent of the senior cohort). And among the various program areas, new and senior faculty reported similar satisfaction levels with their job overall.

Summary

The new academic generation entered their academic careers later (table 4.2) and with a more varied work history both in and outside higher education (tables 4.3 and 4.4). A large segment (about one-third) of the new generation was more likely than their seniors to have entered into "temporary" or "term" positions that do not offer the traditional academic career ladder (table 5.2). Indeed, the new-entry cohort was significantly less satisfied with their job security and prospects for advancement, and most other indicators of job satisfaction than their senior colleagues (table 5.3).

Table 5.1—Percentage distribution of full-time faculty, by rank, faculty seniority, type and control of institution, and program area: Fall 1992

Faculty seniority, type and control of institution, and program area	Academic rank							
	Number	Professor	Associate Professor	Assistant Professor	Instructor	Lecturer	Other	No Rank
All faculty[1]	514,976	32.1	24.0	23.1	13.2	2.0	2.6	3.0
New faculty[2]	172,319	11.9	15.0	42.6	20.1	3.2	4.8	2.4
Senior faculty[2]	342,657	42.3	28.5	13.3	9.8	1.5	1.5	3.2
Type and control								
New faculty								
All institutions	172,319	11.9	15.0	42.6	20.1	3.2	4.8	2.4
All research institutions	50,865	15.7	18.0	44.8	5.1	6.3	9.6	0.5
All other doctorate-granting institutions[3]	26,361	12.1	13.3	57.7	12.9	1.7	2.1	0.2
All comprehensive institutions	39,929	10.6	16.8	50.5	17.0	3.0	1.9	0.2
Private liberal arts institutions	12,662	8.4	15.0	52.0	17.1	2.9	3.7	0.9
Public 2-year institutions	33,283	8.5	7.3	16.5	55.0	0.5	3.8	8.4
All other institutions[4]	9,217	13.6	22.6	33.6	15.4	1.0	4.7	9.1
Senior faculty								
All institutions	342,657	42.3	28.5	13.3	9.8	1.5	1.5	3.2
All research institutions	90,727	54.4	29.6	9.6	1.4	2.9	1.8	0.3
All other doctorate-granting institutions[3]	49,845	44.6	33.2	13.8	5.7	1.4	1.2	0.1
All comprehensive institutions	91,490	43.5	32.9	17.7	3.9	1.3	0.3	0.4
Private liberal arts institutions	24,764	40.4	33.0	19.1	3.7	1.0	1.2	1.6
Public 2-year institutions	70,246	25.3	16.8	9.7	33.4	0.3	2.6	11.9
All other institutions[4]	15,586	37.1	26.2	15.3	9.1	0.3	1.7	10.3
Program area[5]								
New faculty								
All program areas	166,045	12.1	15.4	43.3	20.6	3.3	3.0	2.3
Professions	59,966	12.2	16.1	42.0	22.0	3.1	3.3	1.5
Business	13,293	10.6	14.9	43.2	22.4	2.4	3.7	2.9
Education	11,326	10.7	22.8	38.2	21.4	2.8	2.4	1.7
Engineering	9,278	12.8	21.4	44.7	15.1	1.2	3.7	1.2
Health sciences	26,069	13.4	11.8	42.1	24.5	4.2	3.2	0.8

Table 5.1—Percentage distribution of full-time faculty, by rank, faculty seniority, type and control of institution, and program area: Fall 1992, continued

Faculty seniority, type and control of institution, and program area	Academic rank							
	Number	Professor	Associate Professor	Assistant Professor	Instructor	Lecturer	Other	No Rank
Liberal arts and sciences	81,297	11.7	16.0	45.0	18.3	3.5	2.7	2.8
Fine arts	8,394	12.0	14.8	45.0	16.4	4.4	4.0	3.4
Humanities	21,504	9.6	13.4	39.1	26.5	6.6	0.8	4.0
Natural sciences	33,141	12.9	17.9	45.4	16.4	1.9	3.3	2.3
Social sciences	18,258	12.0	16.0	51.1	12.9	2.5	3.4	2.0
All other program areas	24,782	13.3	11.8	41.1	24.9	3.1	3.5	2.3
Senior faculty								
All program areas	337,096	42.6	28.5	13.4	9.8	1.5	1.1	3.2
Professions	105,416	35.3	31.6	18.3	10.3	1.2	1.2	2.2
Business	26,149	33.0	31.4	18.4	11.8	0.8	0.6	4.0
Education	23,826	33.9	33.2	15.8	10.9	2.1	2.3	1.8
Engineering	15,838	51.2	32.7	8.8	5.5	0.5	0.5	0.8
Health sciences	39,604	31.3	30.2	23.4	10.8	1.3	1.2	1.7
Liberal arts and sciences	185,647	46.8	27.7	10.9	8.0	1.8	1.0	3.9
Fine arts	22,651	42.2	30.8	12.5	6.5	1.9	1.3	4.8
Humanities	53,275	43.6	26.8	11.8	10.0	2.6	0.8	4.5
Natural sciences	70,241	49.0	26.1	9.5	9.1	1.4	1.0	4.0
Social sciences	39,480	50.2	29.8	11.3	4.4	1.2	1.0	2.2
All other program areas	46,033	42.5	24.9	11.9	15.7	1.0	1.5	2.5

[1] Includes full-time faculty who reported their principal activity during Fall 1992 was teaching, research, or selected administration activities.

[2] New full-time faculty are defined as having 7 years or less in a full-time faculty position; whereas senior faculty are those who had more than 7 years in a full-time faculty position.

[3] Includes medical schools.

[4] Includes public liberal arts, private 2-year, and other specialized institutions except medical schools.

[5] The numbers for program area differ slightly from those for other variables (i.e., type and control of institution) because some faculty did not report a principal area of teaching.

NOTE: Details may not add to total because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993 National Study of Postsecondary Faculty, "Faculty Survey."

Table 5.2—Percentage distribution of full-time faculty, by tenure status, faculty seniority, gender, type and control of institution, and program area: Fall 1992

Faculty seniority, gender, type and control of institution, and program area	Number	Tenured	Tenure status			
			On tenure track	Not on tenure track	No tenure for faculty status	No tenure system at institution
All faculty[1]	514,976	56.6	21.4	9.7	4.4	8.0
New faculty[2]	172,319	23.9	42.9	17.0	7.0	9.2
Senior faculty[2]	342,657	73.0	10.5	6.0	3.2	7.3
Gender						
New faculty						
Male	101,974	29.1	42.8	14.7	5.6	7.8
Female	70,345	16.5	43.2	20.2	8.9	11.2
Senior faculty						
Male	244,860	78.4	8.7	4.4	2.5	6.0
Female	97,797	59.5	14.9	10.1	4.9	10.7
Type and control						
New faculty						
All institutions	172,319	23.9	42.9	17.0	7.0	9.2
All research institutions	50,867	29.3	41.8	19.7	8.5	0.7
Public	37,085	32.3	40.6	18.0	9.0	0.1
Private	13,782	21.1	45.0	24.5	7.1	2.3
All other doctorate-granting institutions[3]	26,361	20.1	51.1	20.2	6.7	1.9
Public	17,028	20.2	51.0	21.7	7.1	0.0
Private	9,333	20.0	51.4	17.4	5.9	5.4
All comprehensive institutions	39,929	20.4	50.8	19.9	5.8	3.1
Public	28,017	23.0	49.8	20.7	5.5	1.1
Private	11,912	14.3	53.3	18.1	6.5	7.8
Private liberal arts institutions	12,662	17.2	46.3	19.7	5.2	11.6
Public 2-year institutions	33,283	28.8	33.2	8.1	6.5	23.4
All other institutions[4]	9,217	12.2	22.1	7.8	9.0	48.9
Senior faculty						
All institutions	342,657	73.0	10.5	6.0	3.2	7.3
All research institutions	90,727	80.9	6.9	7.5	3.6	1.2
Public	71,224	83.2	7.0	6.6	2.8	0.4
Private	19,502	72.4	6.6	10.6	6.5	3.9
All other doctorate-granting institutions[3]	49,845	72.0	13.7	9.2	3.7	1.5
Public	33,553	74.7	12.6	9.8	2.7	0.3
Private	16,293	66.4	15.8	8.1	5.7	4.1
All comprehensive institutions	91,490	77.7	13.6	5.4	2.1	1.2
Public	65,860	78.8	13.7	5.1	2.1	0.3
Private	25,630	74.9	13.2	6.2	1.9	3.8
Private liberal arts institutions	24,764	64.4	15.6	6.3	4.8	9.0
Public 2-year institutions	70,246	67.6	7.2	2.7	2.6	20.0
All other institutions[4]	15,586	40.7	10.0	5.4	5.7	38.1

34

Table 5.2—Percentage distribution of full-time faculty, by tenure status, faculty seniority, gender, type and control of
institution, and program area: Fall 1992, continued

Faculty seniority, gender, type and control of institution, and program area	Number	Tenured	Tenure status			
			On tenure track	Not on tenure track	No tenure for faculty status	No tenure system at institution
Program area[5]						
New faculty						
All program areas	166,045	24.5	44.0	16.2	6.0	9.4
Professions	59,966	22.2	43.0	18.5	6.4	9.8
Business	13,293	17.9	49.6	14.6	6.2	11.8
Education	11,326	28.5	43.0	14.3	7.5	6.7
Engineering	9,278	26.5	52.2	8.3	5.2	7.8
Health sciences	26,069	20.2	36.4	26.1	6.4	10.9
Liberal arts and sciences	81,297	25.9	45.2	15.3	5.3	8.4
Fine arts	8,394	21.8	44.3	14.3	4.3	15.3
Humanities	21,504	22.9	41.0	17.6	8.1	10.4
Natural sciences	33,141	29.1	45.4	13.9	5.1	6.5
Social sciences	18,258	25.4	50.1	15.5	2.7	6.3
All other program areas	24,782	25.5	42.3	13.4	7.4	11.4
Senior faculty						
All program areas	337,096	73.4	10.5	5.9	2.8	7.4
Professions	105,416	67.2	13.4	8.5	2.7	8.2
Business	26,149	70.4	13.2	4.3	3.0	9.1
Education	23,826	70.6	12.9	8.9	2.9	4.7
Engineering	15,838	79.8	11.1	2.5	0.8	5.9
Health sciences	39,604	58.0	14.6	13.4	3.2	10.8
Liberal arts and sciences	185,647	77.2	8.7	4.5	2.8	6.9
Fine arts	22,651	68.4	11.5	4.8	2.6	12.7
Humanities	53,275	75.9	8.2	5.0	3.4	7.4
Natural sciences	70,241	78.7	8.1	4.8	2.8	5.7
Social sciences	39,480	81.1	8.6	3.3	2.2	4.8
All other program areas	46,033	72.6	11.7	5.3	3.0	7.4

[1] Includes full-time faculty who reported their principal activity during Fall 1992 was teaching, research, or selected administration activities.

[2] New full-time faculty are defined as having 7 years or less in a full-time faculty position; whereas senior faculty are those who had more than 7 years in a full-time faculty position.

[3] Includes medical schools.

[4] Includes public liberal arts, private 2-year, and other specialized institutions except medical schools.

[5] The numbers for program area differ slightly from those for other variables (i.e., type and control of institution) because some faculty did not report a principal area of teaching.

NOTE: Details may not add to total because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993 National Study of Postsecondary Faculty, "Faculty Survey."

Table 5.3—Percentage of full-time faculty satisfied with selected job dimensions, by faculty seniority, gender, and type and control of institution: Fall 1992

Faculty seniority, gender, and type and control of institution	Percentage of faculty somewhat or very satisfied with each of the following items:							
	Workload	Job security	Advancement opportunities	Keeping current in field	Freedom for outside consulting	Salary	Benefits	Spouse employment
All faculty[1]	69.0	81.1	69.4	48.5	79.5	54.8	75.2	73.4
New faculty[2]	66.7	70.5	65.8	44.9	76.4	53.4	75.4	68.5
Senior faculty[2]	70.1	86.5	71.2	50.3	81.0	55.6	75.1	75.8
Gender								
New faculty								
Male	69.0	72.8	69.5	50.2	78.4	56.4	75.2	67.3
Female	63.3	67.1	60.6	37.3	73.6	49.0	75.6	70.3
Senior faculty								
Male	73.3	88.4	74.3	54.7	83.0	57.9	75.1	76.0
Female	62.2	81.5	63.3	39.3	76.0	49.9	75.3	75.3
Type and control								
New faculty								
All institutions	66.7	70.5	65.8	44.9	76.4	53.4	75.4	68.5
All research institutions	67.3	67.9	68.0	50.7	79.0	54.8	75.6	65.4
All other doctorate-granting institutions[3]	68.1	67.7	65.2	47.9	77.1	54.9	75.3	70.6
All comprehensive institutions	63.3	67.7	64.3	38.8	74.3	48.1	72.6	66.6
Private liberal arts institutions	61.8	65.9	67.1	29.7	74.1	43.1	66.9	64.0
Public 2-year institutions	69.6	83.3	64.8	46.6	75.7	59.5	82.9	75.2
All other institutions[4]	70.5	65.6	64.7	46.5	75.0	55.6	71.3	70.5
Senior faculty								
All institutions	70.1	86.5	71.2	50.3	81.0	55.6	75.1	75.8
All research institutions	77.3	86.9	74.3	59.1	86.3	56.5	75.4	75.5
All other doctorate-granting institutions[3]	73.0	84.7	70.6	55.0	82.3	55.3	73.4	76.4
All comprehensive institutions	62.6	87.3	71.6	45.2	80.3	50.3	73.4	73.7
Private liberal arts institutions	64.7	86.1	77.2	40.8	77.8	52.0	66.6	74.6
Public 2-year institutions	70.6	87.8	65.1	46.1	76.6	62.0	81.3	79.1
All other institutions[4]	69.8	79.0	69.5	49.0	74.3	58.5	74.9	76.3

[1] Includes full-time faculty who reported their principal activity during Fall 1992 was teaching, research, or selected administration activities.

[2] New full-time faculty are defined as having 7 years or less in a full-time faculty position; whereas senior faculty are those who had more than 7 years in a full-time faculty position.

[3] Includes medical schools.

[4] Includes public liberal arts, private 2-year, and other specialized institutions except medical schools.

NOTE: Details may not add to total because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993 National Study of Postsecondary Faculty, "Faculty Survey."

Table 5.4—Percentage of full-time faculty satisfied with selected career dimensions, by faculty seniority, gender, type and control of institution, and program area: Fall 1992

Faculty seniority, gender, type and control of institution, and program area	Percentage of faculty who would choose an academic career again[1]	Percentage of faculty satisfied with overall job[2]
All faculty[3]	89.1	84.2
New faculty[4]	88.7	82.2
Senior faculty[4]	89.2	85.2
Gender		
New faculty		
Male	88.7	82.9
Female	88.7	81.2
Senior faculty		
Male	89.6	85.9
Female	88.4	83.5
Type and control		
New faculty		
All institutions	88.7	82.2
All research institutions	86.3	80.6
All other doctorate-granting institutions[5]	89.5	78.3
All comprehensive institutions	88.9	81.5
Private liberal arts institutions	89.2	82.2
Public 2-year institutions	90.9	89.2
All other institutions[6]	89.8	79.8
Senior faculty		
All institutions	89.2	85.2
All research institutions	89.3	84.9
All other doctorate-granting institutions[5]	88.2	84.5
All comprehensive institutions	89.3	83.3
Private liberal arts institutions	90.2	84.0
Public 2-year institutions	89.5	89.5
All other institutions[6]	89.0	83.1

Table 5.4—Percentage of full-time faculty satisfied with selected career dimensions, by faculty seniority, gender, type and control of institution, and program area: Fall 1992, continued

Faculty seniority, gender, type and control of institution, and program area	Percentage of faculty who would choose an academic career again[1]	Percentage of faculty satisfied with overall job[2]
Program area[7]		
New faculty		
All program areas	88.8	82.4
Professions	90.2	84.1
Liberal arts and sciences	88.2	80.7
Fine arts	87.0	78.1
Humanities	89.4	81.0
Natural sciences	86.6	80.7
Social sciences	90.3	81.7
All other program areas	87.3	83.5
Senior faculty		
All program areas	89.4	85.3
Professions	88.7	87.6
Liberal arts and sciences	89.7	83.3
Fine arts	88.8	79.8
Humanities	87.4	81.0
Natural sciences	91.7	85.3
Social sciences	89.8	85.0
All other program areas	89.4	87.9

[1] Percentage of faculty who somewhat or strongly agreed with the following statement: "If I had it to do over again, I would still choose an academic career."

[2] Percentage of faculty who were somewhat or very satisfied with: "My job here, overall."

[3] Includes full-time faculty who reported their principal activity during Fall 1992 was teaching, research, or selected administration activities.

[4] New full-time faculty are defined as having 7 years or less in a full-time faculty position; whereas senior faculty are those who had more than 7 years in a full-time faculty position.

[5] Includes medical schools.

[6] Includes public liberal arts, private 2-year, and other specialized institutions except medical schools.

[7] The numbers for program area differ slightly from those for other variables (i.e., type and control of institution) because some faculty did not report a principal area of teaching.

NOTE: Details may not add to total because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993 National Study of Postsecondary Faculty, "Faculty Survey."

Section 6: Summary and Conclusions

The comparison of two cohorts of academics—the new and the senior generations—has demonstrated both similarities and dissimilarities between them. The ways in which the new entrants are like and unlike their predecessors has important implications for who the future faculty will be and what priorities they will bring with them to their academic tasks.

Perhaps the most striking characteristic of the new faculty cohort is its sheer size. Contrary to what many observers would have expected, there has been a lot of movement into faculty ranks in recent years. While general perceptions have been of a quiescent academic labor market, in fact the marketplace has been more porous—more dynamic than static—at least in some important respects. By the calculations here, fully one-third of all full-time faculty in the Fall of 1992 had seven years or less full-time faculty experience. Indeed, a formidable 41 percent of all full-time faculty at private research universities fell into the new-faculty cohort. Quietly, almost invisibly, a large number of faculty members have been infused into the ranks of the full-time faculty between 1986 and 1992—a development examined further in the section on implications. Meanwhile, a summary comparing the two cohorts' characteristics follows.

<u>Summary</u>

The new generation of academic career entrants in the Fall of 1992 was much more diverse demographically than the previous generations in terms of the numerical ascendance of women (table 3.2), but also in the increased representation of racial/ethnic minorities (particularly Asian/Pacific Islander males, table 3.3) and foreign nationals (table 3.4). Taking just these factors of gender, race/ethnicity and nativity into account, the distinctive background of the new academic generation signals a sizable shift in the characteristics of the American faculty— although clearly the American academic profession remains numerically white, male, and U.S. born.

The new entrants differed from the senior cohort both in terms of their institutional and their programmatic homes. Proportionately more hiring of new faculty took place at the doctorate-granting institutions; indeed, 36 percent of all full-time faculty in the research university category qualify as new compared to 30 percent at the comprehensive and 32 percent at the public 2-year institutions (table 2.1). A more dramatic shift was evident in the distribution of new faculty members among program areas: their programmatic venues were considerably more likely than previous generations to fall outside the traditional liberal arts fields (table 2.2).

The new entrants embarked on their academic careers with a richer variety of previous work experiences (tables 4.3 and 4.4). They were more likely than their senior counterparts to have begun academic employment in "temporary" or "term" positions rather than starting out on the traditional academic career ladder (tables 5.1 and 5.2). They were, not surprisingly, less satisfied with their job overall, especially with their job security and their prospects for advancement (tables 5.3 and 5.4). Overall, however, they were as satisfied as the senior cohort in their choice of an academic career (table 5.4).

<u>Implications for the Future Faculty and their Work</u>

In considering the implications of the changing characteristics of the new generation of academics, the starting point must be the large size of this cohort. Because the new-entrant cohort is so large—we measure it at 172,319 out of the total of 514,976 full-time faculty members or fully one-third of all full-time faculty—it is likely to have a much more pervasive influence in shaping academic values and practices in the years ahead than if the new cohort had been substantially smaller. What, then, are the implications that can be drawn from this sizable cohort's characteristics?

First the new cohort is demographically different from the senior cohort. White males, as noted, were the dominant presence in the older cohort. With the increasing presence of women and minority faculty, the white males' "share" has shrunk—although they still maintain their overall plurality.

Second, the proportion of the faculty within the traditional arts and science fields is shrinking and the concomitant expansion in the proportion of faculty in the professions and occupational programs. The liberal arts core of higher education is declining numerically; and that will likely mean a weakening among the faculty of the values associated with doctoral education in the traditional arts and sciences.

Third, the proportion of faculty who are tenurable (either tenured or tenure-track) is shrinking. This powerful trend can be seen in two parallel developments.   One is the large number of faculty who are part time (see footnote 4). The second trend is the contraction in the proportion of tenure-track positions as increasing numbers of faculty appointments are made in other categories, some short-term, others longer term, but all less closely coupled with the host institution and its future.

Fourth, it appears that different sectors within higher education are being affected differently by prevailing conditions. That is, data from the NSOPF-93 faculty survey suggested that faculty in some types of institutions were faring better than their counterparts in other types of institutions. In particular, new faculty at 2-year community colleges defied the trend of declining job satisfaction perceptible in other institutional sectors: they were as satisfied as their senior, more established colleagues. Moreover, faculty at 2-year community colleges were the most satisfied with their salary and benefits. New faculty at research and other doctoral granting universities appear to be at a relative disadvantage to their senior colleagues; and faculty at private liberal arts colleges were least satisfied overall—senior as well as new entrants.

In sum, the faculty responses to the NSOPF-93 faculty survey provide a lens through which the future of the academic profession and, indeed, of higher education can be viewed. The lens may be more translucent than clear; unpredictable events will intervene to recast higher education's future. But the view from the vantage point afforded by this survey presages a faculty more richly diverse in their origins and in the careers they are pursuing.

Appendix A: Technical Notes

Blank page

Technical Notes

Overview

The 1992–93 National Study of Postsecondary Faculty (NSOPF–93) was sponsored by the U.S. Department of Education's National Center for Education Statistics (NCES). The study received additional support from the National Science Foundation (NSF) and the National Endowment for the Humanities (NEH). It was conducted by NORC, the National Opinion Research Center at the University of Chicago, under contract to NCES.

The first cycle of NSOPF was conducted in 1987–88 (NSOPF–88) with a sample of 480 institutions (including 2-year, 4-year, doctorate-granting, and other colleges and universities), over 3,000 department chairpersons, and over 11,000 faculty. The second cycle of NSOPF, conducted in 1992–93, was limited to surveys of institutions and faculty, but with a substantially expanded sample of 974 public and private nonproprietary higher education institutions and 31,354 faculty. The study was designed to provide a national profile of faculty: their professional backgrounds, responsibilities, workloads, salaries, benefits, and attitudes.

Institution Universe

The definition of the institution universe for NSOPF–93 was identical to the one used in NSOPF–88. It included institutions in the traditional sector of higher education: that is, institutions whose accreditation at the college level is recognized by the U.S. Department of Education, that provide formal instructional programs of at least two years' duration, that are public or private not-for-profit, and that are designed primarily for students who have completed the requirements for a high school diploma or its equivalent.

Faculty Universe

Unlike NSOPF–88, which was limited to faculty whose regular assignment included instruction, the faculty universe for NSOPF–93 was expanded to include all those who were designated as faculty, whether or not their responsibilities included instruction, and other (non-faculty) personnel with instructional responsibilities. Under this definition, researchers and administrators and other institutional staff who hold faculty positions, but who do not teach, were included in the sample. Instructional staff without faculty status also were included. In summary, the eligible universe 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;

- 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;

- instructional personnel supplied by independent contractors.

Sample Design

A two-stage stratified clustered probability design was used to select the NSOPF–93 sample. The first-stage NSOPF–93 sampling frame consisted of the 3,256 postsecondary institutions that provided formal instructional programs of at least two years' duration and that were public or private, not-for-profit, drawn from the 1991–92 IPEDS (Integrated Postsecondary Education Data System[12]) Institutional Characteristics Survey. The sampling frame was sorted by type and control of institution to create groups of institutions called strata. The selection of institutions occurred independently within each stratum.

A modified Carnegie[13] classification system was used to stratify institutions according to cross-classification of control by type, first into 17 cells, and then into 15 strata. There were two levels of control, public and private, and nine types of institutions including:

1. Research universities (public or private): These institutions offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, and give high priority to research. They award 50 or more doctoral degrees each year. There were 104 research institutions in the NSOPF-93 sampling frame;

---

[12] IPEDS is a recurring set of surveys developed and maintained by NCES. Postsecondary education is defined by IPEDS 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 definition includes programs whose purpose is academic, vocational and continuing professional education and excludes a vocational and adult basic education. IPEDS encompasses all institutional providers of postsecondary education in the United States and its outlying areas. 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). This manual is also distributed with IPEDS data on CD-ROM.

[13] See *A Classification of Institutions of Higher Education,* (Princeton, N.J.: The Carnegie Foundation for the Advancement of Teaching), 1987. Out of the 3,256 institutions, 278 could not be classified. Carnegie staff supplied updates for 81 institutions; the remaining group of unclassified institutions were designated as "unknown" on the NSOPF–93 sampling frame.

2. Other Ph.D. (public or private): These institutions offer a full range of baccalaureate programs and are committed to graduate education through the doctorate. They award annually at least 10 doctoral degrees (in three or more disciplines), or 20 or more doctoral degrees in one or more disciplines. There were 109 other Ph.D. institutions in the NSOPF-93 sampling frame;

3. Comprehensive colleges and universities (public or private): These institutions offer a full range of baccalaureate programs and are committed to graduate education through the master's degree. They award 20 or more master's degrees annually in one or more disciplines. There were 578 comprehensive institutions in the NSOPF-93 sampling frame;

4. Liberal arts colleges (public or private): These institution are primarily undergraduate colleges with major emphasis on baccalaureate degree programs. There were 578 liberal arts institutions in the NSOPF-93 sampling frame;

5. Two-year colleges (public or private): These institutions offer associate of arts certificate or degree programs and, with few exceptions, offer no baccalaureate degrees. There were 1,107 2-year institutions in the NSOPF-93 sampling frame;

6. Independent medical institutions (public or private): Those not considered as part of a 4-year college or university. There were 52 independent medical institutions in the NSOPF-93 sampling frame;

7. Religious colleges (private only): There were 309 religious institutions in the NSOPF-93 sampling frame;

8. Other (public/private): Includes a wide range of professional and other specialized degree-granting colleges and universities. There were 222 other specialized institutions in the NSOPF-93 sampling frame; and

9. Unknown (public/private): There were 197 institutions on the NSOPF-93 sampling frame that did not have a Carnegie classification.

First Stage Sampling

Since there are no public religious institutions, the cross-classification of control by type had 17 cells. However, 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. Therefore, a single sampling stratum was constructed for these institutions, and all institutions were selected in that stratum (i.e., selected with certainty). Grouping these institutions together was appropriate from a sampling design and selection standpoint, although this stratum does not comprise a group of analytic interest.

Institutions in the 14 other strata[14] were referred to as "noncertainty" institutions. The stratum sample sizes, 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. Systematic probability proportional to size (PPS) sampling was used with measure of size (MOS) equal to 41 or the estimated number of faculty (and instructional staff), whichever was larger. MOS was defined as the total number of faculty and instructional staff as specified in the most recent IPEDS Fall Staff Survey available (1989–90). 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.

In systematic sampling, the order in which the institutions are listed on the frame is important, as it reflects an implicit stratification. Within each stratum the institutions were sorted by MOS in a "serpentine" manner, i.e., if one stratum was in ascending order by MOS, the next was descending, the one after that was ascending, 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 were initially selected and later supplemented with 185 institutions for a total of 974 selected in the first-stage.

Institutions were selected in two replicates. The first replicate "Pool 1" contained the initial sample of noncertainty and certainty institutions. The second replicate "Pool 2" was sorted into random order within strata and contained only noncertainty institutions. Institutions that were determined ineligible or could not be recruited after extensive follow-up were replaced at random by institutions within the same explicit stratum in Pool 2. Replacement institutions for the certainty stratum were selected at random from similar strata. ("Other Ph.D.," "Public Comprehensive," and "Private Comprehensive" sampling strata were used for this purpose.)

Second Stage Sampling

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. Each institution was randomly assigned a target total sample size, say *n*, of either 41 or 42 faculty to yield the desired average sample size of 41.5. Whenever an institution had fewer than 42 individuals, all faculty and instructional staff were selected. Otherwise, the following oversampling sizes[15] were used to select groups to ensure their adequate representation in the sample and to meet NSF and NEH analytic objectives: full-time females (3.36), blacks or Hispanics (5.60), Asians or Pacific Islanders (1.12), faculty in four NEH disciplines (2.24)—philosophy/religion, foreign languages, English language and literature, and history—and all others (0.00). All listed individuals who

---

[14] The "noncertainty" sampling strata were broken down as follows: private, other Ph.D.; public, comprehensive; private, comprehensive; public, liberal arts; private, liberal arts; public, medical; private, medical; private, religious (there are no public religious colleges); public, two-year; private, two-year; public, other; private, other; public, unknown; and private, unknown.
[15] 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.

would qualify for more than one group were assigned to the group for which the oversampling rate (here defined as the oversample size divided by the number of individuals qualifying for the group) was largest. These five groups were used as strata for sampling faculty. 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. For more details about second stage sampling, refer to the *1993 National Study of Postsecondary Faculty: Methodology Report* [NCES 97–467].

Data Collection and Response Rates

Prior to data collection, it was first necessary to obtain cooperation from the sampled institutions. Each institution was asked to provide annotated lists of all faculty and instructional staff according to the eligibility (and oversampling) criteria needed for second stage sampling. Between October 1992 and early March 1993, 26 institutions in the original sample were replaced by randomly selected comparable institutions (from Pool 2): 5 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).

Project staff tried to gain cooperation from original and replacement (or supplemental) institutions simultaneously.[16] Of the 974 institutions in the total sample, 12 (1.2 percent) were found to be ineligible.[17] 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. A total of 817 eligible institutions agreed to participate (i.e., to provide a list of faculty and instructional staff), for a list participation rate of 84.9 percent (83.4 percent, weighted).

Faculty data collection was conducted between January and December 1993, with a two-month hiatus during July and August while most faculty and instructional staff were on summer break. The faculty survey relied on a multi-modal data collection design which combined an initial mailed questionnaire with mail and telephone prompting supplemented by computer-assisted telephone interviewing (CATI). Questionnaire and follow-up mailings were sent out in large waves between January and July 1993 as the lists were received, sampled, and processed. Coordinators at the participating institutions who signed NCES's affidavit of nondisclosure and confidentiality also assisted in the effort by prompting nonrespondents to return their completed

---

[16]Since the Pool 2 institutions were additional random selections into the sample, the effect of using Pool 2 institutions is no different than if a larger number of institutions had been selected initially and the pools had not been used at all. The response rates for Pool 1 institutions, and for Pool 1 and Pool 2 institutions combined, have the same expected value. Since it is based on a larger sample, the response rate for Pool 1 and Pool 2 combined is a more accurate estimator of the population response rate.

[17] 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.

questionnaires to NORC. Of the 31,354 faculty and instructional staff sampled,[18] 1,590 (5.1 percent) were found to be ineligible, which included staff who were deceased or no longer at the institution, staff who did not have a Fall 1992 teaching assignment, and teaching assistants. A total of 25,780 questionnaires were completed for a response rate of 86.6 percent (84.4 percent, weighted). The overall faculty response rate (institution list participation rate multiplied by the faculty questionnaire response rate) was 73.5 percent (70.4 percent, weighted). The unweighted faculty response rate for public 4-year institutions was 87.8 percent and 84.2 percent for private 4-year institutions.

Institution data collection was conducted between September 1993 and May 1994. The institution survey combined a mailed questionnaire with mail and telephone prompting directed at both participating (817 institutions which submitted faculty lists) and nonparticipating institutions (145 institutions), for an eligible sample of 962 institutions. For 385 (44 percent) of the self-administered questionnaires completed, the institutional coordinator who had provided the original list was the main respondent, although other institution staff usually contributed to the effort. A total of 872 institution questionnaires were completed for a response rate of 90.6 percent (93.5 percent, weighted).

Best Estimates of Faculty

In comparing the weighted estimates based on the lists of faculty and instructional staff provided by institutions with those based on the institution questionnaires, several patterns emerged that were contrary to expected results. Although some variance in the estimates based on the lists and the institution questionnaires was expected, the magnitude of the difference was larger than anticipated. This, in and of itself, was not seen as a problem since the estimates were from two different sources. What was less plausible were the trends in the estimates of part-time faculty between NSOPF–88 and NSOPF–93. The institution survey showed a 5 percent increase in the estimate of part-time faculty between the Fall of 1987 and the Fall of 1992. The faculty survey, based on the lists of faculty and instructional staff provided by the institution, showed no change in the percentage of part-time faculty between the two points in time. The weighted estimates based on the lists also showed a 37.5 percent decrease in the number of health sciences faculty and instructional staff from the Fall of 1987 to the Fall of 1992. Institution recontact was necessary to resolve these discrepancies and to determine the "best estimates" of total, full- and part-time faculty and instructional staff.

The best estimates were derived following a reconciliation and verification recontact with a subset of institutions which had discrepancies of 10 percent or greater between the total number enumerated on the faculty list used for sampling and the total number reported on the institution questionnaire. The recontact effort also included 120 institutions identified by NCES as employing health sciences faculty.

---

[18] Initially, 33,354 faculty were sampled. To reduce costs, 2,000 nonresponding faculty and instructional staff were randomly eliminated from the sample through subsampling in August 1993. A higher proportion of part-time faculty and instructional staff were eliminated than remained; this was taken into account in the calculation of faculty weights.

Of the 760 "matched" institutions[19] (i.e., institutions which provided both a completed institution questionnaire and a list of faculty and instructional staff), 450 (59 percent) had a discrepancy of 10 percent or more between the questionnaire and the list, and 61 of the 450 had health sciences faculty.

Of the 817 institutions who provided lists of faculty and instructional staff, 509 institutions (450 with 10 percent or greater discrepancies plus an additional 59 institutions with health sciences faculty) were recontacted. Before recontacting each institution, each discrepancy was reviewed to eliminate obvious clerical or list posting errors. A best estimate was obtained for 492 (or 96.7 percent) of these institutions.

It is important to point out that 118 of the reconciled institutions were unable to provide a specific reason for the discrepancies. For the 374 that provided reasons, the most commonly cited reason was the omission of some part- or full-time faculty from the list provided for sampling faculty. This occurred for 107 institutions. Some institutions included certain types of medical faculty in one set of estimates, but not in the other. Downsizing affected faculty counts at several institutions. Another factor in the discrepancies was the time interval (in some instances a year or more) between the time the list of faculty and instructional staff was compiled and the time the institution questionnaire was completed. The list did not always include new hires for the fall term, which were counted in the institution questionnaire. Some institutions provided "full-time equivalents" (FTE's) on the institution questionnaire rather than the actual headcount of part-time staff that was requested. In some instances, however, where part-time faculty and instructional staff were over-reported (on either the list or the questionnaire) the reason involved confusion between the pool of part-time or temporary staff employed by, or available to, the institution and the number actually employed during the fall semester.

NORC used data gathered in the recontacting effort to adjust the original list of faculty and instructional staff to incorporate recontacted institutions' best estimates into the final estimates. The first step in this process used as its starting point the original list, which reported totals for full-, part-time, and total faculty and instructional staff for each of the 817 participating institutions. However, in some cases, institutions which supplied a total number did not supply a breakdown of the total number into full- and part-time components.[20] For these institutions, NORC used a two-step procedure of deriving best estimates: first, deriving "best total estimates" and, second, deriving "best full-time estimates." Best estimates for part-time staff were simply calculated by subtracting the number of full-time staff from the total number at each institution.

---

[19] A total of 929 of the 962 eligible institutions (96.6 percent) participated in the survey in some way—either by completing an institution questionnaire or by submitting a faculty list. A total of 872 institutions completed institution questionnaires and 817 institutions provided faculty lists. Of the 817 institutions which submitted faculty lists, 760 of them also completed an institution questionnaire. Therefore, "matched" data—counts of the total number of faculty at the institution drawn from the faculty list and from the institution questionnaire—are available for only these 760 institutions.

[20] Eighty-four of the 817 institutions did not specify the employment status (i.e., full- or part-time) of faculty and instructional staff on their original lists.

The next step in calculating best total estimates involved the substitution of the verified counts from the 492 institutions NORC recontacted. If an institution verified the counts from its original faculty list or was unable to confirm other estimates, the original list estimate was retained as the best estimate. If the institution verified the institution questionnaire data as a more accurate estimate, questionnaire data were substituted for original list data as the best estimate. If the institution provided a different set of estimates, the new estimates were substituted for counts based on original list data.

Institutions which were nonrespondents in the verification effort and which had discrepancies of 10 percent or greater between the estimates of faculty and instructional staff based on the lists provided by institutions and those based on the institution questionnaire were adjusted by multiplying the ratio of verified counts to original counts for the 492 recontacted institutions by the original list count. Original list data were used for the institutions which were not selected for recontact. For all 817 institutions, the source of the final best estimates was as follows:

    460 (56.3 percent) used original list data;
    280 (34.3 percent) used questionnaire data;
    61 (7.5 percent) used new estimates (other than questionnaire or original list data); and
    16 (1.9 percent) were ratio-adjusted.

During the reconciliation effort, some ineligible faculty and instructional staff were excluded from the institution-level totals. This happened if recontacted institutions reported that the original faculty list had included ineligible faculty. This information was supplied by 23 institutions. It is assumed that faculty population estimates derived from the best estimate calculations include only eligible faculty. For more discussion of the verification process and calculation of best estimates, see the *1993 National Study of Postsecondary Faculty: Methodology Report* [NCES 97–467].

Weight Calculations

The weights for both the institution and faculty samples were designed to adjust for differential probabilities of selection and nonresponse. (For a detailed description of the weighting process, see the *1993 National Study of Postsecondary Faculty: Methodology Report* [NCES 97–467].) Weights for the institution sample were constructed in three steps. First, the institution's base weight—equal to the reciprocal of its probability of selection into the sample—was calculated. (This step reflected the several steps used to select the institutions from sample Pool 1 and sample Pool 2.) Second, the base weights were adjusted for institutions that had merged and so were effectively listed multiple times in the sampling frame.[21] Finally, a nonresponse adjustment factor was applied to the weights to compensate for institution-level nonresponse. A review of the data indicated that post-stratification adjustment was not needed.

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

---

[21] After the sample was selected and institutions were contacted, NORC discovered 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 any listing of the institution was selected from the frame, its weight must be reduced accordingly.

their institutions were sampled. In this step, the initial selection probabilities also were adjusted to reflect the exclusion of a random subsample of faculty. (See footnote 8.) Then the reciprocals of these selection probabilities were calculated to yield base conditional weights. Second, these 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 compensate for nonresponse by faculty members. Fourth, the nonresponse-adjusted weights were poststratified to the best estimates of total, full-, and part-time faculty and instructional staff by sampling stratum.

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.

Imputation of Missing Data

Item nonresponse occurred when a respondent did not answer one or more survey questions. The item nonresponse rates were generally low for the institution and faculty questionnaires, since missing critical (and selected other) items were retrieved by interviewers. The NSOPF–93 faculty questionnaire had a mean item nonresponse rate of .103 for 395 items in six sections. The NSOPF–93 institution questionnaire had a mean item nonresponse rate of .101 for 283 items in
four sections.[22] Imputation for item nonresponse was performed for each survey item, to make the study results more inclusive.[23] "Don't know" responses were treated as item nonresponse and imputed for both the institution and faculty questionnaires. However, a second imputation was done 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 second imputation, "don't knows" were treated as legitimate responses, and only in a case where there was no response to a survey item was imputation performed. For these items, in the second imputation, missing responses were imputed across all response categories, including the don't know category. This was done to allow researchers to choose how to treat don't knows in their

---

[22] The item nonresponse rate is defined as the ratio of the total number of nonresponses to the total number of individuals eligible to respond to a questionnaire item. The mean item nonresponse rates reported here are the unweighted means of the item nonresponse rates for all items on the questionnaires. For a full description of item nonresponse, see the *1993 National Study of Postsecondary Faculty: Methodology Report* [NCES 97–467].

[23] For more information on imputation of missing data in sample surveys, see Kalton, Graham and Daniel Kasprzyk, "Imputing for Missing Survey Responses." Paper presented at 1982 Proceedings of the Section on Survey Research Methods, American Statistical Association; Kalton, Graham and Daniel Kasprzyk, "The Treatment of Missing Survey Data," *Survey Methodology 12 (1)* (June 1986), pp. 1–16.

analyses. Not applicable ("NA") responses were not imputed since these represented respondents who were not eligible to answer the relevant item.

Imputation was performed using several procedures. Missing sex, race, and employment status data on the faculty data file were imputed directly from information supplied by institutions on the lists used for sampling faculty and instructional staff, whenever this information was available.

Two statistical procedures, regression-based and hot-deck, were employed to impute other missing data on both data files. Regression-based imputation was used for continuous and dichotomous variables. Hot-deck imputation was used for all other variables. The type of imputation used was recorded by setting the appropriate value of the imputation flag for each survey item.

Sources of Error

The survey estimates provided in the NSOPF–93 analytical reports, published by NCES, 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. In the reports, the variance estimate is the square of the standard error for the mean or proportion (including percent). The standard error 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.

The standard errors may be used to calculate confidence intervals around each estimate and to compare two or more estimates to determine if the observed differences are statistically significant. For example, table 2.1 in this report shows that 29.5 percent of full-time new entrant faculty were employed in research institutions in the Fall of 1992. The standard error of that estimate is 2.1 (table B2.1). The 95 percent confidence interval for the statistic extends from 25.4 [29.5 - (1.96 x 2.1)] to 33.6 [29.5 + (1.96 x 2.1)] or from 25 to 34 percent. Standard errors for all estimates presented in this report's tables were computed using a technique known as Taylor series approximation. A computer program, SUDAAN,[24] was used to calculate the standard errors. Those opting to calculate variances with the Taylor-series approximation method should use a "with replacement" type variance formula. Specialized computer programs,

---

[24] 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.

such as SUDAAN and CENVAR[25] calculate variances with the Taylor-series approximation method.

Comparisons noted in this report are significant at the .05 level. The significance of the difference between the overall mean (i.e., the mean of the entire population) and a subgroup mean (e.g., between the mean salary of all faculty in all institutions and the mean salary of all faculty in public doctoral institutions) was tested using a t-test in which the standard error of the difference was adjusted for the covariance between the subgroup and the total group. The exact formula for the appropriate t-test is:

$$t = \frac{\overline{X}_S - \overline{X}_T}{\sqrt{se_S^2 + se_T^2 - 2(p)se_S^2}}$$

where $\overline{X}_T$ and se_T are the mean and standard error for the total group, $\overline{X}_S$ and se_S are the mean and standard error for the subgroup, and p is the proportion of the total group contained in the subgroup.

When multiple pairwise comparisons were made, the acceptable minimum significance level was decreased by means of the Bonferroni adjustment.[26] This adjustment takes into account the increased likelihood, when making multiple comparisons, of finding significant pairwise differences simply by chance. With this adjustment, the significance level being used for each comparison (.05) is divided by the total number of comparisons being made.

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, undercoverage, 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, undercoverage (in which institutions did not provide a complete enumeration of eligible faculty) and listing of ineligible faculty necessitated the "best estimates" correction to the NSOPF–93 faculty population estimates. For a more detailed discussion of the undercoverage problem, refer to the *1993 National Study of Postsecondary Faculty: Methodology Report* [NCES 97–467]. Whereas general sampling theory can be used, in part, to determine how to estimate the sampling variability of a statistic, nonsampling errors are not easy to measure. Measurement of nonsampling errors usually requires the incorporation of a methodological experiment into the survey or the use of external data to assess and verify survey results.

To minimize the potential for nonsampling errors, the faculty and institution questionnaires (as well as the sample design, data collection, and data processing procedures) were field-tested with a national probability sample of 136 postsecondary institutions and 636 faculty members in

---

[25] U.S. Bureau of the Census, *CENVAR IMPS Version 3.1* (Washington D.C.: U.S. Bureau of the Census), 1995.
[26] For an explanation of the Bonferroni adjustment for multiple comparisons, see Miller, Rupert G., *Simultaneous Statistical Inference* (New York: McGraw Hill Co.), 1981 or Dunn, Olive Jean, "Multiple Comparisons Among Means," *Journal of the American Statistical Association 56 (293),* (March 1961), pp. 52–64.

1992. To evaluate reliability, a subsample of faculty respondents were re-interviewed. An extensive item nonresponse analysis of the questionnaires also was conducted followed by additional evaluation of the instruments and survey procedures.[27] An item nonresponse analysis also was conducted for the full-scale surveys. See the *1993 National Study of Postsecondary Faculty: Methodology Report* [NCES 97–467] for a detailed description of the item nonresponse analysis.

In addition, for the full-scale surveys, a computer-based editing system was used to check data for range errors, logical inconsistencies, and erroneous skip patterns. For erroneous skip patterns, values were logically assigned on the basis of the presence or absence of responses within the skip pattern whenever feasible, given the responses. Missing or inconsistent critical items were retrieved. Some small inconsistencies between different data elements remained in the data files. In these situations, it was impossible to resolve the ambiguity as reported by the respondent. All data were keyed with 100 percent verification of a randomly selected subsample of 10 percent of all questionnaires received.

Replicate Weights

Thirty-two replicate weights are provided on the data files for users who prefer another method of variance estimation. These weights implement the balanced half-sample (BHS) method of variance estimation,[28] and they have been created to handle the certainty stratum and to incorporate finite population correction factors for each of the 14 noncertainty strata. Two widely available software packages, WesVarPC®,[29] and PC CARP,[30] have capabilities to use replicate weights to estimate variances.

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.

A Note About Estimates Based Upon Small Samples

Analysts who use either the restricted use 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. Analysts should interpret the accuracy of NSOPF–93 statistics in light of estimated standard errors and of the number of observations used in the statistics.

---

[27] A complete description of the field test design and results can be found in Abraham, Sameer Y., *et al*., *1992–93 National Study of Postsecondary Faculty: Field Test Report* (Washington, D.C.: U.S. Department of Education, National Center for Education Statistics [NCES:93–390]), February 1994.

[28] 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.

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

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

A Special Note About Estimates of Health Sciences Faculty

Problems with estimates of health sciences faculty could only be partly rectified by the creation of new best estimates. The reconciliation effort helped to identify some institutions that failed to list health science faculty on their original faculty lists. However, 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 science faculty.

Health science faculty are more likely to perform individualized instruction or noncredit teaching activities than are other types of faculty participating in NSOPF–93. The largest concentration of faculty who conducted individualized instruction but who did not teach courses, was found in the health sciences. Of the estimated 76,200 faculty who conducted individualized instruction and taught no other course, 31,201, or 41 percent, of the total were health sciences faculty. The next largest group of faculty meeting these criteria were found in the natural sciences (8,805 or 11.6 percent). Because of the importance of individualized instruction to health sciences faculty, selecting for analysis only those faculty who had any for-credit instructional responsibilities may have the unintended consequence of excluding a greater number of health sciences faculty than is warranted. In the *1993 National Study of Postsecondary Faculty: Methodology Report* [NCES 97–467]*,* the problem with health science estimates is discussed further and recommendations are made for future rounds of NSOPF.

Blank page