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Authors

Hammel, Eugene A.
Mason, Carl
Prater, Ariadne
et al.

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Gender and the Academic Career in North American Anthropology: Differentiating Intramarket from Extramarket Bias[1]

E. A. HAMMEL, CARL MASON, ARIADNE PRATER, AND ROBERT LUNDY
Departments of Demography and Anthropology (Hammel)/*Department of Demography* (Mason)/*International and Area Studies Training Program* (Prater), *University of California, Berkeley, Calif. 94720/Dialog Information Systems, Palo Alto, Calif. 94305* (Lundy), *U.S.A.* 27 IX 94

Professional employment in anthropology is concentrated in academia. Most graduate training in anthropology continues to stress the classical academic career, most aspirants for the doctorate express an intention to enter such careers, and over 80% of professionally active anthropologists are occupied with teaching and research in postsecondary academic milieux. Anthropology has also been dominated by men, both in numbers and prestige, although in contrast to the situation in some other scientific disciplines, there have always been enough, and enough distinguished, women professionals to allow

 Our use of the phrase "North American" in the title means North America north of Mexico, and it should be clear that in numerical terms events in the United States dominate the analysis.

comparison. These characteristics of the field make statistical examination of gender issues in academic careers in anthropology appropriate.

This report will show that an unmistakable bias against women in hiring at entry level was present before the mid-1970s. Such bias is hard to detect in promotion to higher ranks even before the mid-1970s, and since then even the bias at entry level has disappeared or been reversed. However, other factors in the lives of women, rooted perhaps in traditional expectations of behavior, continue to impede their progress.

We examine the effect of being male or being female on the achievement and unfolding of professional careers in anthropology from the early 1960s into the late 1980s. The data are drawn from the published *Guides to Departments of Anthropology* of the American Anthropological Association 1962–89, consisting of lists of doctorates awarded in 1964 and later and the staffing rosters of academic departments in the United States and Canada in 1962 and later. The data base includes about 7,500 doctorates, 9,800 individuals listed in teaching positions, and 92,000 annual observations of individuals across 28 years.[2]

The 92,000 observations were linked into individual career histories, and it is the trajectory of these careers that we analyze here (see appendix). We identify three important transitions after receipt of the Ph.D.: (1) obtaining a teaching position (JOB); (2) having had such a teaching position, being promoted to associate professor (TENURE); and (3) having been an associate professor, being promoted to full professor (PROF). At the JOB transition we accept as equivalent a series of common entry-level titles (see appendix). At any transition we accept modified titles (acting, visiting, adjunct, etc.) as equivalent to the unmodified title.

The *Guide* data also provide ancillary information on the characteristics of individuals and the institutions with which they are associated. The list of these characteristics is modest at the JOB transition but fuller at the higher transitions. At the JOB transition we know only the following:

Year of award of the Ph.D. (PHDYR). This variable serves to contextualize the analysis, relating each person's chances to those of his or her own entry cohort.

Prestige of the institution awarding the Ph.D. (BIGPHD). This is a simple dichotomy, based on the Cartter (1966) and Roose-Anderson (1970) ratings of graduate programs, separating the top 16 institutions from all others, to which we added our own judgments about the prestige of certain elite foreign universities. These rankings have been relatively stable over time, especially if viewed only dichotomously. We anticipate that a prestigious Ph.D. will assist the career.

Subdiscipline (ARCHaeology, BIOlogical, social-CULTural, with linguistic and medical anthropology included in the last of these). These assignments were judgmental, based on the title of the dissertation. We have no well-founded expectations for this variable but an intuitive one that social-cultural anthropologists might be at a relative disadvantage in the entry-level job market.

We have more information at the two higher transitions, including in addition to the above the following:

Year of the previous transition. For TENURE this is JOBYR, the year of first appearance in the data as assistant professor, and for PROF it is TENYR, the year of first appearance in the data as associate professor. As does PHDYR, this variable contexualizes the analysis within cohorts.

The presence of a gap in service (GAP), indicated by temporary absence from the roster of all departments. We expect that the presence of such gaps will be associated with slower progress. This effect could be confounded if absences were actually research leaves, but most departments seem to continue to list faculty who are on research leave.

Evidence of part-time rather than full-time employment (but not full-time appointments split across more than one department) (NOTFT). We anticipate that part-time appointment will impede the career. Like GAP, this variation may be confounded if individuals are on part-time research appointments, but it seems more common (where we have any knowledge) for departments to continue to list faculty as full-time even if their salaries come in part from research sources.

The gender ratio among tenured faculty at the institution at which the individual is eligible for promotion (GENRAT). We anticipate that a higher proportion of female tenured faculty may improve the possibilities for promotion of women.[3]

The prestige of the department in which the individual is employed (BIGSCHL). Like BIGPHD, this variable is dichotomous and based on the Cartter and Roose-Anderson scales. We anticipate that advancement may

2. Technical issues of analysis and a review of the voluminous literature on gender bias in professional careers are contained in Hammel et al. (1993*a*, *b*). See especially Long (1987) and Long, Allison, and McGinnis (1989, 1993) for methodologically similar work in sociology. A copy of Hammel et al. (1993*b*) may be obtained by writing to the Department of Demography, University of California, Berkeley, Calif. 94720, U.S.A. In the body of the present paper we explicitly avoid technical complexity and comparison with most of the results of other analyses (except within anthropology), but we provide a technical appendix. The underlying data are publicly available on the Internet by anonymous ftp; send electronic mail to carlm@demog.berkeley.edu for details. This research was supported by an initial-expense grant from the American Anthropological Association for photocopying of published data, later by NSF FD89-18850, and by the facilities of the Quantitative Anthropology Laboratory and the Department of Demography at Berkeley. None of these institutions is responsible for any errors of fact or interpretation. We are especially indebted to Ken Exum, Jonathan Habarad, Allison Kiplinger, and Alvida Meneely, among other students, for assistance in data entry and processing and to Debra Blackwell for help in the review of the literature.

3. Hazard analysis shows that this ratio has no significant effect on the relative rates of promotion of men and women.

be more regular, especially relative to gender, in the larger and more prestigious institutions than in the smaller ones, since larger institutions are more thoroughly bureaucratized and less personalistic.

Subdiscipline (ARCH, BIO, CULT, as above). This variable has the same structure as for JOB but comes from a different source, the listing of fields of specialization in the *Guide* data. There are, of course, ambiguous cases that were arbitrarily resolved. We have no particular expectations for the effect of subdiscipline on career advancement above entry level.

Additionally, but for the two higher transitions only, we have information from the *Social Science Citation Index*, *Sociological Abstracts*, and other indexing databases to help us assess scientific productivity or at least professional visibility as manifest in citation rates (CITELOTS, or more than five citations, CITEFEW, or zero to four citations, CITENONE, or no citations). The citations employed here are those published over the entirety of the period 1962–87 but counted for an individual only for those items that were published during the period of eligibility for the transition under consideration. Thus, if an individual became an assistant professor in 1970 and an associate professor in 1977, we counted citations only for those publications that appeared in print 1970–77, even if the citations were made after 1977. This method of counting gives equal credit to work recognized as influential even in cases of late "discovery" of that work and is a fairer assessment of professional activity than citations themselves made only in the period of eligibility, since recognition of published work is often delayed by several years. Of course, our method of counting also allows networking, reputational advantage, and other factors full play, for better or worse.[4] Here, as in other studies, citation counts are notoriously difficult to interpret. Yet the data we have allow no other information.[5]

ANALYTIC STRATEGIES

What we observe in the data are individuals who can be characterized as eligible to achieve some stage in the career by virtue of having achieved some prior stage at some earlier date. For example, the persons receiving the Ph.D. in 1980 can be considered to be eligible to obtain an academic position (JOB) by or after that date (see appendix). They are a cohort at risk of experiencing the event of getting a job. Similarly, those individuals who got a first teaching position in some year such as 1982 constitute a cohort at risk of promotion to associate professor (TENURE) on or after that date.

For such a cohort, we can ask what proportion experienced the event of interest, that is to say, got a job or were promoted. However, as of the date of end of observation, in this analysis in 1989, the earlier cohorts have had more time to experience the event than the later ones. Thus we will expect, even under conditions of no historical change in the chances of hiring or promotion, that earlier cohorts will show a higher rate of experiencing the event than later ones, and comparisons between cohorts will be confounded by their age. We must specify a time limit within which that event is measured: three years from Ph.D. to JOB, nine years from JOB to TENURE, and nine years from TENURE to PROF. The time limit at TENURE is a bit longer than we might think reasonable (for example, the usual "up-or-out" rule for tenure has a time limit of seven years), but it allows a little flexibility for second chances and especially for late reporting of promotions in the *Guide* listings.[6] The time limit for PROF may be a bit short, since attainment of that rank may often take longer than nine years, and there is no customary limit as there is for TENURE. Nevertheless, the limits we use do not seem unreasonable, and changing them (as we have done experimentally) does not alter the results much.

The proportion of persons achieving some transition in a defined time span is taken as the probability of that transition in that time interval. It is the analog of the $q(x)$ of the ordinary life table. It tells us only what proportion achieves the transition, not when inside the time interval it does so, and it assumes that members of cohorts are continually at risk of the event until the time limit specified. Since cohorts between Ph.D. and JOB are not under continuous observation, we can follow no other strategy. Cohorts between JOB and TENURE and between TENURE and PROF are under "continuous" (annual) observation, but we use the same strategy as for JOB to preserve consistency.[7]

We present results primarily as graphical displays that illustrate the following points (see appendix for technical details): (1) the actual experience of successive cohorts of men and women in achieving the JOB, TENURE, and PROF transitions in the time spans defined above; (2) how women would have fared at these transitions if the processes of hiring and promotion had been truly gender-blind or, more precisely, if the women had been treated just as men were treated in these processes (how that hypothetical experience would have compared with the actual experience of men and with the actual experience of women), and (3) whether men and women were treated equally, characteristic for characteristic.

The central idea is that we can conduct a statistical experiment that will reveal differences between the kinds of gender bias that occur within the recruitment and promotion process and those that occur outside it—

4. Because of recognition delays, earlier cohorts can be expected to show higher citation counts than later cohorts, *ceteris paribus*, and are thus advantaged in such analysis. Analysis within cohorts such as we conduct here is not subject to this difficulty.

5. Hazard analysis shows that citation counts are the most powerful of all predictors of professional progress in our data.

6. There is a counterbalancing cost to using a longer rather than a shorter interval. Since we must allow individuals the entire specified time span within which to make the transition, we must stop looking at cohorts earlier than we would with a shorter interval. For example, in this analysis we have to stop looking at TENURE and PROF cohorts nine years before the end of the data set.

7. Hammel et al. (1993*a*, *b*) employed hazard analysis for the TENURE and PROF transitions.

what we will call, respectively, intramarket and extramarket bias. We proceed to:

1. Estimate logistic regressions separately for men and women at each of the defined transitions, obtaining the effect of all of the characteristics available to us on the outcome variable (hiring, promotion).

2. Use these values to produce the estimated probability of success at each transition, separately for men and women, for each historical annual cohort.[8]

3. Produce an analogous, hypothetical level of achievement for women substituting the effects that are particular to men (as estimated in the male regression), characteristic by characteristic. In this sense, we "treat the women just like men." We ask what their experience would have been if they had had the characteristics they had but those characteristics had had the effect that they did when men had those characteristics.

4. Compare the hypothetical experience of women with the actual experience of men.

5. Compare the hypothetical experience of women with the actual experience of women.

Our second step models what actually happened to men and women. Our fourth step shows how women would have fared compared with men if they had been treated like men, and our fifth shows how they would have fared, if so treated, compared with their actual experience.

Finally, we ask whether each characteristic actually had the same effect for men and women by looking at the magnitude and statistical significance of the coefficients for these characteristics for men and for women.

Comparing each gender's modeled experience with the hypothesized experience of women if women were treated like men allows us to decompose any observed disadvantage to women into two parts. The first is a disadvantage that emerges from gender-differential treatment in the processes of recruitment and promotion themselves. The second is any disadvantage that might remain even if women were treated explicitly the same as men. This second part can be thought of as a more subtle, more general, and extramarket bias that stems from the different characteristics of women even though those characteristics are evaluated in the same way as for men. These are thought of as extramarket disadvantages because they depend on events and processes occurring either before women enter the recruitment and promotion processes (for example, in socialization and formal education) or concurrently with their professional involvement but outside of it (for example, in their private and domestic lives).

8. Such probabilities are by assumption in regression the same as the mean success rates in that year. On the basis of this assumption, and in order to use the same procedures for generating pictures of "actual" and hypothetical experience, we use these modeled probabilities to represent the actual success rates of cohorts. Thus, in this presentation, "actual experience" means our model of that experience based on the regression analysis. Sometimes we add a cautionary parenthetical note in the text to stress this.

RESULTS: THE JOB TRANSITION

The most notable aspect of the modeled experience of Ph.D.'s in the hiring market, cohort by cohort, and the hypothesized experience of women if they had been treated like men from 1964 through 1986 (fig. 1) is the drastic decline in the chances that anyone would obtain a teaching job within three years. The chances of finding a job were lower for women than for men most of the time until about 1978, but the female disadvantage has decreased over time. The women of the 1971 cohort had better chances than men, a phenomenon that may be related to the military draft of that year.[9] The narrowing of the gap and final equalization of chances can plausibly be attributed to the force of affirmative action policies.

Comparing the modeled experience of men with the hypothesized experience of women, we find that the female disadvantage virtually disappears in all years. If women had been treated like men, then, their experience would have been almost identical to that of men. Nevertheless, the chances for women are very slightly but consistently lower than those for men. From the evidence of equalization of the modeled experience of the two genders we may conclude that virtually all of the gender difference observed (fig. 1) can be attributed to raw, intramarket gender bias. In the early period this gender bias was directed negatively against women, while in some of the later years women had an advantage over men. From the evidence of the small residual difference between the experience of men and that of women if treated like men we may conclude that there are some characteristics more common among women that disadvantage them in the hiring market. Men were concentrated more in the favorable hiring markets of the 1960s, while women were concentrated more in the tighter markets of the 1980s (table 1). More men than women had prestigious Ph.D.'s, more were in archaeology, fewer were in biological and cultural anthropology. All of these differences are statistically significant. The chances of getting a teaching job were better in the '60s than in the '80s, better with a prestigious Ph.D., and poorer in cultural anthropology than in the other subdisciplines.

Comparing the hypothesized experience of women treated like men with the actual experience of women, we find that the hypothesized women would have done a good deal better than they did for most of the time between 1964 and 1978 but sometimes worse (1980–82, 1984–85). Our conclusion is that there was historical gender bias against women in the recruitment process itself until about 1978, that that has been eliminated or reversed in some later years, and that there is continuing extramarket bias working against women. Our data only allow us to suggest what seem to be "tracking" or "channeling" tendencies in the socialization and education of women that steer them toward specializations and degree sources that are less advantageous.[10]

9. We are indebted to Candice Bradley for this suggestion.

10. It is possible that the data do not reveal other important differences that are correlated with gender but are more plausibly causal

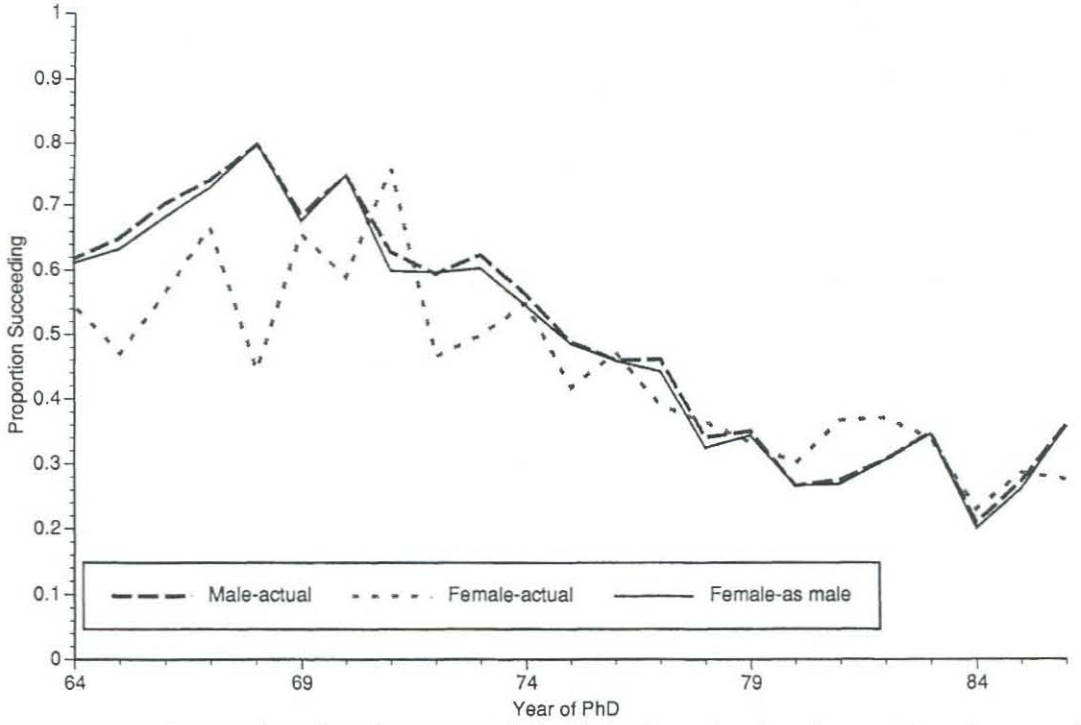

FIG. 1. *Getting an academic job within three years of the Ph.D. for males, females, and females treated the same as males.*

RESULTS: THE TENURE TRANSITION

According to the modeled experience of men and women assistant professors with respect to promotion to associate professor, cohort by cohort of assistant professors, and the hypothesized experience of women treated like men (fig. 2), the chances of tenure for women are almost always lower than the chances for men but do not decline much over time. The chances of tenure for men do decline over time. The result of comparison of the hypothesized experience of women treated like men and the actual experience of men is startling. Although the difference in chances of tenure between men and women treated the same as men is less in the early years than was the case for modeled actual experience, it actually increases somewhat in some of the later years, and in general the disadvantage of women treated the same as men at this transition is more consistent than it was in the modeled actual experience of the two genders. We can conclude from this figure that there surely was some raw gender bias against women up to about the 1971 cohort and perhaps some bias in favor of women after that cohort. But the most important effect is the persistence and clarification of a female disadvantage across the entire time span, even if women are treated the same as men.

We can also see that if women had been treated the same as men they would have had better chances of tenure than they did, most of the time in the cohorts from 1963 to 1972, but often not by much, and would actually have done slightly worse in a few cohorts, such as 1973 and 1974–78.

What are the different characteristics that would have impeded the progress of women even if those impediments were assessed in the same way for men and women? Men were competing for tenure more in the '60s and women more in the '80s (table 1). We know from other analysis (Hammel et al. 1993*a*, *b*) that although there was not much change in the ultimate probability of tenure over the three decades, accelerated advancement declined, so that the "tenure market" was probably somewhat tighter in the '80s. Men and women had about the same chances of having a gap in service, but women were much more likely to have worked part-time. While about three-quarters of the men competing for this transition had not been cited in the literature, almost nine-tenths of the women had not been cited. Conversely, about three times the proportion of men as of women had been cited more than five times. Men (as at the previous transition) were more likely to have a prestigious Ph.D., and men had a greater chance of teaching in a prestigious institution. More men were in

with respect to the effects here revealed. For example, if the social origins or behavioral response patterns of women and men in anthropology differed and had consequences for their careers but we had no knowledge of those characteristics, we could mistake the effect of social origin or behavioral response patterns for a purely exogenous gender effect.

TABLE 1
Descriptive Statistics

Variable	*p*(men)	*p*(women)	*z*(diff)	*p*(diff)
JOB (3,965 men, 2,459 women)				
DEC60	0.16	0.08	9.3246	0.00000
DEC70	0.50	0.46	3.1438	0.00083
DEC80	0.32	0.46	−11.2480	0.00000
BIGPHD	0.47	0.41	4.7272	0.00000
ARCH	0.26	0.16	9.4092	0.00000
CULT	0.59	0.67	−6.3966	0.00000
BIO	0.15	0.17	−2.1029	0.01774
TENURE (2,073 men, 1,011 women)				
DEC60	0.29	0.13	9.8457	0.00000
DEC70	0.49	0.50	−0.4831	0.31453
DEC80	0.22	0.37	−8.7731	0.00000
GAP	0.05	0.06	−1.0753	0.14111
NOTFT	0.38	0.52	−7.3419	0.00000
CITENONE	0.74	0.88	−8.8504	0.00000
CITEFEW	0.10	0.06	3.7701	0.00008
CITELOTS	0.17	0.06	8.4757	0.00000
BIGPHD	0.35	0.30	2.8051	0.00252
BIGSCHL	0.13	0.10	2.4642	0.00687
ARCH	0.23	0.14	5.9079	0.00000
CULT	0.71	0.81	−5.9201	0.00000
BIO	0.06	0.05	1.2099	0.11316
PROF (1,421 men, 409 women)				
DEC60	0.25	0.12	5.6517	0.00000
DEC70	0.41	0.40	0.4197	0.33734
DEC80	0.33	0.48	−5.4990	0.00000
GAP	0.02	0.02	0.2004	0.42058
NOTFT	0.28	0.36	−3.0561	0.00112
CITENONE	0.55	0.71	−5.7316	0.00000
CITEFEW	0.13	0.09	2.2713	0.01156
CITELOTS	0.32	0.20	4.7594	0.00000
BIGPHD	0.49	0.48	0.4127	0.33993
BIGSCHL	0.19	0.13	2.8777	0.00200
ARCH	0.23	0.16	3.1082	0.00094
CULT	0.74	0.81	−2.8378	0.00227
BIO	0.03	0.03	0.1645	0.43468

NOTE: Variables as defined in text.

archaeology, fewer in cultural anthropology, and about the same proportions in biological anthropology. Most of the differences are statistically significant.

The important differences were that women were more likely to have had some part-time employment and were less often cited in the literature. These characteristics damage the careers both of men and women, but women suffer the greater disadvantage because those characteristics are more frequent among them.

RESULTS: THE PROF TRANSITION

The modeled experience of cohorts of associate professors in achieving full professorship, 1963–81 (fig. 3), shows no regular and consistent difference between men and women. The proportions succeeding among women fluctuate a lot, especially in the early period, probably because the number of women associate professors was relatively small. There is a decline of about 30% in the chances of promotion across the time period, but we must recall that the nine-year time limit may be somewhat short and therefore a slowdown in promotion, even if ultimate levels did not change, would have this result.

Comparing the hypothesized experience of women if treated like men to the modeled actual experience of men, we find that women would have fared generally worse than men. When we compare the hypothesized experience of women with their actual experience, it is clear that there would have been no consistent improvement in their experience if they had been treated like men. These results are very much like those for the TENURE transition. There is little evidence for intramarket bias but substantial evidence for extramarket bias—differences in the characteristics of men and women.

What are these characteristics at the PROF transition? Table 1 shows that higher proportions of men were competing for this transition in the '60s, while higher proportions of women were competing in the '80s; any tightening of the "PROF market" would have been felt

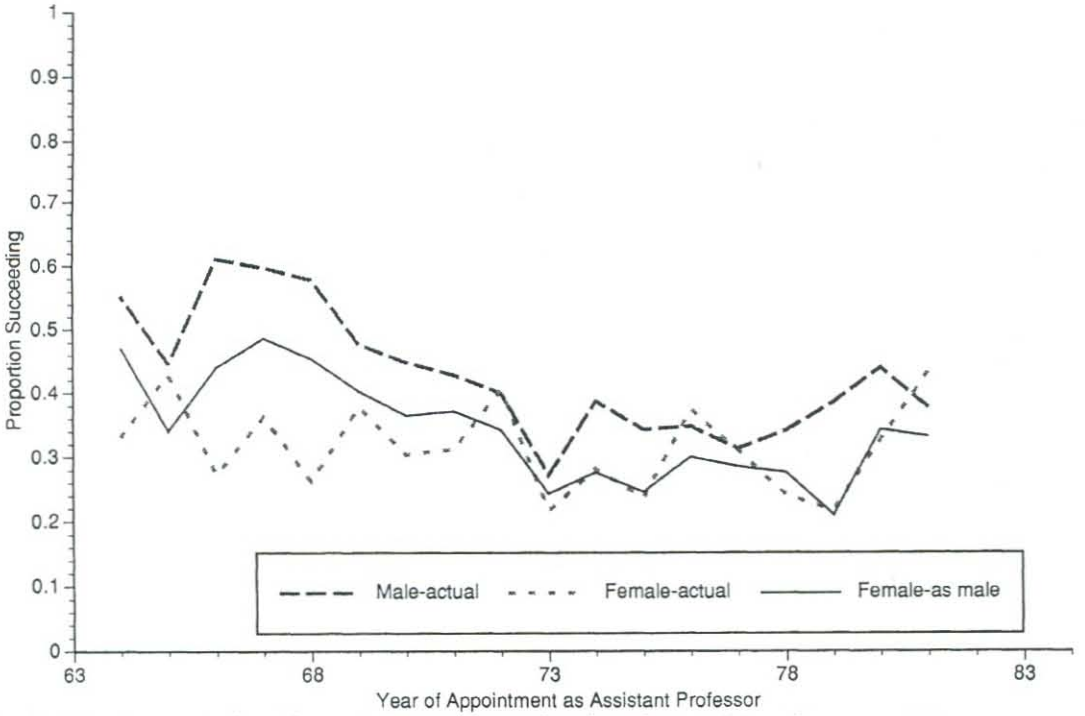

FIG. 2. *Getting tenure in less than nine years for males, females, and females treated the same as males.*

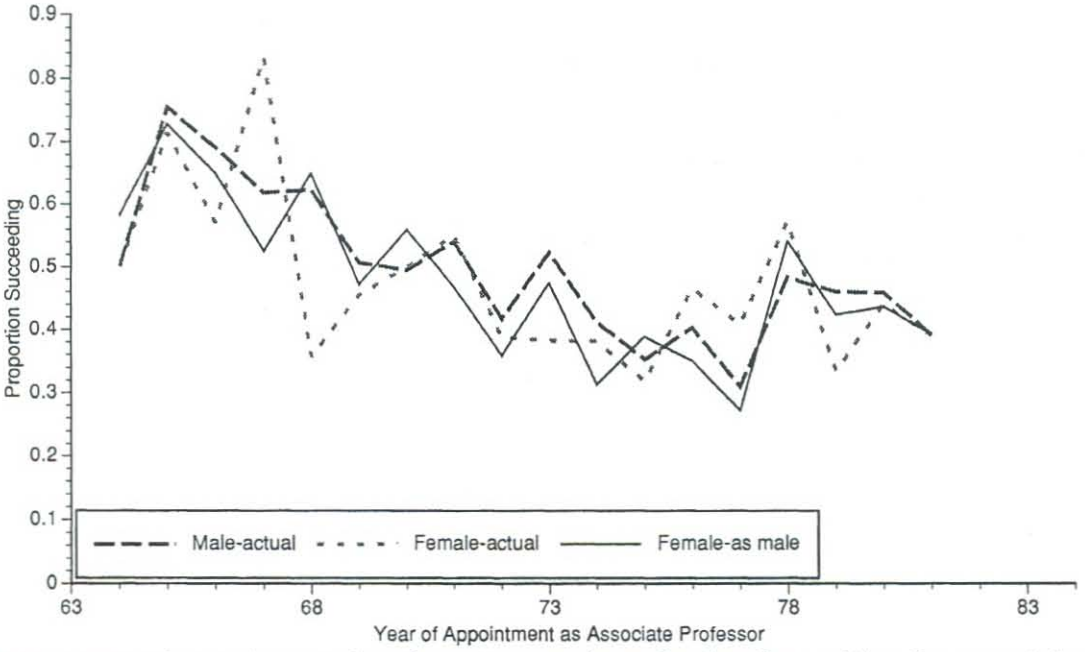

FIG. 3. *Being promoted to professor in less than nine years for males, females, and females treated the same as males.*

more by women, although to be sure there is no clear evidence of such tightening except in a slowdown in accelerated promotions. Women were more likely to have worked part-time. While about half the men at this career point had never been cited in the literature, almost three-quarters of the women had never been cited. Conversely, almost a third of the men had had more than five citations, while only a fifth of the women had. By this career point, men and women were equally likely to have prestigious Ph.D.'s (probably reflecting the concentration of Ph.D.-granting in the prestigious institutions in the years in which these individuals received their degrees), and men were more likely to teach in prestigious institutions. They were more frequently in archaeology and less frequently in cultural anthropology. The differences are statistically significant.

As at the TENURE transition, we see that the characteristics of women place them at greater risk of impeded advancement to the full professorship.

ARE EFFECTS GENDER-BLIND?

Asking what the experience of women might have been if they had been treated like men begs the question of whether the treatment of men and women was equivalent with respect to each of the analytic characteristics. We have seen that in many instances women did not enjoy the same success as men and, because of their different characteristics, would not have even if they had been treated like men. Are women of equivalent characteristics as men treated like men? For example, do men and women enjoy the same facilitation of the career for equivalent numbers of citations in the literature? Do they suffer the same disadvantages from having had part-time work?[11]

The coefficients from the logistic regressions for the JOB, TENURE, and PROF transitions, respectively (figs. 4–6, tables 2–4) estimate the effects of each variable in the context of all the other variables, that is, "all else equal." The intercept in these regressions is an estimate of the effect of all unmeasured variables, including the effect of simply being male or female, and the effects of the measured variables (such as citation counts) are estimated against that baseline. Men benefited more than women if they got their Ph.D.'s in 1968 or 1970 but suffered more than women from the declining job market after 1975 (fig. 4). While the coefficients are not always significant in individual years, the overall pattern is clear; men were advantaged before about 1972, and women were advantaged after that. There was no significant difference in the treatment of men and women in archaeology, and the advantage to both of being in that field was not significant. Men were disadvantaged compared with women in cultural anthropology, but women in that field fared on average the same as women in any other field. Both men and women benefited from having a prestigious Ph.D., but women benefited more than men. Almost everything at the JOB transition is driven by the conditions of the job market across the years, by the rather consistent advantage to men in the early years, and by the even more consistent advantage to women in the later years.

The average chances of women in getting tenure were worse than those of men (fig. 5). (This shows in the intercept for the regressions, which reflects the different characteristics of men and women and differences induced by any unobserved variables.) But given this difference, men rather consistently had a lower chance of tenure through almost all of the period, as indicated by the stronger negative values for the annual male coefficients. Both men and women suffered from gaps in service and from part-time employment, although men had a stronger disadvantage resulting from part-time employment, while women had a stronger disadvantage from gaps in service. Men and women benefited from a prestigious Ph.D., but at this transition men benefited slightly more than women. By far the strongest factors are the citation variables. Both men and women benefited from being cited either occasionally or frequently, and women benefited slightly more than men in both instances.

Men and women had about the same average chance of promotion to full professor (in the intercept), but there are two cohorts (1966, 1969) in which men had better chances than women (fig. 6). Both men and women suffered from gaps in service, but men were more disadvantaged than women if they had a gap. Again, the most important influence was wielded by citations in the literature. Both men and women benefited, but men benefited slightly more than women (in contrast to the result at the TENURE transition).

We see somewhat inconsistent results in the strength of the coefficients. There are small differences in the relative benefit of citation counts to men and women at the TENURE and PROF transitions. There are small differences between men and women in the effect of part-time work and gaps in service. There are similarly minor differences in the effect of having a prestigious Ph.D. At the same time, the effect of annual job markets shows a stronger pattern; men did better before the cohorts of the '70s, and women did better after the '70s, all else equal. The differences in effects between men and women diminish from the lowest to the highest transition. Thus we conclude that the effects of any characteristic were fairly equal for men and women, except those embedded in the historical time periods, probably mostly gender bias in one direction or the other in a changing job market.

DISCUSSION

This analysis reveals that (1) there has been a marked deterioration in the entry-level job market in academic anthropology over the past three decades; (2) there has been less overall historical change in promotion rates once individuals obtained an academic position; (3) there is evidence of marked gender bias against women at entry

11. We caution that our modeling depends on the adequacy of the assumptions of regression.

TABLE 2
Regression Coefficients and Their Differences at the JOB Transition

Variable	$b(M)$	$SE(M)$	$t(M)$	$p(t[M])$	$b(F)$	$SE(F)$	$t(F)$	$p(t[F])$	$b(M) - b(F)$	t(diff)	$p(t$[diff])
[Intercept]	0.32691	0.27005	1.21056	0.22614	−0.24126	0.62355	−0.38691	0.69886	0.56817	50.26702	0.00000
PHDYR65	0.12575	0.34851	0.36083	0.71824	−0.21967	0.78341	−0.28040	0.77920	0.34542	24.16976	0.00000
PHDYR66	0.42500	0.34777	1.22204	0.22176	0.27557	0.74531	0.36974	0.71161	0.14943	10.85965	0.00000
PHDYR67	0.64042	0.33774	1.89622	0.05800	0.70459	0.70807	0.99508	0.31980	−0.06417	−4.88032	0.00000
PHDYR68	1.02681	0.33198	3.09301	0.00200	−0.27725	0.68096	−0.40715	0.68394	1.30406	102.51371	0.00000
PHDYR69	0.38612	0.32727	1.17981	0.23815	0.62870	0.70842	0.88747	0.37491	−0.24258	−18.59510	0.00000
PHDYR70	0.73362	0.33739	2.17436	0.02974	0.32752	0.69342	0.47233	0.63673	0.40610	31.36743	0.00000
PHDYR71	0.17609	0.33575	0.52445	0.59999	1.31033	0.75169	1.74318	0.08143	−1.13424	−82.63331	0.00000
PHDYR72	0.07443	0.29083	0.25594	0.79801	−0.10993	0.64723	−0.16985	0.86515	0.18436	15.57616	0.00000
PHDYR73	0.17202	0.28577	0.60197	0.54723	0.11594	0.64214	0.18055	0.85674	0.05608	4.78689	0.00000
PHDYR74	−0.06812	0.28300	−0.24073	0.80978	0.33123	0.63697	0.52001	0.60310	−0.39935	−34.37824	0.00000
PHDYR75	−0.35869	0.28603	−1.25403	0.20990	−0.25703	0.63558	−0.40441	0.68595	−0.10166	−8.74319	0.00000
PHDYR76	−0.46998	0.28175	−1.66807	0.09538	−0.04646	0.63191	−0.07352	0.94140	−0.42352	−36.71931	0.00000
PHDYR77	−0.51418	0.28548	−1.80111	0.07176	−0.35584	0.63629	−0.55925	0.57605	−0.15834	−13.61288	0.00000
PHDYR78	−0.96033	0.28979	−3.31383	0.00093	−0.39068	0.63436	−0.61587	0.53804	−0.56965	−48.90378	0.00000
PHDYR79	−0.93537	0.29542	−3.16627	0.00156	−0.59979	0.63666	−0.94210	0.34624	−0.33558	−28.59107	0.00000
PHDYR80	−1.31483	0.29757	−4.41850	0.00001	−0.75479	0.63526	−1.18817	0.23488	−0.56004	−47.70281	0.00000
PHDYR81	−1.31238	0.29608	−4.43248	0.00001	−0.46998	0.63764	−0.73707	0.46115	−0.84240	−71.64848	0.00000
PHDYR82	−1.12956	0.30224	−3.73723	0.00019	−0.44642	0.63695	−0.70086	0.48346	−0.68314	−57.83636	0.00000
PHDYR83	−0.96953	0.29842	−3.24885	0.00117	−0.62672	0.63551	−0.98616	0.32415	−0.34281	−29.16943	0.00000
PHDYR84	−1.67327	0.31275	−5.35026	0.00000	−1.11139	0.63677	−1.74537	0.08105	−0.56188	−47.13775	0.00000
PHDYR85	−1.32878	0.30315	−4.38319	0.00001	−0.81979	0.63276	−1.29559	0.19524	−0.50899	−43.26610	0.00000
PHDYR86	−0.90858	0.29926	−3.03605	0.00241	−0.92601	0.63457	−1.45927	0.14462	0.01743	1.48363	0.06898
ARCH	0.06995	0.10828	0.64597	0.51833	0.25827	0.14787	1.74653	0.08084	−0.18832	−58.71866	0.00000
CULT	−0.30970	0.09710	−3.18958	0.00144	−0.18832	0.11637	−1.61830	0.10573	−0.12138	−45.07355	0.00000
BIGPHD	0.41265	0.07066	5.83960	0.00000	0.61120	0.08858	6.89955	0.00000	−0.19855	−99.14370	0.00000

NOTE: One of each set of mutually exclusive dummy variables is omitted from the regression (e.g., PHDYR64, BIO). $b(M)$ and $b(F)$, regression coefficients for the variable for men and women, respectively; $SE(M)$ and $SE(F)$, standard errors for the regression coefficients for men and women, respectively; $t(M)$ and $t(F)$, t-statistics for the coefficients for men and women, respectively; $p(t[M])$ and $p(t[F])$, probabilities that t-statistics this large or larger can be expected by chance alone for men and women, respectively; $b(M) - b(F)$, difference between the coefficients for men and women; t(diff), t-statistic associated with the difference between the coefficients for men and women; $p(t$[diff]), probability that a t-statistic this large or larger can be expected by chance alone. Variables as defined in text.

level in the first half of the historical period considered and within the recruitment process itself; (4) there is less or no clear evidence of such pure gender bias within the promotion process at the associate professor or professor level;[12] (5) there is modest evidence at entry level and strong evidence at higher levels of extramarket disadvantages to women that handicap them in hiring and promotion.

By constructing hypothetical hiring and promotion chances for women, through the device of attributing the effects of their characteristics (using the effect of those characteristics as estimated for men), we are able conceptually to separate the effects of gender bias within the hiring and promotion process from gender bias outside that immediate context. Our knowledge of individual characteristics is very modest at entry level, since the data do not tell us much other than subdiscipline and source of Ph.D. We have richer data above entry level. Some of the characteristics on which analysis depends are worthy of critical scrutiny.

Part-time employment and gaps in service are difficult to determine in the *Guide* data. The specification of part-time employment seems inconsistently made at times, and one can never be sure whether a gap in service is a true gap or a clerical omission. Similarly, one cannot be certain whether part-time work or a gap in service may reflect involvement in extramurally funded research. Such involvement might well enhance the career, rather than impede it; yet the overall effect of part-time work and gaps in service is usually negative. More important, we cannot simply assume that part-time work or gaps in service are a consequence only of extramarket bias, for example, of the greater pressure on women to take time out for childbearing and child care. The tendency for women to have higher rates of part-time employment and more gaps in service could be a result of bias within the appointment and promotion process if women were offered irregular positions more frequently than men, perhaps only in anticipation by gatekeepers of extramarket bias. We have no way to distinguish these causal forces in our data.

By far the strongest effects in the promotion process are the citation counts, and these are also problematic. The difficulties of dealing with citation data are legendary. Citations need not be in praise but may be critical. Citations are often only ritualistic. They may be strongly affected by networking, reflecting more a later

12. There is evidence of such bias in the speed of promotion, however. In the earlier years, although men and women might have had roughly equal chances of eventual promotion, men were promoted faster.

TABLE 3
Regression Coefficients and Their Differences at the TENURE Transition

Variable	$b(M)$	$SE(M)$	$t(M)$	$p(t[M])$	$b(F)$	$SE(F)$	$t(F)$	$p(t[F])$	$b(M) - b(F)$	$t(\text{diff})$	$p(t[\text{diff}])$
(Intercept)	−0.66101	0.31569	−2.09387	0.03639	−1.58906	0.53914	−2.94740	0.00328	0.92805	60.03687	0.00000
JOBYR65	−0.89719	0.40681	−2.20545	0.02753	0.62704	0.67347	0.93106	0.35205	−1.52424	−77.91143	0.00000
JOBYR66	0.16830	0.37970	0.44324	0.65764	−0.21953	0.82005	−0.26771	0.78898	0.38783	17.94083	0.00000
JOBYR67	−0.10936	0.36414	−0.30034	0.76395	−0.04926	0.67306	−0.07319	0.94167	−0.06010	−3.21313	0.00066
JOBYR68	0.09969	0.34752	0.28686	0.77425	−0.31744	0.67066	0.47332	0.63609	0.41713	22.73420	0.00000
JOBYR69	−0.53701	0.35835	−1.49857	0.13413	0.24988	0.68735	0.36355	0.71627	−0.78690	−41.75504	0.00000
JOBYR70	−0.55813	0.35599	−1.56782	0.11707	−0.05324	0.62786	−0.08480	0.93243	−0.50489	−28.41488	0.00000
JOBYR71	−0.63578	0.35176	−1.80741	0.07084	−0.11394	0.58831	−0.19368	0.84647	−0.52184	−30.66785	0.00000
JOBYR72	−0.78059	0.34680	−2.25081	0.02450	0.56754	0.55009	1.03173	0.30244	−1.34813	−82.79864	0.00000
JOBYR73	−0.93851	0.35720	−2.62739	0.00867	−0.25618	0.58401	−0.43865	0.66101	−0.68233	−40.00411	0.00000
JOBYR74	−0.93672	0.37178	−2.51955	0.01182	0.02090	0.56980	0.03667	0.97075	−0.95762	−55.89431	0.00000
JOBYR75	−1.09946	0.36712	−2.99484	0.00278	−0.28035	0.57507	−0.48751	0.62600	−0.81910	−47.85043	0.00000
JOBYR76	−0.96779	0.36471	−2.65358	0.00802	0.44807	0.57208	0.78324	0.43367	−1.41586	−83.19564	0.00000
JOBYR77	−1.02333	0.39720	−2.57634	0.01005	0.09128	0.56784	0.16075	0.87232	−1.11462	−63.12255	0.00000
JOBYR78	−0.41655	0.37290	−1.11707	0.26409	0.20095	0.61195	0.32837	0.74270	−0.61750	−34.60609	0.00000
JOBYR79	−0.75356	0.38369	−1.96397	0.04966	0.20537	0.57065	0.35989	0.71901	−0.95893	−55.09814	0.00000
JOBYR80	−0.09432	0.37356	−0.25248	0.80069	0.71823	0.56605	1.26885	0.20478	−0.81255	−47.48719	0.00000
JOBYR81	−0.26921	0.38921	−0.69168	0.48921	1.20009	0.54763	2.19145	0.02865	−1.46931	−85.59061	0.00000
CITEFEW	2.72579	0.16354	16.66727	0.00000	2.76496	0.24223	11.41454	0.00000	−0.03917	−5.29189	0.00000
CITELOTS	2.91659	0.14952	19.50641	0.00000	2.99802	0.26408	11.35270	0.00000	−0.08143	−10.90228	0.00000
BIGPHD	0.46874	0.12010	3.90282	0.00010	0.44130	0.18015	2.44966	0.01447	0.02744	5.01488	0.00000
ARCH	−0.04244	0.16000	−0.26527	0.79082	−0.02725	0.27922	−0.09760	0.92227	−0.01519	−1.91447	0.02783
CULT	0.10337	0.14832	0.69696	0.48590	−0.00849	0.24379	−0.03481	0.97224	0.11186	15.74638	0.00000
NOTFT	−0.80134	0.12415	−6.45475	0.00000	−0.62805	0.17683	−3.55173	0.00040	−0.17329	−31.45666	0.00000
GAP	−1.01689	0.18178	−5.59408	0.00000	−1.40003	0.28687	−4.88034	0.00000	0.38314	45.01944	0.00000
BIGSCHL	−0.03263	0.17429	−0.18722	0.85150	0.19845	0.28129	0.70551	0.48065	−0.23108	−27.96974	0.00000
GENRAT	−0.28759	0.33380	−0.86157	0.38902	−0.07540	0.48065	−0.15687	0.87538	−0.21219	−14.24780	0.00000

NOTE: One of each set of mutually exclusive dummy variables is omitted from the regression (e.g., JOBYR64, BIO, CITENONE). $b(M)$ and $b(F)$, regression coefficients for the variable for men and women, respectively; $SE(M)$ and $SE(F)$, standard errors for the regression coefficients for men and women, respectively; $t(M)$ and $t(F)$, t-statistics for the coefficients for men and women, respectively; $p(t[M])$ and $p(t[F])$, probabilities that t-statistics this large or larger can be expected by chance alone for men and women, respectively; $b(M) - b(F)$, difference between the coefficients for men and women; $t(\text{diff})$, t-statistic associated with the difference between the coefficients for men and women; $p(t[\text{diff}])$, probability that a t-statistic this large or larger can be expected by chance alone. Variables as defined in text.

inclusion into professional networks than an earlier recognition of important work. They may be strongly affected by the relative age of the persons citing and being cited, especially in ritualistic citations, and it is worth noting here that the average professional age of men in anthropology is higher than that of women. Because one can only cite what has already been published, there is an intrinsic bias toward citing senior members of the discipline and thus toward citing men rather than women. But this should have no effect in the *intracohort* kind of analysis we here conduct.

Lutz's (1990) analysis showed that papers written by women were cited less than papers written by men. Her method of inquiry, using the published part as the unit of analysis rather than the author, eliminates the problem of differential publication rates by the authors who might be cited. However, it is worth noting Bradley and Dahl's finding from curriculum vitae data (1993*a*, *b*) that women actually do publish less than men cohort for cohort and for each kind of publication. If women publish less than men, they will be cited less than men, *ceteris paribus*. But this effect may be multiplied if there is any tendency for women to read the works of women, either because of network structures or because of commonality of interest in particular subjects (such as gender, for example). In order for a person to be cited in the literature it is first necessary that that person publish. Then it is also necessary that the readers of that author also publish, in order to cite. But if women publish less than men, and if there is any tendency for women especially to read the works of women, women will receive lower citation counts than men because they publish less as authors and less as readers. This plausible effect may account for part of the lower citation counts for women observed by Lutz, even if the unit of analysis is the published paper. It may be, however, that men fail to cite women even when they might do so. Teasing apart the effects of differences in age between men and women, those of lower publication rates by women regardless of age (both as initial authors and as readers), and any tendency on the part of men to ignore the writings of women regardless of relative age is a daunting task that we do not here attempt. Suffice it to say that lower citation counts are strongly associated with lower rates of progress along the career ladder, whether citation counts are actually examined in the promotion process or whether they only mirror levels of professional activity that are evaluated by other indicators in that promotion process. In any case, citation counts can be plausibly identified as extramarket influences and thus as part of

TABLE 4
Regression Coefficients and Their Differences at the PROF Transition

Variable	$b(M)$	$SE(M)$	$t(M)$	$p(t[M])$	$b(F)$	$SE(F)$	$t(F)$	$p(t[F])$	$b(M) - b(F)$	t(diff)	$p(t[\text{diff}])$
(Intercept)	−1.58685	0.43371	−3.65880	0.00026	−1.56198	1.22146	−1.27879	0.20118	−0.02487	−0.63971	0.26122
TENYR65	0.99472	0.53435	1.86155	0.06287	0.80710	1.49009	0.54165	0.58815	0.18762	3.94381	0.00004
TENYR66	1.17177	0.51438	2.27804	0.02287	0.83439	1.45129	0.57493	0.56543	0.33738	7.30777	0.00000
TENYR67	0.23376	0.52879	0.44206	0.65851	1.73439	1.62432	1.06776	0.28581	−1.50063	−29.75668	0.00000
TENYR68	0.98676	0.47335	2.08463	0.03728	−0.70713	0.30821	−0.54053	0.58892	1.69388	40.44403	0.00000
TENYR69	0.30940	0.46950	0.65899	0.51001	0.07669	0.34928	0.05684	0.95468	0.23271	5.45157	0.00000
TENYR70	0.12381	0.45385	0.27279	0.78505	−0.12084	1.31411	−0.09196	0.92675	0.24465	5.89763	0.00000
TENYR71	0.43485	0.44983	0.96669	0.33386	0.89739	1.27011	0.70654	0.47997	−0.46254	−11.45035	0.00000
TENYR72	0.11416	0.45336	0.25180	0.80123	0.16042	1.22273	0.13120	0.89563	−0.04627	−1.17275	0.12052
TENYR73	0.23503	0.45832	0.51281	0.60816	−0.38500	1.21950	−0.31570	0.75227	0.62003	15.68894	0.00000
TENYR74	−0.39378	0.45466	−0.86610	0.38658	0.05370	1.25657	0.04274	0.96592	−0.44748	−11.12345	0.00000
TENYR75	−0.38790	0.46034	−0.84264	0.39957	−0.92304	1.26028	−0.73241	0.46404	0.53513	13.22361	0.00000
TENYR76	0.09721	0.44195	0.21995	0.82594	0.72261	1.23067	0.58717	0.55718	−0.62540	−15.91057	0.00000
TENYR77	−0.42253	0.45114	−0.93658	0.34913	0.38097	1.19767	0.31809	0.75046	−0.80350	−20.68628	0.00000
TENYR78	0.52628	0.46469	1.13253	0.25760	0.61746	1.22959	0.50217	0.61562	−0.09118	−2.28408	0.01124
TENYR79	0.56224	0.46453	1.21034	0.22635	−0.05348	1.21137	−0.04415	0.96479	0.61572	15.57917	0.00000
TENYR80	0.53977	0.46669	1.15659	0.24763	0.56749	1.20101	0.47251	0.63664	−0.02772	−0.70425	0.24068
TENYR81	0.52073	0.46319	1.12422	0.26111	0.48207	1.20663	0.39952	0.68957	0.03865	0.98148	0.16324
CITEFEW	2.41786	0.18940	12.76568	0.00000	2.14625	0.34606	6.20202	0.00000	0.27161	20.69949	0.00000
CITELOTS	2.56200	0.15324	16.71878	0.00000	2.22422	0.28697	7.75076	0.00000	0.33777	31.43026	0.00000
BIGPHD	0.06037	0.13519	0.44656	0.65526	0.42451	0.24293	1.74749	0.08077	−0.36414	−39.19632	0.00000
ARCH	−0.04532	0.17858	−0.25379	0.79970	−0.16814	0.36340	−0.46270	0.64365	0.12282	9.38995	0.00000
CULT	−0.11338	0.16789	−0.67533	0.49958	−0.00600	0.33720	−0.01778	0.98582	−0.10739	−8.79443	0.00000
NOTFT	−0.00901	0.16074	−0.05608	0.95529	−0.49118	0.27815	−1.76589	0.07763	0.48217	44.43573	0.00000
GAP	−1.22760	0.30578	−4.01467	0.00006	−0.77098	0.48538	−1.58843	0.11241	−0.45661	−22.97969	0.00000
BIGSCHL	0.01309	0.18555	0.07057	0.94375	−0.15854	0.38118	−0.41592	0.67753	0.17163	12.56337	0.00000
GENRAT	0.28487	0.48961	0.58182	0.56078	0.36834	0.68550	0.53733	0.59112	−0.08347	−2.75533	0.00296

NOTE: One of each set of mutually exclusive dummy variables is omitted from the regression (e.g., TENYR64, BIO, CITENONE). $b(M)$ and $b(F)$, regression coefficients for the variable for men and women, respectively; $SE(M)$ and $SE(F)$, standard errors for the regression coefficients for men and women, respectively; $t(M)$ and $t(F)$, t-statistics for the coefficients for men and women, respectively; $p(t[M])$ and $p(t[F])$, probabilities that t-statistics this large or larger can be expected by chance alone for men and women, respectively; $b(M) - b(F)$, difference between the coefficients for men and women; t(diff), t-statistic associated with the difference between the coefficients for men and women; $p(t[\text{diff}])$, probability that a t-statistic this large or larger can be expected by chance alone. Variables as defined in text.

the subtle disadvantage that women experience within the promotional process.[13]

Finally, we note the possibility that our historical contextualization through the use of calendar years as variables may mask an important kind of variation that we cannot measure in our data, namely, the intellectual capacities of the individuals comprising the annual cohorts at each of the transitions. It is entirely possible that the lower success rates experienced by men at the entry-level JOB transition in the last part of the data set is a function of a relative decline in the intellectual quality of men obtaining their Ph.D's, compared with women. It is possible that men with more options chose other subjects or other careers even if they had a Ph.D. in anthropology, while at the same time women entered the field, but we have no way to measure such differences in our data. It is less likely that such effects occurred at higher transitions, because we do have some knowledge of intellectual performance in the citation counts.

CONCLUSION

These simple experiments about career progression show that direct intramarket bias against women in the hiring and promotion process was always concentrated at entry level while reduced or absent at higher levels and that it has now been virtually eliminated.[14] Other disadvantages to women that might be assumed to be largely exogenous to the promotion process—irregularity of appointment manifested in gaps in service or part-time appointment and low citation counts—clearly persist. Important problems of social and administrative policy are raised by the impact of extramarket influences on gender equality in the job market or, indeed, any equality of opportunity for social subgroups. Correcting exogenous inequalities by administrative readjustment of positions, rates of promotion, or compensation is one mechanism. Altering the criteria of advancement to include measures in which the disadvantaged subgroup may excel is another. Keeping the criteria the same but addressing the exogenous in-

13. Bradley's current work shows that marital status has a noticeable effect on publication rates: married women publish less than unmarried ones (C. Bradley, personal communication).

14. Webster and Burton (1992) have found that there are no significant salary differentials between men and women, controlling for professional age.

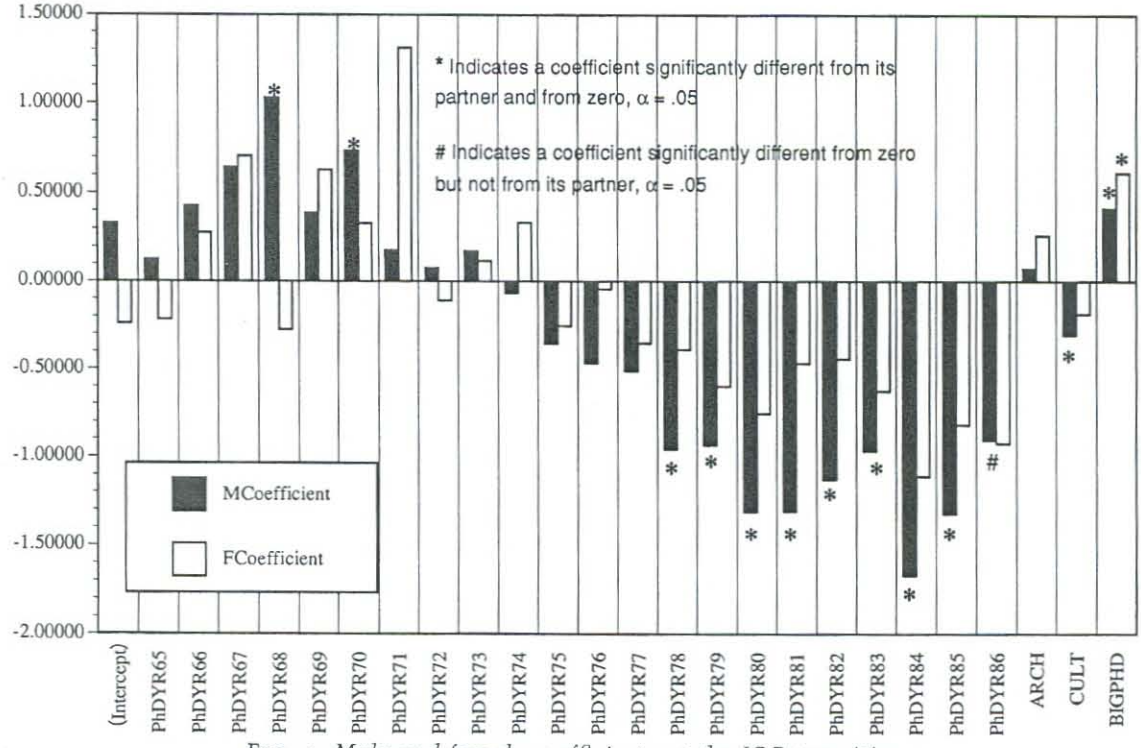

FIG. 4. *Male and female coefficients at the JOB transition.*

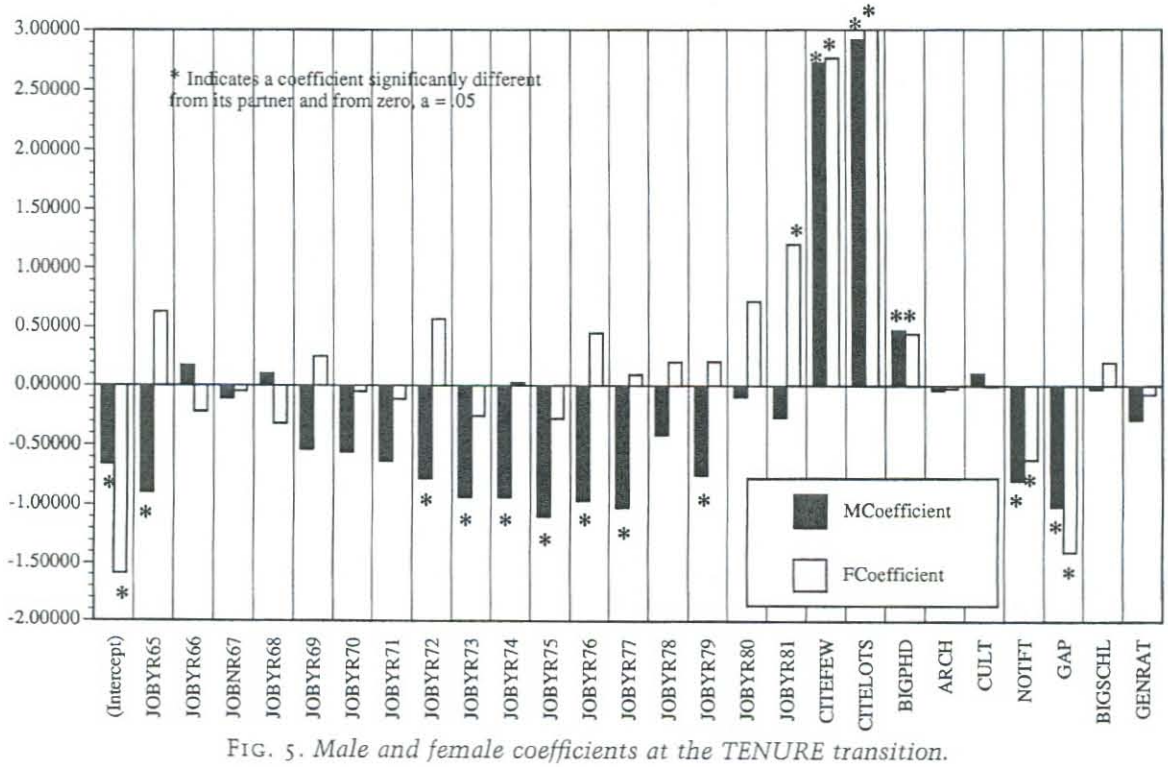

FIG. 5. *Male and female coefficients at the TENURE transition.*

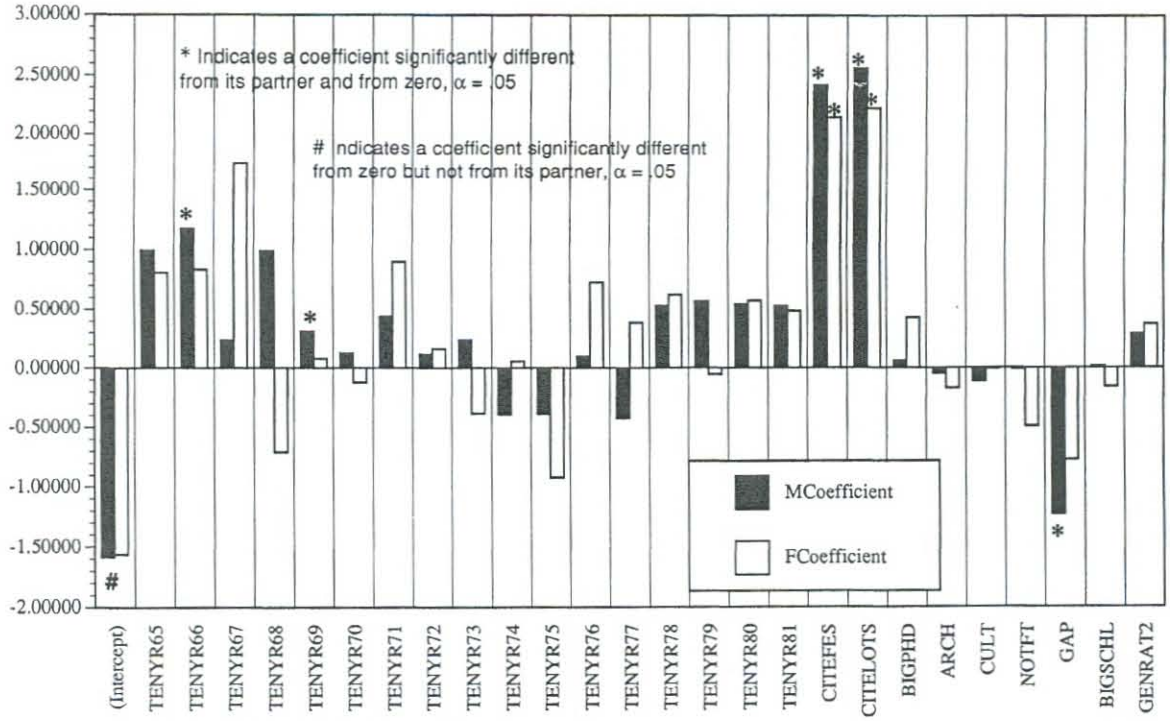

FIG. 6. *Male and female coefficients at the PROF transition.*

fluences directly (mentoring, child care, urging a culture of spousal equality, etc.) is another and probably more generally acceptable battery of mechanisms. The predictable decline in the academic job market itself (D'Andrade et al. 1975) and issues of training students for a broader career market also emerge as important issues (Hammel 1983; Kay 1977, 1978).

TECHNICAL APPENDIX

The techniques in this enterprise are similar to those employed in nominal data linkage for family reconstitution in historical demography. Linkage across years in the *Guides* depended on last name, first name, date and source of Ph.D., and fields of specialization. These procedures minimized linkage failures for women, who change their last names more frequently than men, and thus minimize spurious disappearances from the database, which might be interpreted as failures to be hired or promoted.

Data from the *Guides* were transcribed into machine-readable format. These data were initially linked and transformed into individual life histories by R. Z. Deuel with a user-written Fortran linkage procedure; subsequent linkage for the enlarged data set was done by Mason using the Sybase database management programs. Considerable effort was devoted to the determination of gender from first names. Some determinations were made by calling home departments, some from linguistic evidence, some from research in dictionaries of first names. We were unable to make the determination for 213 persons, and these were dropped from analysis.

Some quality control was possible by cross-checking a small sample of curricula vitae provided by Michael Burton and Candice Bradley (see Webster and Burton 1992; Bradley and Dahl 1993*a*, *b*, n.d.) Our data and the Bradley-Burton data were in close accord.

The number of departments encompassed was 44 in 1962, 71 in 1964, and 353 in 1989. The number of individuals listed as Ph.D. recipients and included in the data is 7,547, and the number listed as employed in teaching departments and included here is 9,802. The total number of person-years of employment recorded is 92,138. The increase and expansion of doctorate-granting departments may have led to a shift in kinds or quality of Ph.D.'s produced. Since our analysis is cohort-based, we achieve some control over these shifts.

We included all persons listed in teaching titles, even if they are listed as anthropologists in departments of another name. We grouped teaching titles into three levels equivalent to assistant professor, associate professor, and professor, for example, including acting, visiting, and adjunct titles with their equivalents. All entry-level teaching titles, such as lecturer or instructor (but not teaching assistant, teaching associate, or teaching fellow) were classed with assistant professor. Where an individual held two or more positions simultaneously, the title used for analysis was that at the higher rank. Our procedures will misclassify individuals holding a position above assistant professor in one year and lecturer in a subsequent year, since the latter would be classed as the former. It is possible that some universities, perhaps in Canada, use the lecturer and senior lecturer titles as they are employed in Britain, but that practice is

not known to us. It is possible that some high-level visiting faculty might be appointed in lecturer titles in the United States, but most such appointments are made with a visiting professor title. Thus our classification of the lecturer title as entry-level should not cause serious errors.

We cannot reliably distinguish so-called tenure-track from other assistant professor appointments; we are reluctant to consider all titles other than assistant professor as non-tenure-track or all titles of assistant professor as tenure-track. Bradley and Dahl (1993*b*), who do attempt this distinction, find that "temporary" positions are a small fraction of the total of entry-level positions. (Informal observation suggests that the frequency of temporary positions has been increasing but perhaps only after 1989.) We observe that even if the number of temporary positions is small in a temporal cross section, a very large number of persons may pass through those positions. We see no solution to these problems with our data.

Salary data are not available in the *Guide*.

The establishment of cohorts for analysis introduces some problems. We consider persons obtaining the Ph.D. as in competition for teaching jobs, but some seek other jobs, and some have such jobs before obtaining the Ph.D. We have no evidence to suggest that the proportion of persons actually desiring and seeking nonteaching jobs changed in a regular way from 1962 to 1989. We treat persons already employed in teaching on receipt of the Ph.D. as obtaining the job in the same year as the Ph.D. The incidence of pre-Ph.D. teaching employment was more common at the beginning of the period than at the end, about 21.3% in the 1960s and 6.5% in the 1980s. Since we allow three years for the first job, no important bias is introduced by treating persons already employed in the same way that we treat persons employed within three years.

At the higher transitions, we note some left-censoring (i.e., truncation that masks the first appearance of a condition). The *Guide* data begin in 1962. We cannot accept individuals who were assistant professors in 1962 in any analysis of achievement of the associate professorship in which the lapse of time is a consideration, because we have no way of knowing when they became assistant professors. For example, of two persons who were at the assistant professor level in 1962 but both appeared at the associate level in 1963, one might have first become an assistant professor in 1962 and been promoted a year later while the other first became an assistant professor in 1951 and waited 12 years for the promotion. Only if we see an individual "appear" in a position can we assign him or her to a cohort for that year. Thus, data from 1962 cannot be utilized, and by extension we cannot utilize any data for the first year in which a department appears in the *Guide*, since the individuals then listed might have been in it in the previous year, of which we can have no knowledge. Strictly speaking, we define for individuals valid dates of appearance D0, D1, D2, and D3, corresponding to their appearance (in the sense just noted) in the *Guide* at the awarded Ph.D. level, as assistant professor, as associate professor, and as professor. In order to be considered for analysis of any transition, an individual must have the lower bounding date for that transition (e.g., D1 for TENURE).

Our specification of the time allowed to achieve the first transition is arbitrary but not unreasonable. In the 1960s, 65.9% of Ph.D.'s who eventually became assistant professors by 1989 did so in less than four years, while 6.2% did so in more than three but less than seven years. In the 1970s those figures were 45.4% and 4.7%. Using a three-year cutoff might lead to biased results for some subdisciplines in which postdoctoral fellowships were more common. However, such fellowships are usually for one or two years and are followed, if successful, by a job in the second or third and would count as successes. At the second transition we depend on the usual "up-or-out" rule for the attainment of tenure plus two years for late reporting. At the third transition we use the same span as for the second.

The data are of two kinds. The first kind consists of initial observations of eligibility for the members of an annual cohort, some of which are followed by nominally linked observations of success at an indeterminate future time. Thus, for example, we have individuals who are awarded the Ph.D. in year t, and for some of these we have observations of a first teaching job in year $t + n$ while for others we have no such observation. The outcome variable for individuals is binary; either they succeed or they do not. Other information on these individuals can be employed as covariates of the outcome, and logistic regression can be employed to estimate the effect of such covariates on the outcome. We used the LOGISTIC routines in SAS for the estimation.

Interpretation of the regression coefficients should be as follows: The dependent variable in each observation is the binary value, 1 or 0, of making the transition. The mean of such values is a probability between 0 and 1. Since this probability is bounded at 0 and 1, no linear effect can be directly estimated. The effects of the variables are exponential in the odds of the transition. Where the probability of the transition is p, the odds are $p/(1 - p)$. Where there are, for example, two variables, x and y, with associated coefficients α and β, the relationship is $p/(1 - p) = e^{\alpha x}e^{\beta y}$, commonly expressed as the logit, or $\ln [p/(1 - p)] = \alpha x + \beta y$. From this it can be seen that the effect of the variables is linear in the logit of the probability, that is, in the logarithm of the odds. This is the form in which the coefficients are expressed in the analysis, where they are formally the equivalent of the coefficients of ordinary regression. One way to think about the direct effect of the variables on the odds is to exponentiate them. Another and more intuitive way is to think of them as inducing a proportional change in the odds. For example, a coefficient of 0.5 would increase the odds by half, while a coefficient of 1.0 would double the odds.

Coefficients were estimated separately for men and women, so that the above equation has two forms, $\ln [p_m/(1 - p_m)] = \alpha_m x + \beta y_m x$ and $\ln [p_f/(1 - p_f)] = \alpha_f x + \beta y_f$, where m and f indicate the gender.

In the presentation of the modeled experience of each gender, the equations are $\ln [\hat{p}_m/[1 - \hat{p}_m]] = \alpha_m x + \beta y_m x$ and $\ln [\hat{p}_f/[1 - \hat{p}_f]] = \alpha_f x + \beta_f y$.

In the experiment in which men are accorded the coefficients of women and vice versa, the equations are $\ln [\hat{p}_m/[1 - \hat{p}_m]] = \alpha_f x + \beta y_f x$ and $\ln [\hat{p}_f/[1 - \hat{p}_f]] = \alpha_m x + \beta_m y$. (The values predicted for men use the coefficients particular to women, and vice versa.) These steps form the basis of the analysis, constraining analysis at all transitions to the same model. There are, however, alternatives for the two higher transitions, which we do not follow in this paper but only explicate briefly.

The second kind of data, at the two higher transitions, consists of annual observations of persons who do have teaching positions. We consider such observations as though they were continuous and divide the observational span into reasonable periods, for example, 0–3, 3–6, 6–9, 9–12, > 12 years. Within each of these periods we consider persons to be in competition only if they have survived the previous spans. Thus, an assistant professor observed as employed in year 5 is considered still in competition for promotion in the period 6–9, but one who disappeared from the data in year 4 is not so considered. The ability to distinguish such "censored" observations from others permits the use of hazard or event-history analysis, yielding results of much finer grain. Such results are given in Hammel et al. (1993*a*, *b*) but because of their complexity are omitted here. Readers interested in event-history techniques may consult Allison (1981), Kalbfleisch and Prentice (1980), Trussel and Hammerslough (1984), Tuma (1981), and Tuma, Hannan, and Groeneveld (1979).

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