Equal Rites, Unequal Outcomes

Women in American Research Universities

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Chapter Seven

Explaining Sex Differences in Publication Productivity among Postsecondary Faculty

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In all academic disciplines, scholarly productivity is a primary marker of career success. Productive scholars are rewarded with promotions in rank, favorable job mobility, and pay raises. Likewise, unproductive scholars are considered "unsuccessful" and are sometimes pushed out of their own institutions or out of the academy altogether. While publication rate of scholarly work *per se* may not be an accurate measure of scholarly contribution in all disciplines, the adage "publish or perish" portrays the pressure that pervades the postsecondary community. This adage emphasizes the weight placed on quantifiable measures of productivity in the assessment of scholarly contribution, and it reflects the important role of publication in determining career success among faculty in the academy. Given the strong link between publication productivity and career advancement, explaining sex differences in publication rates clearly advances our understanding of sex differences in the career progress and outcomes of postsecondary faculty. The large volume of research aimed at explaining sex differences in scholarly productivity attests to the importance of this effort (for reviews see Zuckerman 1991; Long and Fox 1995; Ward and Grant 1995). Until very recently (Xie and Shauman 1998), however,

research was unsuccessful at explaining the reasons for sex differences in research productivity, and indeed such sex differences among scientists were labeled a "productivity puzzle" by Cole and Zuckerman (1984:218) and accepted as such by many other scholars.

In examining publication rates among scientists and engineers, Xie and Shauman (1998) show that the productivity puzzle can be solved by accounting for sex differences in personal characteristics, experiences, and structural positions that are related to publication. According to Xie and Shauman's results, if men and women are located in the same positions within the structure of the academy and if they have equal access to the resources that facilitate publication, sex differences in research productivity are nil. Xie and Shauman's results imply that the persistence of the gender gap in scholarly publication rates is symptomatic of continuing structural inequality between men and women among postsecondary faculty. As long as male academic scientists occupy better positions and have easier access to resources than do female academic scientists, the gender gap in research productivity will persist.

Although there exists a large body of research on sex differences in publication output, the overwhelming majority has focussed on the productivity puzzle among scientists. In fact, most studies typically focus on small samples of scientists from specific fields. The generalizability of the results from this literature to non-science academic disciplines has not been adequately investigated. It remains an open question whether the explanatory framework employed by Xie and Shauman (1998) applies to and helps explain sex differences in publication productivity among postsecondary faculty in other academic disciplines. In this paper, we attempt to generalize the findings of Xie and Shauman (1998) by applying the same explanatory model to a broader range of academic disciplines in a comparative analysis.

In this paper, we present the results of an empirical examination of sex differences in publication productivity among all full-time postsecondary faculty in four general academic disciplines: the social sciences and education, the arts and humanities, the natural sciences and engineering, and the medical and professional fields. The analysis is based on data from four large, nationally representative surveys of postsecondary faculty in 1969, 1973, 1988, and 1993. We first compare the level of publication productivity and the degree of sex differences that characterize each discipline and examine changes in measured sex differences in publication productivity over the 24-year period for which we have data. We then examine trends in sex differences in the personal and career characteristics

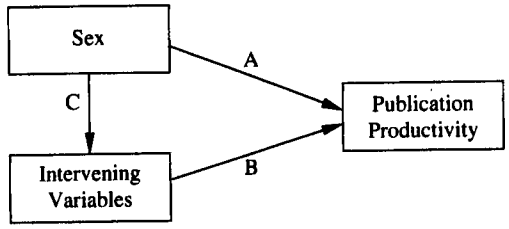
that are believed to influence the publication productivity of postsecondary faculty. Finally, we present the results of a multivariate analysis aimed at explaining sex differences in publication productivity among faculty in each academic discipline. There are three main findings from our research. First, sex differences in research productivity have generally decreased since 1969 among faculty in all academic disciplines, except among medical and professional school faculty. Second, over the 24-year period from 1969 to 1993, male and female postsecondary faculty have become increasingly similar in terms of the individual and career characteristics that are widely accepted as determinants of publication productivity. Third, in each academic discipline, a significant portion of the measured sex differences in publication productivity can be attributed to sex differences in the individual and career characteristics examined.

EXPLAINING SEX DIFFERENCES IN PUBLICATION PRODUCTIVITY

Our attempt to explain sex differences in publication productivity rests on the logic of indirect multivariate relationships. It has long been recognized that sex differences in publication productivity are at least partially accounted for by sex differences in social factors that are related to productivity. That is, sex differences in publication productivity may be mediated by intervening factors in a recursive causal model. This causal logic is illustrated in Figure 1. Based on this logic, researchers have attempted to explain the bivariate relationship between sex and publication by accounting for factors that intervene in the bivariate relationship. In this multivariate framework, the direct relationship between sex and publication productivity, denoted by A, is expected to be reduced to insignificance when all the relevant intervening variables are accounted for.

Figure 1

EXPLAINING SEX DIFFERENCES IN PRODUCTIVITY



Prior research has identified many intervening factors that help explain sex differences in publication productivity. The list of relevant factors includes both personal characteristics, such as age, prestige of Ph.D. program, field of research, and family status, as well as career characteristics, such as institutional type, rank, teaching hours, level of research funding, and access to research assistance. Few of the extant studies, however, have been successful in explaining gender differences in publication productivity because they fail to adequately account for intervening variables. Recent research by Xie and Shauman (1998) shows that, when a large number of relevant intervening factors are controlled, the relationship between sex and publication productivity is indeed reduced to insignificance among scientists and engineers. Following Xie and Shauman (1998), we set out to explain sex differences in publication productivity by accounting for three sets of intervening explanatory variables: background characteristics, career characteristics and resources, and family status. The background characteristics we include in this analysis are a detailed measure of the field of specialization within each of the four broad academic disciplines, the time taken to complete the doctoral degree, and years of experience as a postsecondary faculty member. We measure career characteristics and resources by the type of institution at which individuals are employed, academic rank, number of teaching hours, research funding, and access to research assistance. Family status is measured by a single indicator of marital status. We conduct separate multivariate analyses incorporating the explanatory variables for each of the four groups of academic disciplines we examine.

For this analysis, we are comfortable in assuming that the background characteristics are antecedent to the measure of publication, making it possible to identify the extent to which publication productivity is dependent upon their causal influence. Beyond this, the cross-sectional nature of our data does not permit further ordering of the causal factors. Specifically, we are unable to identify the causal direction of the relationship between publication productivity and the career and resource variables, represented in Figure 1 by the arrow labeled B. Structural and resource variables such as institutional affiliation, rank, funding, and teaching hours may affect the rate at which an academic publishes, but these career characteristics also may be consequences of productivity. The causality between research productivity and resource variables is clearly reciprocal. Without experimental or longitudinal data, we are not in a position to identify the reciprocal causality. We therefore present our multivariate results as descriptive rather than causal, and we interpret the results accordingly.

DATA AND MEASURES

For this study, we use data from four sources: the *National Survey of Higher Education* conducted by the Carnegie Commission in 1969 (hereafter Carnegie-69), the *Teaching Faculty in Academy* study conducted by the American Council of Education in 1972-1973 (hereafter ACE-73), and the 1987-1988 and 1992-1993 *National Survey of Postsecondary Faculty* (hereafter NSPF-88 and NSPF-93) conducted by the National Center for Education Statistics. Each of these data sets includes detailed information about the personal characteristics, education background, and career characteristics of nationally representative samples of postsecondary faculty. Faculty in different academic fields were included in each study. In addition, the similarity of the sampling designs and survey instruments of these four data sets allows us to describe changes in sex differences in publication productivity over a 24-year period.

We define postsecondary faculty as individuals who hold a doctoral degree, are appointed at a postsecondary institution, and are responsible for teaching at least one college-level course. Our definition encompasses teaching staff at all academic ranks, including lecturers/instructors who are regularly employed but excluding graduate student instructors.

To reduce the number of fields to a manageable size, we first collapsed the many detailed academic fields into 19 major fields and then grouped them into four general disciplinary areas: (1) social sciences and education, (2) arts and humanities, (3) science and engineering, and (4) medical and professional fields. Appendix Table 1 presents the distribution of male and female postsecondary faculty by field, disciplinary group, and data source. The social sciences and education group includes education, psychology, sociology, anthropology, economics, political science, and other social science fields. The arts and humanities disciplinary category encompasses the arts, English, foreign languages and literature, history, philosophy, religion, and other humanities fields. The science and engineering group includes the fields of engineering, mathematics, computer science, any of the physical sciences, and any of the biological sciences. The medical and professional group includes subcategories of medical fields, nursing, other medical sciences such as veterinary medicine, business, and other professional fields such as journalism and law. Using the definition of postsecondary faculty detailed above and excluding respondents with invalid or missing information for all the measures used in our analysis, our samples consist of 21,413

postsecondary faculty from Carnegie-69, 15,240 from ACE-73, 3,589 from NSPF-88, and 6,510 from NSPF-93.

We measure publication productivity as the count of all publications reported by postsecondary faculty for the two years prior to the date of the survey. Our definition of publications includes articles published in refereed and nonrefereed journals, chapters in edited volumes, books, and monographs.[1] This definition applies to all the data sources with one exception: for the NSPF-88, "creative works" were included with articles and books in the publication count. This discrepancy between the data sources inflates the average publication count for the NSPF-88 sample, although it should not result in a bias for our study if the publication of "creative works" is unrelated to sex.

RESULTS

SEX DIFFERENCES IN PUBLICATION PRODUCTIVITY: TRENDS AND DISCIPLINARY DIFFERENCES

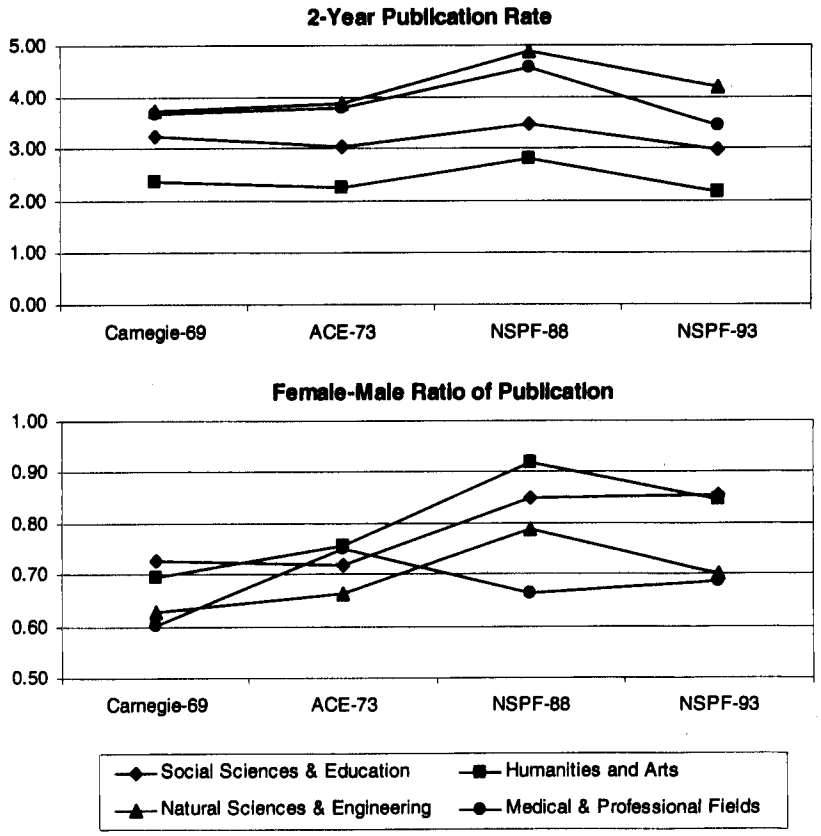
We describe trends in sex differences in publication productivity among postsecondary faculty from two perspectives: sex differences in the average number of publications during the two years prior to the survey date, and sex differences in the proportion of faculty accomplishing no publications during the two year period. The top panel of Figure 2 presents the average 2-year publication rate for all postsecondary faculty by disciplinary group and data source. Given that the publication count for the NSPF-88 data is inflated due to the inclusion of "creative works," the average 2-year rate of publication is highly stable in each discipline across the 24-year period covered by the data. A clear hierarchy among the disciplines is also evident, with postsecondary faculty in the natural sciences and engineering fields publishing at the highest rates and those in the arts and humanities at the lowest rates. In 1969, academics in the natural sciences and engineering published at an average 2-year rate of 3.7. This rate increased only slightly to 4.2 in 1993. The average publication rate among faculty in the medical and professional fields was only slightly lower than the rate for the natural sciences and engineering in 1969 and 1973 but dropped slightly to 3.4 in 1993. The 2-year publication rates among faculty in the social sciences and education averaged about 3.0 between 1969 and 1993, and those among faculty in the arts and humanities hovered just over 2.

The average publication rates establish the inter-disciplinary differences in the level of publication productivity, but they do not describe sex

differences in publication productivity. We measure sex differences with the female-to-male ratio in average 2-year publication rates. The value of the female-to-male ratio indicates the magnitude of the sex differences in publication productivity. A ratio of one indicates gender equity, while values less than one reveal male advantage. The female-to-male ratio of publication rates for each academic discipline and data source is presented in the bottom panel of Figure 2. The figure shows that women publish at lower rates than men in all four broad disciplinary categories and throughout the 24-year period. The data also show a general trend toward gender

Figure 2

TWO-YEAR PUBLICATION RATE AND FEMALE-MALE RATIO OF PUBLICATION RATE BY ACADEMIC DISCIPLINE:
Carnegie-69, ACE-73, NSPF-88, and NSPF-93

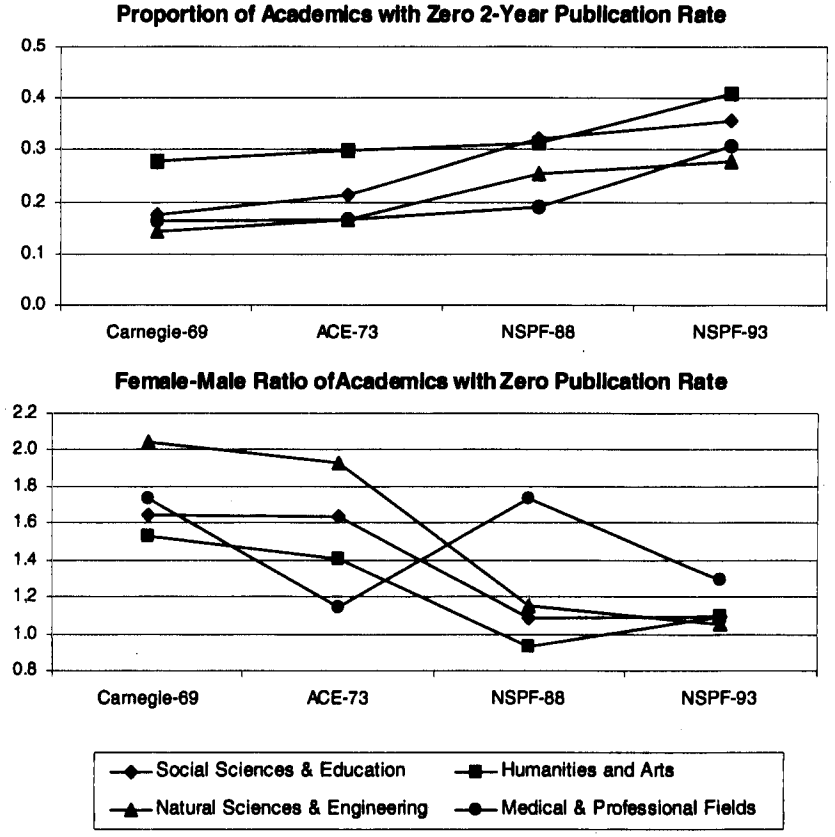


equity in the rate of publication productivity for all academic disciplines. The smallest sex differences in publication productivity are found among academics in the social sciences and education and in the arts and humanities. In both of these broad disciplinary groups, the publication ratio increased from about 70 percent in the late 1960s to 85 percent in the early 1990s. This indicates that the gender gap in publication productivity has declined by half over the 24-year period. That is, women's publication rate was 30% lower than men's in 1969, but women were publishing at a rate only 15% lower than their male colleagues by 1993. Sex differences in publication productivity were relatively greater in the natural sciences and engineering and in the medical and professional fields than in other disciplines at both the start and end of the 24-year period. In the natural sciences and engineering and the medical and professional fields, the female-to-male ratio of publication rates was at 0.60 in 1969. By the early 1990s, the ratio for both disciplines had increased by 10 points to 0.70. Although the trend is toward equity, the data clearly show significant and persistent sex differences in publication productivity at the end of the period.

Sex differences in publication rates may be largely due to gender differences in the proportion of postsecondary faculty who do not publish (Long 1992). We therefore measured both the proportion of all faculty who reported no publication during the two years prior to the survey date and the female-to-male ratio of faculty with zero publications for each discipline and data source. These statistics are presented in Figure 3. The top panel of Figure 3 shows that the proportion of faculty with a zero 2-year publication rate increased between the late 1960s and the early 1990s in all disciplines. The rise in the prevalence of zero publication has been accompanied, however, by dramatic declines in sex differences in zero publication. The bottom panel of Figure 3 shows that the female-to-male ratio of postsecondary faculty with zero publication rates declined to near equity in all academic disciplines. In 1969, rates of zero publication were very high among women relative to men. For example, in the natural sciences and engineering women were more than twice as likely as men to be among faculty with zero publication rates; in the other disciplinary groups, women were between 50 and 70 percent more likely to be non-publishers. By 1993, the female-to-male ratio of non-publication had declined to slightly over one in the social sciences and education, the natural science and engineering, and the arts and humanities. Although the trend for the medical and professional fields appears non-monotonic, the female-to-male ratio declined from 1.7 in 1969 to 1.3 in 1993.

Figure 3

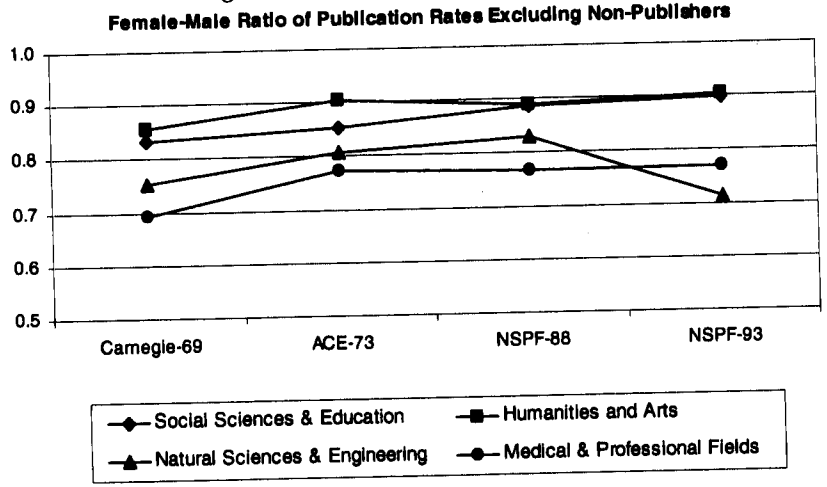
PROPORTION OF POSTSECONDARY FACULTY WITH ZERO 2-YEAR PUBLICATION RATE AND FEMALE-MALE RATIO OF POSTSECONDARY FACULTY WITH ZERO PUBLICATION RATE BY ACADEMIC DISCIPLINE: Carnegie-69, ACE-73, NSPF-88, and NSPF-93



This decline in the rate of zero publication among female faculty must account for some of the increase in the female-to-male ratio in publication rates over the observed time period. Figure 4 illustrates the extent to which the trend toward sex equity in average publication rates is explained by the increased participation of women in the "publish or perish" culture of the postsecondary academy. This figure presents the female to-male ratio of publication rates excluding non-publishing postsecondary faculty. Compared to the female-to-male ratios presented in Figure 2, the exclusion of non-publishers raises the female-to-male publication ratio

Figure 4

FEMALE-MALE RATIO OF PUBLICATION RATE BY ACADEMIC DISCIPLINE EXCLUDING NON-PUBLISHERS:
Carnegie-69, ACE-73, NSPF-88, and NSPF-93



towards one (equity level) at all points of observation for all disciplines, but the increase is especially dramatic for the Carnegie-69 and ACE-73, in which large proportions of female faculty had zero publication rates. The relative flatness of the trend lines over the 24-year period reflect only very small decreases in sex differences in publication productivity among those who do publish. These results indicate that much of the observed sex differences in publication productivity, especially in the past, are attributable to the differential proportion of men and women postsecondary faculty who publish at all. However, sex differences in the rate of publication among publishing faculty, though smaller in magnitude than those among all faculty, nonetheless exist and indeed persisted throughout the period.

SEX DIFFERENCES IN FACTORS RELATED TO PUBLICATION PRODUCTIVITY

In this section, we describe sex differences in the background characteristics, career characteristics, and resources that are related to publication productivity. We describe trends in sex differences in each explanatory factor across the 24-year period covered by the data. Although the explanatory variables we include in our analysis are not strictly parallel

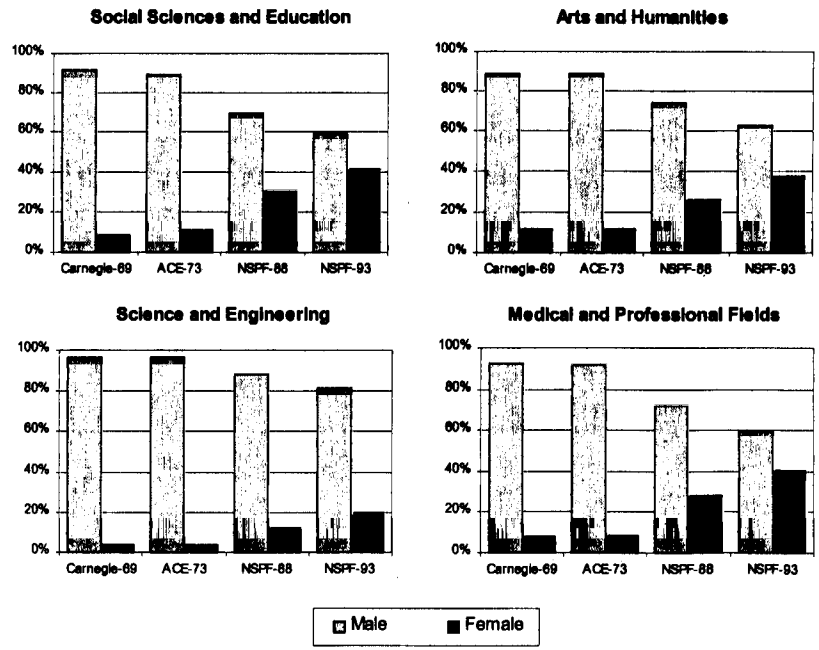
across the data sets, they are very similar. In the descriptions of individual variables we note and describe any measurement differences that exist.

Background Characteristics

The representation of women varies significantly across the disciplinary groups that we compare. Figure 5 presents the percent distribution of men and women at the four points of observation separately for each broad disciplinary group. Although there are disciplinary differences in the level of representation at each point in time and in the speed at which equal representation is approached, a clear trend toward more equal representation of men and women in all four disciplinary categories is illustrated by this figure. For all disciplinary groups, each successive survey reveals an increase in the proportionate participation of women. This figure also clearly shows that by 1993 women had not yet achieved equal

Figure 5

PERCENT DISTRIBUTION OF MALE AND FEMALE POSTSECONDARY FACULTY BY ACADEMIC DISCIPLINE:
Carnegie-69, ACE-73, NSPF-88, and NSPF-93



representation in any of the disciplinary groups. Women have achieved the highest level of relative representation in the social sciences and education and in the medical and professional fields, where women comprise about 40 percent of all postsecondary faculty in 1993, up from about 8 percent in 1969. A similar degree of equal representation has been achieved in the arts and humanities, where in 1993 about 38 percent of all postsecondary faculty were women. The postsecondary faculty in the natural sciences and engineering, however, continue to be overwhelmingly dominated by men. In 1993, only 19 percent of all postsecondary faculty in these fields were women. These figures are highly aggregated, and they obscure patterns of sex differences in representation in the detailed academic fields that comprise each of these four broad categories. The percent distribution of men and women in the detailed fields is presented in Appendix Table 1. Although our analysis focuses on inter-disciplinary comparisons at the aggregate level, we recognize significant differences in the determinants of sex differences in publication productivity across detailed fields. We therefore control for detailed fields in the multivariate analysis.

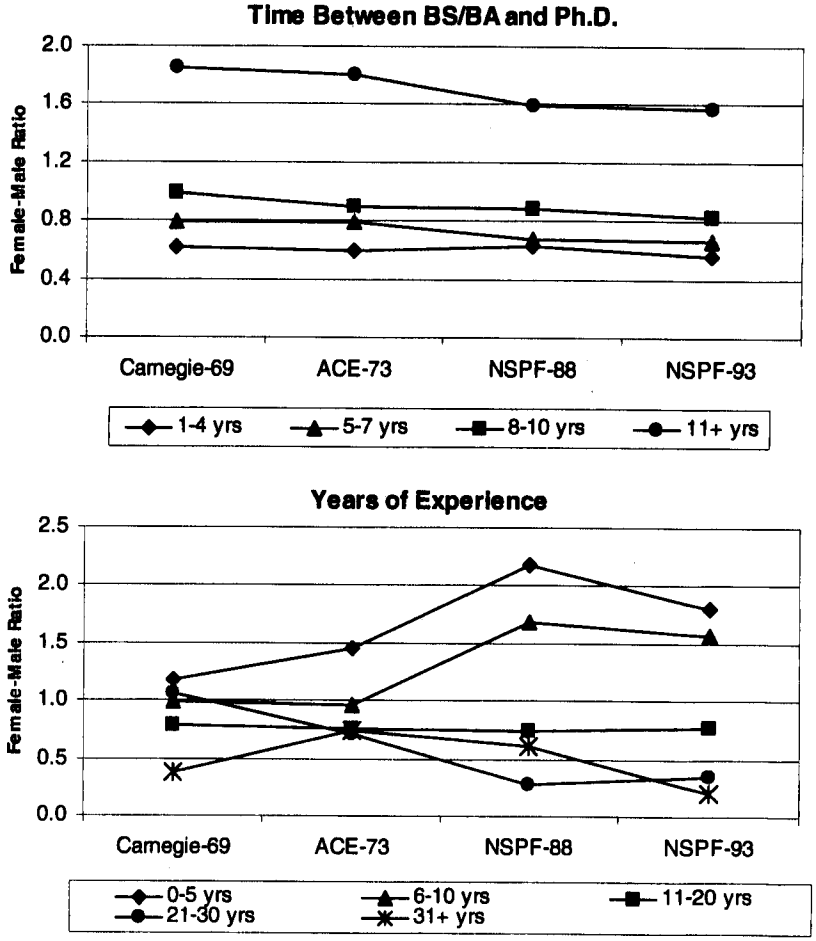
The time a graduate student takes to complete his/her graduate degree has been shown to be correlated with publication productivity (Clemente 1973). The time between bachelor's and doctoral degrees may influence later scholarly productivity through a number of indirect causal routes. First, delayed attainment of a doctoral degree may be seen by hiring institutions as an indicator of low levels of drive or commitment and hence may handicap an individual in the competition for positions in resource-rich institutions. Second, a long period between bachelor's and doctoral degree may lead to delays of first publications. Since early publication is correlated with higher rates of publication over the course of a scholar's career (Reskin 1978), delayed first publication inhibits the early establishment of a publication record. Sex differences in the time between bachelor's and doctoral degree are presented in the top panel of Figure 6. The figure shows that at each point of observation during the 24-years, women are significantly more likely than men to take eleven or more years to complete a doctoral degree. In 1969, women were over 1.8 times as likely as men to earn their Ph.D. eleven years after earning their bachelor's degree. By 1993 the female-to-male ratio declined only slightly to 1.6. Women and men are about equally likely to spend 8-10 years between undergraduate and graduate degree, but women are less likely than men to earn their doctoral degree in under seven years. Some women may take more time to complete their doctoral degree because their family

responsibilities interfere with their graduate studies. For example, they may temporarily withdraw from school to support their husbands' education or to bear and raise children.

The final background characteristic that we consider in our analysis is years of experience in a faculty position. Publication productivity displays a distinct pattern over the life course: It sharply increases to a peak early in the

Figure 6

SEX DIFFERENCES IN EXPLANATORY VARIABLES MEASURING BACKGROUND CHARACTERISTICS:
Carnegie-69, ACE-73, NSPF-88, NSPF-93



career and then gradually declines (Long 1992; Levin and Stephan 1991). Because women have begun to join the ranks of postsecondary faculty in significant numbers only during the past two decades, they tend to have fewer years of experience on average than do male postsecondary faculty. The implication of the relatively recent entry of women into faculty positions for sex differences in years of experience is evident in the bottom panel of Figure 6. The female-to-male ratio of the proportion of postsecondary faculty who have 0-5 years of experience increased from 1.2 in 1969 to 2.2 in 1988 and then declined to 1.8 in 1993. The female-to-male ratio of the proportion of faculty with 6-10 years of experience increased from one in 1969 and 1973 to 1.6 in 1993. Conversely, the data show that women are much less likely than men to have a great many years of experience: for example, the female-to-male ratio of the proportion of faculty with 21-30 years of experience declined from one in 1969 to 0.3 in 1988. The data clearly show that women have become overrepresented among postsecondary faculty whose careers are still young and underrepresented among faculty with extensive years of experience. Given the life-course profile of publication rates, it is necessary to control for professional experience in our multivariate models explaining sex differences in publication productivity.

Career Characteristics and Resources

Distinct types of postsecondary institutions differ in the demands and expectations placed on the faculty who staff them. Institutions vary

Figure 7

SEX DIFFERENCES IN TYPE OF CURRENT INSTITUTION:
Carnegie-69, ACE-73, NSPF-88, NSPF-93

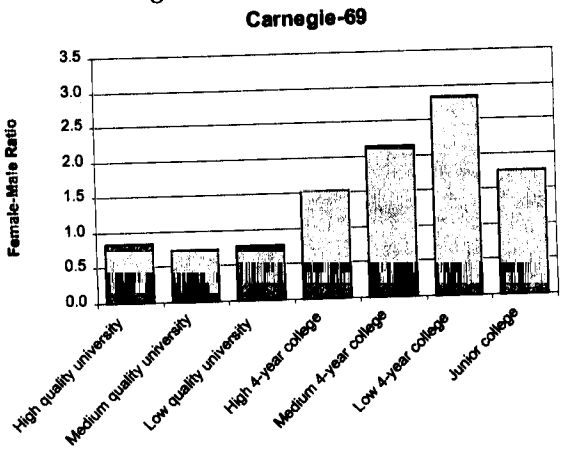
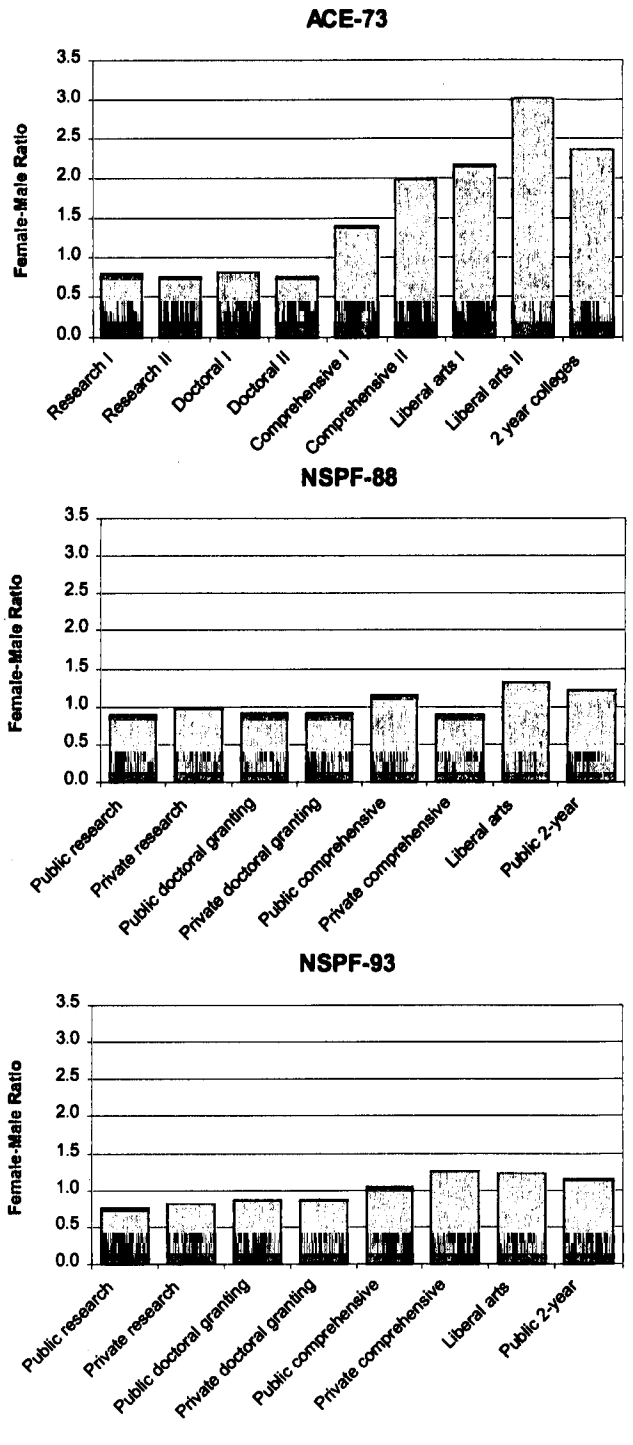


Figure 7 *continued*



significantly in the level of publication productivity that is expected of faculty and in the structural resources that support faculty's scholarly publication. The demand and support for publication is greatest at public and private research and doctoral granting universities. At other types of universities and colleges, teaching tends to be either emphasized or the sole expectation of faculty. Previous research has shown that the type of institution of faculty employment is significantly related to publication productivity (Allison and Long 1990; Blackburn, Behymer, and Hall 1978; Clemente 1973; Long 1978; Reskin 1978). Research has also shown that women are underrepresented in the types of institutions where publication is expected and supported and overrepresented in institutions where teaching is the primary duty of faculty (Bentley and Blackburn 1992; Reskin 1978; Long and Fox 1995).

Figure 7 presents the pattern of sex differences in type of employing institution at the time of each survey. Although the measures of institutional type used for each survey are comparable, they differ slightly in classification scheme.[2] The female-to-male ratio of proportionate representation in research and doctoral granting universities is less than one for all data sources, indicating that women are less likely than men to be employed in such institutions. Conversely, the female-to-male ratio is almost uniformly greater than one for teaching-oriented types of institutions such as 4-year, comprehensive, and liberal arts colleges. The data, however, reveal a marked decrease in the segregation of women in 4-year, comprehensive, and liberal arts colleges. The results from the Carnegie-69 data show that women were 1.5 to 2.8 times as likely as men to be employed in 4-year colleges, and the ACE-73 data show that women were 2.2 to 3 times as likely as men to be employed in liberal arts colleges. According to the NSPF-1988 and NSPF-1993 data, however, the concentration of women had declined significantly. In 1988, the female-to-male ratio for employment in a liberal arts college was about 1.4, and in 1993 it stood at 1.2. The data for type of employing institution therefore appear to show movement toward a more equitable distribution of male and female postsecondary faculty. The persistent underrepresentation of women in research and doctoral granting universities and slight overrepresentation of women in liberal arts colleges should contribute to sex differences in publication productivity.

Sex differences in publication productivity may also be partly explained by sex differences in other career characteristics such as the academic rank and teaching hours of postsecondary faculty. A comparison of the

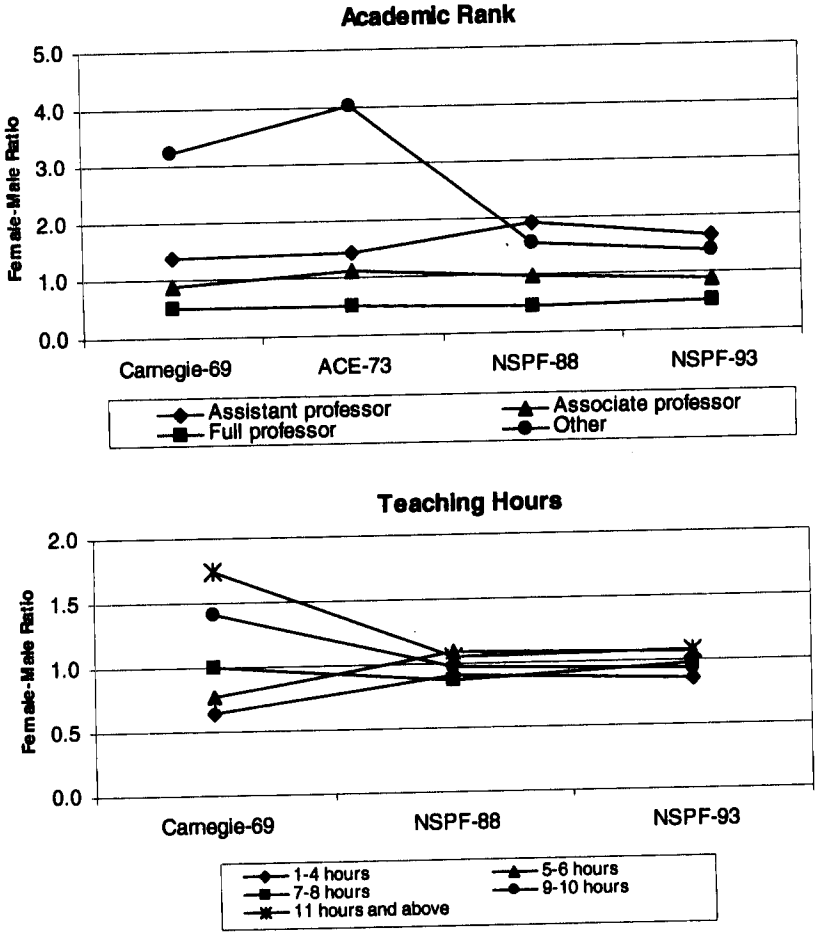
proportionate distribution of male and female postsecondary faculty across four levels of academic rank is presented in the top panel of Figure 8. The data confirm the pattern of female overrepresentation among low ranks and female underrepresentation among advanced ranks of the academic ladder, as reported in previous research (Ahern and Scott 1981; Bentley and Blackburn 1992). There has been a significant decline since the early 1970s in the female-to-male ratio of the proportion of postsecondary faculty in "other" academic ranks. Other ranks are non-tenure-track, including instructorships and lectureships. In the late 1960s and early 1970s, women were 3.3 to 4 times as likely as men to be employed in these non-tenure-track ranks. By 1993 the female-to-male ratio had dropped significantly but still stood at 1.4, indicating that women were still 40 percent more likely than men to be employed in non-tenure-track positions. Women also continue to be overrepresented among assistant professors. The increase in the female-to-male ratio for assistant professors from 1.4 in 1973 to 1.9 in 1988 may be attributable to the relative youth of female postsecondary faculty, as well as to sex differences in promotion rates. Throughout the 24-year period, women and men have been about equally represented at the associate professor rank, but women are about half as likely as men to be among the ranks of full professors at every point of observation.

The teaching load carried by a postsecondary academic can have a significant impact on publication productivity through its effect on the time available for research. The inverse relationship between teaching load and publication productivity may have a disproportionate effect on the average publication rates among female faculty, for women report spending more hours at teaching and carrying heavier course loads than male faculty (Xie and Shauman 1998). Sex differences in teaching load are partly explained by the overrepresentation of women in postsecondary institutions that emphasize teaching over research such as liberal arts colleges. However, even within the same institutional type, women tend to spend more time teaching than do men. We measure teaching load with the number of hours per week that postsecondary faculty report devoting to classroom teaching. The coding scheme for the teaching hours variable is identical for the Carnegie-69, NSPF-88, and NSPF-93 data. Because a slightly different classification of teaching hours was used for the ACE-73 data, descriptive results for this survey are not presented here. The variable, however, is included in the multivariate analysis for all the surveys.[3]

The female-to-male ratio of self-reported faculty teaching hours is presented in the bottom panel of Figure 8. The convergence of the

Figure 8

SEX DIFFERENCES IN EXPLANATORY VARIABLES MEASURING CAREER CHARACTERISTICS:
Carnegie-69, ACE-73, NSPF-88, NSPF-93



female-to-male ratio for each teaching hours category between 1969 and 1988 is the most striking aspect of this graph. In 1969, women were much more likely than men to devote more than 11 hours per week to classroom teaching and much less likely than men to be among those who spend only 1-4 hours in the classroom each week. By the late 1980s and early 1990s, the distributions of women and men across all the teaching hours categories were about equal: in 1993 the female-to-male ratio

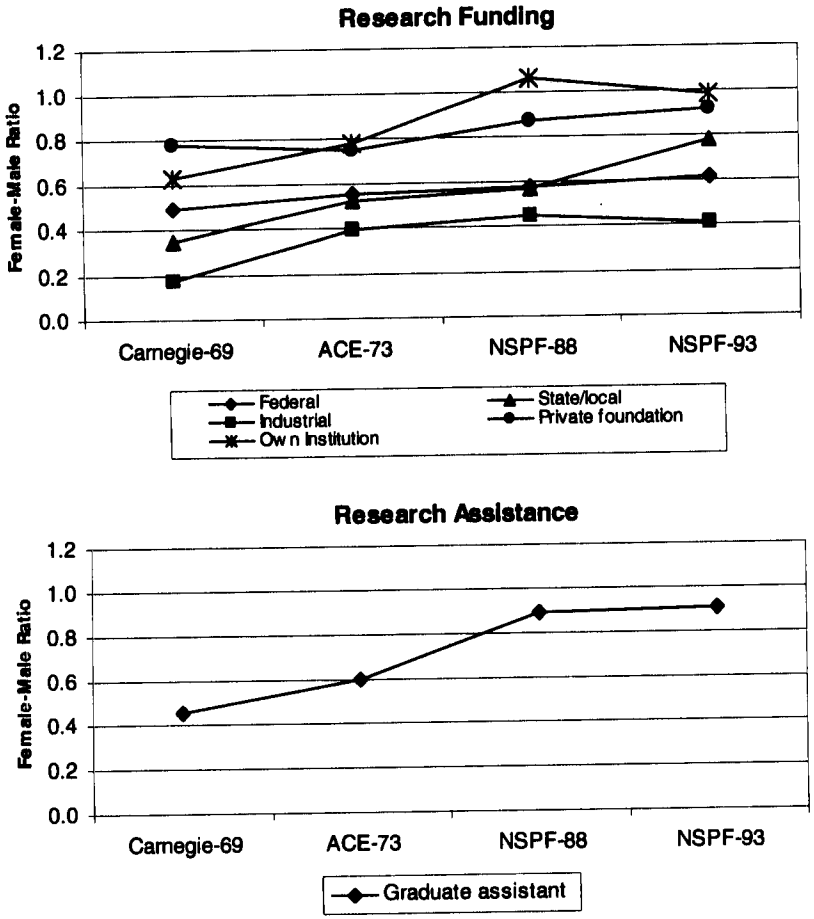
ranged from 0.9 for 1-4 teaching hours to 1.1 for the 11+ hours category. These results clearly show that sex differences in teaching responsibilities have largely disappeared.

Publication productivity is also affected by access to resources that facilitate research and its dissemination. Two very important resources from which faculty may benefit are research funding and research assistance. The importance and availability of research funding varies significantly across academic disciplines, but the extent to which access to research funding differs for men and women within the same discipline may help explain sex differences in publication productivity. All of the four data sets included questions about funding resources. We measure research funding with a set of dichotomous variables that indicate whether or not a faculty member received funding from each of five sources: federal, state, private, industrial, and the respondent's own institution. The statistics describing sex differences in research funding from each data source are presented in the top panel of Figure 9. The upward slope of each of the lines in this graph reflects increasing gender equality in access to each funding source, but apparent sex differences remain. For example, throughout the 24-year period, women have been much less likely than men to have their scholarship funded by industrial sources. This disparity is likely a result of the underrepresentation of women in the natural sciences and engineering, since industry is a major source of funding for research in these fields. Women are also significantly less likely than men to receive funding from federal sources: In 1993, women were 40 percent less likely than men to report having received funding from the federal government. According to the NSPF-93, men and women are about equally likely to have funding from their own institution, and they appear to have nearly equal access to funding from private foundations (female-to-male ratio = 0.9).

Access to research assistance in the form of a graduate student assistant is another resource that can greatly facilitate the publication process. Having the aid of one or more research assistants can expedite the conduct and completion of research that result in scholarly publications. Each of the four data sets collected information on whether or not respondents had at least one graduate student research assistant. The data show a significant decrease in the gender gap in access to research assistance. In 1969, female postsecondary faculty were 70 percent less likely than their male colleagues to report having a research assistant. By 1988, the gap had declined to the extent that women were only 10 percent less likely than men to have a research assistant. Although the gap did not decline further between 1988

Figure 9

SEX DIFFERENCES IN EXPLANATORY VARIABLES MEASURING RESOURCES:
Carnegie-69, ACE-73, NSPF-88, NSPF-93



and 1993, the trend toward gender equity during the 1970s and 1980s was significant. Taken together, the results on sex differences in research funding and research assistance indicate increased equality in access to resources that facilitate publication. This convergence toward equality undoubtedly has had a positive effect on declining sex differences in publication productivity. Because significant disparities by sex in access to resources remain, we

are interested in knowing the extent to which controlling for resources helps explain sex differences in publication rates.

Family Status

Marriage and parenthood are hypothesized to have differential effects on the publication productivity of male and female faculty because of significant sex differences in the time and emotional demands of marital and familial roles. It is commonly assumed that women's careers slow after marriage and childbearing, whereas men's careers are bolstered, especially by marriage. Although previous research has found childbearing to negatively affect productivity for both men and women scientists (Hargens, McCann, and Reskin 1978), there is reason to hypothesize that marriage may be a positive influence. A postsecondary academic's work may benefit from the additional economic resources of marriage and the support of a spouse. Research has shown a positive effect of marriage on the publication productivity of postsecondary faculty in the sciences. Cole and Zuckerman (1987:125) find that "Women scientists who marry and have families publish as many papers per year, on the average, as single women." Xie and Shauman (1998) report that married scientists have significantly higher rates of productivity than unmarried scientists, and they find no evidence that the effect of marital status on publication productivity differs between men and women.

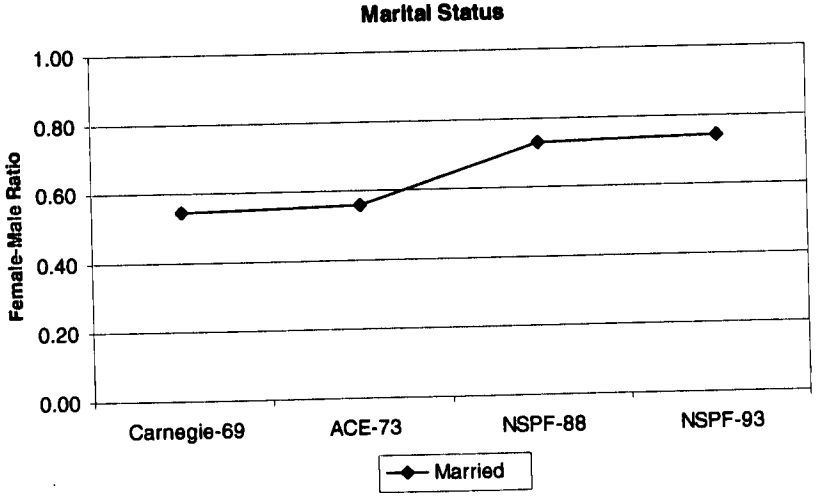
To measure marital status, we use a dichotomous indicator that contrasts postsecondary faculty who reported being married to those who reported being unmarried (either single, divorced, widowed or separated) at the time of the survey. Figure 10 presents the female-to-male ratio in the proportion of postsecondary faculty who are married at each point of observation between 1969 and 1993. The data reveal a persistent sex difference in marriage rates among postsecondary faculty. Throughout the 24-year period, significantly lower proportions of female academics are married than are male academics. Although the data show that the ratio increased from 0.56 to 0.73 between 1973 and 1988, the upward trend did not continue into the early 1990s. The female-to-male ratio in 1993 indicates that women faculty are 25 percent less likely than men to be married. Given women faculty's lower likelihood of being married, they are less likely, on average, to benefit from marriage. If being married benefits the publication productivity of male and female postsecondary faculty equally, then controlling for marital status will help explain sex differences in publication rates.

MULTIVARIATE RESULTS: EXPLAINING SEX DIFFERENCES IN PUBLICATION PRODUCTIVITY

We use negative binomial models to estimate the effects of sex and the other explanatory variables on the number of publications during the two years prior to the date of the survey as reported by each postsecondary faculty respondent. See Long (1997) for an explanation of this statistical method and Xie and Shauman (1998) for a discussion of the suitability of this method for modeling publication rates. For each disciplinary group, we build a series of hierarchical models with the number of publications as the dependent variable. We estimate four models for each data set. We begin with the bivariate model including sex as the sole independent variable. The second model incorporates background characteristics. The third model adds career characteristics and resources, and the final model includes marital status. These models are hierarchical in that as variables are added, the simpler model is nested within the more complicated model. As variables are added, we track variations in the estimated coefficient of sex. Given the hypothesis that sex differences in productivity are due to sex differences in intervening variables, we are interested in whether the magnitude of the sex coefficient shrinks towards zero as we gradually

Figure 10

SEX DIFFERENCES IN MARITAL STATUS OF POSTSECONDARY FACULTY:
Carnegie-69, ACE-73, NSPF-88, NSPF-93

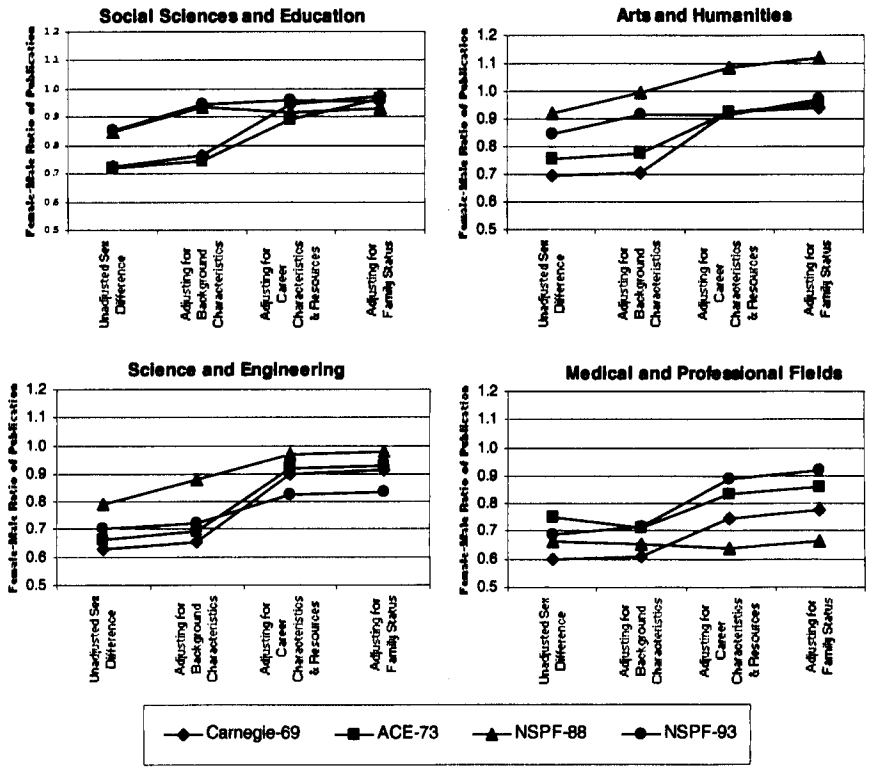


account for the intervening explanatory variables. Appendix Tables 2a-d present the estimated coefficient of sex and model fit statistics for the four negative binomial models of publication productivity among postsecondary faculty in each of the four disciplinary groups.

The results of our multivariate analysis are summarized in Figure 11. This figure presents, separately for each of the four disciplinary groups, the estimated female-to-male ratios of publication rates for the four hierarchical models by data source. These figures show that the female-to-male ratio in publication productivity increases toward one as the intervening explanatory variables are added to the statistical model. The results indicate that

Figure 11

ESTIMATED FEMALE-MALE RATIO OF PUBLICATION RATES ADJUSTING FOR BACKGROUND CHARACTERISTICS, CAREER CHARACTERISTICS, AND MARITAL STATUS FOR EACH ACADEMIC FIELD:
Carnegie-69, ACE-73, NSPF-88, and NSPF-93



sex differences in publication productivity are largely accounted for by sex differences in background characteristics, career characteristics and resources, and marital status. In fact, after controlling for the intervening variables, we generally observe negligible difference in the publication rates between male and female postsecondary faculty.

For postsecondary faculty in the social sciences and education, accounting for sex differences in background characteristics, career characteristics and resources, and marital status increases the female-to-male ratio to between 0.93 and 0.97 for all the data sets. Note that for the social sciences and education, the coefficient of sex is not statistically significant from zero in the final model for any of the data sets. Furthermore, for data from the Carnegie-69, NSPF-88, and NSPF-93, the coefficient of sex becomes insignificant after the career and resource variables are included in the model (see Appendix Table 2a). These results indicate that sex differences in publication productivity among postsecondary faculty in the social sciences and education are accounted for by sex differences in background and career characteristics, and that marital status does not help explain sex differences in publication rates.

A similar explanatory pattern emerges for the arts and humanities. For faculty in the arts and humanities, sex differences in publication productivity decline to insignificance for all data sets after controlling for background and career and resource variables (see Appendix Table 2b). After adjusting for all the intervening factors, the female-to-male ratio of publication rates ranges from 0.94 to 1.12. We thus find that female and male faculty in the arts and humanities would have the same publication rates if they had the same background characteristics and were located in the same structural positions with equal resources.

Controlling for the three groups of intervening variables has a similar effect on sex differences in publication productivity among faculty in the sciences and engineering fields. For faculty in these fields, the estimated effect of sex is reduced to insignificance after adjusting for career and resource variables for the ACE-73 and NSPF-88 data. For the Carnegie-69 data set, the effect of sex becomes insignificant after marital status is controlled in the fourth model. And for the most recent data, the NSPF-93, the female-to-male ratio of publication remains significantly different from one, at 0.84, after controlling for all the intervening variables (see Appendix Table 2c). It is unclear whether the deviation of the NSPF-93 results represents a real departure from the patterns observed from earlier surveys or measurement problems in the 1993 data set unknown to us.

Overall, however, it is safe to say that our final multivariate model is still quite powerful in explaining sex differences in publication productivity among science and engineering faculty, although it is slightly less so than it is for faculty in the social sciences and education and in the arts and humanities.

The multivariate model of publication productivity successfully accounts for sex differences in publication rates among faculty in the medical and professional fields for only two of the four data sources. Although the results for the medical and professional fields exhibit the same general pattern of increasing female-to-male ratio of publication rates as intervening variables are added to the model, the pattern is not as clear as it is for the other disciplines. The estimated sex difference is reduced to insignificance for the ACE-73 and the NSPF-93 data sets, but it remains statistically significant (at α=0.05 significance level) for Carnegie-69 and NSPF-88 even after controlling for all the background, career, and resource variables, as well as marital status (see Appendix Table 2d). In addition, the adjusted female-to-male ratio of publication rates from the final model is much lower for the medical and professional fields than for the other disciplinary groups. For the medical and professional fields, the ratio ranges from 0.66 to 0.92. For the other three disciplinary groups, the final model yields adjusted female-to-male ratio values much closer to unity. These results indicate that our multivariate model is less successful in accounting for sex differences in publication productivity among faculty in the medical and professional fields than among the other disciplines. One possible explanation for the discrepancy is that the category of medical and professional fields is too heterogeneous to allow meaningful comparisons between male and female faculty within the category.

DISCUSSION AND CONCLUSION

The results of this research support three main findings. First, with trend data covering the 24-year period from 1969 to 1993, we show that sex differences in research productivity have generally declined among faculty in all academic disciplines. The overall male-female gap in average publication rates of postsecondary faculty has been narrowing, as has the male-female difference in the proportion of academics who publish. The trend toward increasing gender equality in publication productivity is clearly evident among faculty in the social sciences and education, the arts and humanities, and the sciences and engineering. The trend among faculty in

the medical and professional fields, however, does not follow the same orderly pattern of increasing equality observed in the other disciplines.

Second, in concert with the declining trend in the overall sex differences in publication productivity, male and female postsecondary faculty have become increasingly similar in terms of individual and career characteristics that are conducive to publication productivity. The representation of women in all the four major disciplinary groups increased significantly between 1969 and 1993, and women have increasingly occupied similar positions within the postsecondary community and had similar access to facilitating resources as men. As of 1993, however, significant differences between the sexes remain. Women have consistently taken more time to complete their doctoral degrees, and this gender gap puts women in a disadvantaged position as compared to men. The more recent influx of women into postsecondary careers means that women have fewer years of experience than men on average, and this difference in professional experience may explain the continued overrepresentation of women in the lower ranks of the academic career ladder. Women are no longer as heavily segregated, as they were in the 1960s and 1970s, in postsecondary institutions that tend to emphasize teaching rather than research, although sex segregation by institution has persisted to some extent. Sex differences in teaching hours have declined dramatically, but on average women continue to report devoting more of their work time to teaching than do men. Women also continue to report having fewer resources such as research funding and research assistance than do men, although the gap in access to facilitating resources has narrowed somewhat. Finally, women postsecondary faculty are less likely than men to be married and thus are less likely to benefit from marriage.

The third major finding of this research is that accounting for sex differences in relevant individual and career characteristics explains a significant portion of the raw sex differences in publication productivity for four different data sets during the 24-year period examined. Especially for the social sciences and education, the arts and humanities, and science and engineering, we have successfully identified differences between men and women postsecondary faculty in personal characteristics, structural positions, and facilitating resources that account for women's lower publication productivity. In other words, we found that women publish fewer articles and books than men because women are less likely than men to have the background characteristics, the structural positions, and the resources that are conducive to publication productivity. We conclude that the direct effect of sex on productivity is extremely small, if it exists at all.

With the exception of postsecondary faculty in medical and other professional fields, the empirical results presented in this paper are very similar to those of Xie and Shauman (1998). The congruency in results suggests that similar processes underlie sex differences in scholarly productivity among academic scientists and engineers as among academics in the other fields. We have shown, for example, the secular trend of women's increasing role in all the disciplines: Women have not only increased their representation in all the disciplines in the academy but have also positioned their activities away from teaching toward research in significant ways. Although true gender equality in postsecondary education is still to be achieved, the gap in structural positions between men and women faculty is much narrower now than two decades ago.

Parallel to Xie and Shauman's results, the results of our preceding analyses also point to the crucial role of certain individual and career characteristics in determining publication productivity. The unequal distribution of these characteristics by gender (in disfavor of women faculty) has been the main reason for women's lower productivity rates. However, we still do not know *why* men and women differ systematically on these important dimensions. In some sense, we are merely replacing the "productivity puzzle" by a "career puzzle." This summary statement suggests that the focus of future research should be shifted away from the connection between sex and publication productivity and into the connection between sex and those individual and career characteristics that facilitate scholarly productivity. In other words, our findings should lead to a renewed interest in the long-standing social problem of sex differences in the career trajectories of male and female academics (Bernard 1964).

NOTES

1. For both the Carnegie-69 and ACE-73 surveys, the publication count was measured in categorical intervals through a closed-ended question. For these data sets, we use the midpoint of the response categories as an approximation of publication counts. The coding scheme used was: none = 0,1-2 = 1.5, 3-4 = 3.5, 5-10 = 7.5, and more than 10 = 12.5. The NSPF-88 and NSPF-93 is coded as a detailed count of publications for each respondent.
2. For the Carnegie-69 data, the classification of institutional type is based on the Gourman Report of 1967 (Trow et al. 1975). The ACE-73

survey instrument rated institutions according to what became known as the Carnegie Classification scheme. In NSPF-88 and NSPF-93, institutions were rated according to a modified Carnegie Classification that is very comparable to that used for the ACE-73.

3. The ACE-73 classification scheme and female-to-male ratio of self-reported teaching hours is as follows: the female-to-male ratio of respondents reporting 1-4 hours of teaching per week is 0.770; the female-to-male ratio of respondents reporting 5-8 hours of teaching per week is 0.767; the female-to-male ratio for 9-12 teaching hours per week is 1.360; and female-to-male ratio for 13-16 weekly teaching hours is 1.291.

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Appendix Table 1

PERCENT DISTRIBUTION OF POSTSECONDARY FACULTY BY DETAILED ACADEMIC FIELDS: Carnegie-69, ACE-73, NSPF-88, and NSPF-93

Academic Discipline	Carnegie-69 Male	Carnegie-69 Female	ACE-73 Male	ACE-73 Female	NSPF-88 Male	NSPF-88 Female	NSPF-93 Male	NSPF-93 Female
Social Sciences and Education	91.18	8.82	88.73	11.27	69.59	30.41	58.99	41.01
Education	15.75	29.17	20.75	39.15	43.50	60.78	29.05	46.96
Psychology	25.71	30.15	27.02	29.93	15.63	15.52	18.26	21.22
Sociology/Anthropology	17.22	18.14	15.77	13.97	10.36	11.21	15.38	11.25
Economics	17.05	6.86	13.40	5.49	11.30	3.45	13.58	5.43
Political Science	14.75	8.33	13.43	7.98	6.97	2.16	11.24	5.30
Other Social Sciences	9.53	7.35	9.63	3.49	12.24	6.90	12.50	9.83
Total *n*	(4,217)	(408)	(3,157)	(401)	(531)	(232)	(1,112)	(773)
Arts and Humanities	88.72	11.28	88.65	11.35	73.85	26.15	62.43	37.57
Arts	14.00	13.74	14.59	12.05	9.94	11.42	14.54	15.36
English	26.73	31.30	25.51	32.05	17.06	29.91	31.60	44.13
Foreign languages and literature	21.60	33.74	20.64	34.22	15.04	29.68	13.61	21.09
History	22.93	10.43	23.60	13.25	29.83	16.67	22.94	12.01
Philosophy, Religion, and other	14.75	10.78	15.67	8.43	28.13	12.33	17.31	7.40
Total *n*	(4,523)	(575)	(3,242)	(415)	(1,237)	(438)	(1,190)	(716)
Science and Engineering	96.42	3.58	96.56	3.44	88.25	11.75	81.30	18.70
Engineering	23.60	2.23	21.82	1.25	19.29	6.12	19.53	9.69
Mathematics and Computer Science	14.20	19.55	16.54	20.00	19.29	19.39	25.56	24.22
Physical Sciences	30.75	25.42	30.91	24.58	29.76	26.53	27.00	19.37
Biological Sciences	31.45	52.79	30.73	54.17	31.66	47.96	27.92	46.72
Total *n*	(9,633)	(358)	(6,740)	(240)	(736)	(98)	(1,526)	(351)
Medical and Professional Fields	92.11	7.89	91.87	8.13	72.24	27.76	59.38	40.62
Medical Fields	18.47	17.16	21.04	15.29	18.34	4.55	11.40	6.43
Nursing, and other medical sciences	24.03	64.93	13.85	60.00	15.28	64.77	10.40	52.05
Business	50.48	11.19	56.35	21.18	56.77	26.14	69.00	33.92
Other professional schools	7.03	6.72	8.75	3.53	9.61	4.55	9.20	7.60
Total *n*	(1,565)	(134)	(960)	(85)	(229)	(88)	(500)	(342)

Appendix Table 2a

ESTIMATED PARAMETER FOR SEX AND MODEL FIT STATISTICS FOR FOUR NEGATIVE BINOMIAL MODELS OF RESEARCH PRODUCTIVITY AMONG POSTSECONDARY FACULTY IN THE SOCIAL SCIENCES AND EDUCATION: Carnegie-69, ACE-73, NSPF-88, and NSPF-93

	Model Specification[a] 1	2	3	4
Panel A: Carnegie-69 (n=4,625)				
b_{Sex}	-0.320***	-0.268***	-0.058	-0.027
(SE)	0.051	0.051	0.048	0.050
Exp(b_{Sex})	0.726	0.765	0.943	0.974
Model Chi-square	37.88	324.07	1221.84	1228.05
DF	1	13	32	33
Panel B: ACE-73 (n=3,558)				
b_{Sex}	-0.330***	-0.292***	-0.114*	-0.038
(SE)	0.056	0.055	0.052	0.055
exp(b_{Sex})	0.719	0.747	0.892	0.963
Model Chi-square	34.03	291.32	895.52	912.51
DF	1	13	33	34
Panel C: NSPF-88 (n=763)				
b_{Sex}	-0.163	-0.069	-0.086	-0.074
(SE)	0.105	0.110	0.102	0.104
exp(b_{Sex})	0.850	0.933	0.918	0.928
Model Chi-square	2.35	39.09	183.91	184.24
DF	1	13	33	34
Panel D: NSPF-93 (n=1,885)				
b_{Sex}	-0.159*	-0.056	-0.043	-0.045
(SE)	0.066	0.069	0.064	0.065
exp(b_{Sex})	0.853	0.945	0.958	0.956
Model Chi-square	5.66	54.45	394.67	394.69
DF	1	13	33	34

*$p<.05$ **$p<.01$ ***$p<.001$ (two-tailed test)

[a]Model Specification:
(1) Sex only
(2) (1) + Field
+ Time between BA/BS and Ph.D.
+ Years of Experience
(3) (2) + Type of Current Institution
+ Rank
+ Teaching Hours
+ Research Funding
+ Research Assistance
(4) (3) + Marital Status

Appendix Table 2b

ESTIMATED PARAMETER FOR SEX AND MODEL FIT STATISTICS FOR FOUR NEGATIVE BINOMIAL MODELS OF RESEARCH PRODUCTIVITY AMONG POSTSECONDARY FACULTY IN THE ARTS AND HUMANITIES: Carnegie-69, ACE-73, NSPF-88, and NSPF-93

	Model Specification[a]			
	1	2	3	4
Panel A: Carnegie-69 (n=5,098)				
b_{Sex}	-0.363***	-0.346***	-0.077	-0.062
(SE)	0.052	0.051	0.050	0.051
Exp(b_{Sex})	0.696	0.707	0.926	0.940
Model Chi-square	48.25	288.29	1040.79	1042.05
DF	1	12	31	32
Panel B: ACE-73 (n=3,657)				
b_{Sex}	-0.279***	-0.256***	-0.079	-0.049
(SE)	0.062	0.062	0.059	0.061
exp(b_{Sex})	0.756	0.774	0.924	0.953
Model Chi-square	20.16	155.42	686.76	690.92
DF	1	12	32	33
Panel C: NSPF-88 (n=1,675)				
b_{Sex}	-0.085	-0.007	0.083	0.114
(SE)	0.071	0.075	0.073	0.074
exp(b_{Sex})	0.918	0.993	1.086	1.121
Model Chi-square	1.44	110.78	272.04	278.17
DF	1	12	32	33
Panel D: NSPF-93 (n=1,906)				
b_{Sex}	-0.167*	-0.087	-0.089	-0.029
(SE)	0.069	0.073	0.068	0.069
exp(b_{Sex})	0.846	0.917	0.915	0.972
Model Chi-square	5.76	81.03	351.55	372.65
DF	1	12	32	33

*p<.05 **p<.01 ***p<.001 (two-tailed test)

[a]Model Specification:
(1) Sex only
(2) (1) + Field
+ Time between BA/BS and Ph.D.
+ Years of Experience
(3) (2)+ Type of Current Institution
+ Rank
+ Teaching Hours
+ Research Funding
+ Research Assistance
(4) (3) + Marital Status

Appendix Table 2c

ESTIMATED PARAMETER FOR SEX AND MODEL FIT STATISTICS FOR FOUR NEGATIVE BINOMIAL MODELS OF RESEARCH PRODUCTIVITY AMONG POSTSECONDARY FACULTY IN THE NATURAL SCIENCES AND ENGINEERING: Carnegie-69, ACE-73, NSPF-88, and NSPF-93

	Model Specification[a]			
	1	2	3	4
Panel A: Carnegie-69 (n=9,991)				
b_{Sex}	-0.468***	-0.424***	-0.104*	-0.089
(SE)	0.053	0.052	0.048	0.049
Exp(b_{Sex})	0.626	0.655	0.901	0.915
Model Chi-square	74.25	1005.05	3581.45	3583.33
DF	1	11	30	31
Panel B: ACE-73 (n=6,980)				
b_{Sex}	-0.413***	-0.367***	-0.082	-0.075
(SE)	0.067	0.065	0.059	0.060
exp(b_{Sex})	0.661	0.693	0.921	0.928
Model Chi-square	36.95	665.63	2695.51	2695.78
DF	1	11	31	32
Panel C: NSPF-88 (n=834)				
b_{Sex}	-0.237	-0.128	-0.032	-0.023
(SE)	0.138	0.137	0.113	0.115
exp(b_{Sex})	0.789	0.880	0.969	0.977
Model Chi-square	2.80	86.35	446.51	446.74
DF	1	11	31	32
Panel D: NSPF-93 (n=1,877)				
b_{Sex}	-0.356***	-0.323***	-0.194**	-0.179*
(SE)	0.079	0.080	0.068	0.069
exp(b_{Sex})	0.700	0.724	0.824	0.837
Model Chi-square	19.26	151.66	807.14	809.17
DF	1	11	31	32

*p<.05 **p<.01 ***p<.001 (two-tailed test)

[a]Model Specification:
(1) Sex only
(2) (1) + Field
+ Time between BA/BS and Ph.D.
+ Years of Experience
(3) (2) + Type of Current Institution
+ Rank
+ Teaching Hours
+ Research Funding
+ Research Assistance
(4) (3) + Marital Status

Appendix Table 2d

ESTIMATED PARAMETER FOR SEX AND MODEL FIT STATISTICS FOR FOUR NEGATIVE BINOMIAL MODELS OF RESEARCH PRODUCTIVITY AMONG POSTSECONDARY FACULTY IN MEDICAL AND PROFESSIONAL SCHOOLS: Carnegie-69, ACE-73, NSPF-88, and NSPF-93

	Model Specification[a]			
	1	2	3	4
Panel A: Carnegie-69 (n=1,699)				
b_{Sex}	-0.510***	-0.498***	-0.296**	-0.257**
(SE)	0.092	0.091	0.087	0.096
$Exp(b_{Sex})$	0.601	0.608	0.744	0.774
Model Chi-square	29.72	210.32	477.20	478.17
DF	1	11	30	31
Panel B: ACE-73 (n=1,045)				
b_{Sex}	-0.286*	-0.340**	-0.179	-0.150
(SE)	0.111	0.113	0.105	0.116
$exp(b_{Sex})$	0.751	0.712	0.836	0.860
Model Chi-square	6.44	123.87	328.29	328.62
DF	1	11	31	32
Panel C: NSPF-88 (n=317)				
b_{Sex}	-0.413**	-0.424**	-0.452**	-0.410*
(SE)	0.148	0.161	0.164	0.166
$exp(b_{Sex})$	0.662	0.654	0.636	0.663
Model Chi-square	7.34	73.44	120.59	122.47
DF	1	11	31	32
Panel D: NSPF-93 (n=842)				
b_{Sex}	-0.378***	-0.335**	-0.114	-0.083
(SE)	0.092	0.102	0.097	0.098
$exp(b_{Sex})$	0.685	0.715	0.892	0.920
Model Chi-square	16.36	51.49	233.17	236.60
DF	1	11	31	32

*p<.05 **p<.01 ***p<.001 (two-tailed test)

[a]Model Specification:
(1) Sex only
(2) (1) + Field
+ Time between BA/BS and Ph.D.
+ Years of Experience
(3) (2) + Type of Current Institution
+ Rank
+ Teaching Hours
+ Research Funding
+ Research Assistance
(4) (3) + Marital Status