

Gender Differences in Promotion Experiences at Two Elite Private Liberal Arts Colleges in the United States¹

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Abstract

In colleges and universities throughout the United States, women are underrepresented at the rank of full professor. This national pattern holds true at two highly selective small private liberal arts colleges in the Northeast, one formerly a men's college and the other formerly a women's college. Analysis of personnel data at the former women's college revealed that female full professors in the natural and social sciences, engineering, and mathematics (STEM) spent an average of a year longer as an associate professor than their male peers before their promotion. These women were also more likely than were men to have served as department chair or program director while an associate professor. This service delayed their promotion by an average of 2.5 years.

In response to a survey of 143 associate and full professors at these two liberal arts colleges, the majority indicated that they were not getting feedback on their progress toward promotion to full professor and that their senior colleagues were not providing help. Analysis of variance showed that gender was associated with faculty perceptions of the promotion process at the former women's college but not the former men's college. Focus groups of STEM women at these two institutions revealed that this lack of feedback and lack of mentoring decreased the likelihood that they would apply for promotion to full professor. Analysis of salaries revealed a gender gap in wages at the former women's college that was greatest for full professors. If colleges and universities develop personnel procedures for providing feedback to associate professors about their progress toward meeting the standards for promotion to full professor, women would be more likely to be promoted in a timely manner.

Gender Differences

Sex segregation still pervades the labor market in the United States, including the academic labor market (Berheide 2011; Berheide and Anderson-Hanley 2012). Vertical segregation in US colleges and universities results in women being overrepresented in lower-level positions and underrepresented in higher ones (Britton 2012; Burrelli 2008; Frehill-Rowe 2006; National

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Science Foundation [NSF] 2004, 2013). According to Britton (2012, 66), “in 2009, women made up 43 percent of all full-time instructional faculty in degree-granting institutions in the United States, but only 28 percent of full professors.” Between 1999 and 2009, the percentage of men holding the rank of full professor only fell from 34 percent to 31 percent while the percentage of women rose from 15 percent to 16 percent, leaving the two-to-one ratio between men and women at the highest faculty rank virtually unchanged (Britton 2012, 66).

Vertical segregation has also resulted in more women teaching at liberal arts colleges than at research universities. According to the American Association of University Professors (AAUP), women constituted a higher proportion of the full-time faculty at undergraduate colleges (42 percent) than at research universities (34 percent) (West and Curtis 2006). Despite the higher proportion of female faculty at this type of institution, women were less likely to hold the rank of full professor even in disciplines where they comprised the majority of faculty, such as psychology (Ellemers et al. 2004). In short, women today are still more likely to hold lower-level faculty positions, especially non-tenure track ones, even at undergraduate colleges.

This underrepresentation of women at the highest faculty rank may be greatest at research universities (Misra et al. 2011; NSF 2013; Roos and Gatta 2009), especially in top 50 STEM departments (Britton 2010). The National Academy of Sciences (National Research Council 2007) found that female faculty at elite research universities were less likely than male faculty to hold the rank of full professor and that those who did had been promoted at a slower pace than their male colleagues. Misra et al. (2011) reported the same pattern of a slower time to promotion to full professor and a lower likelihood of promotion for women at a public research-intensive university. Not only are women more likely to work in predominantly female disciplines and to experience slower promotion rates than men, they were also more likely to earn less than men in equivalent faculty positions (Kelly and Grant 2012; NSF 2013; Renzulli, Grant, and Kathuria 2006; Roos and Gatta 2009). Female faculty thus continue to encounter an academic version of the glass ceiling, one that Bonawitz and Andel (2009) characterized as consisting of concrete rather than glass.

This paper examines whether these national patterns hold true at two highly selective private liberal arts colleges in the northeastern United States, one formerly all male and the other formerly all female. This research explores faculty experiences with promotion to full professor, particularly whether there were gender differences in rank, in time to promotion to full professor, and in how faculty perceived the process for obtaining promotion to full professor. We hypothesize that women were less likely to hold the rank of full professor than men. Second, we hypothesize that women spent more years as an associate professor before their promotion to full professor than men did. Third, we hypothesize that men had a more positive assessment of the process of promotion to full professor than did women. Fourth, we hypothesize that men had higher salaries than women at all ranks.

Promotion Processes in the Professoriate

Achievement of tenure and promotion to full professor are two of the most important steps in faculty careers. Promotion to full professor not only brings status and a substantial salary increase, it also brings the wherewithal to manage time in a way that reduces service obligations at work (Misra et al. 2011) and work-family conflict (Berheide and Anderson-Hanley 2012; Gunter and Stambach 2003). Previous research has found that women faced institutional barriers that negatively affected their advancement in rank (e.g., Bailyn 2003; Fox 2005; Nielsen et al. 2005; Roos and Gatta 2009; Winkler 2000).

Buch et al. (2011, 40) listed six barriers to promotion to full professor that associate professors encountered:

1. Lack of attention to career planning by associates;
2. Lack of institutional and departmental attention to and support for the career-development needs of associates;
3. Lack of career-development opportunities for associates;
4. Disproportionate service demands/administrative duties for associates that interfere with progress toward full;
5. Lack of transparency and clarity regarding promotion criteria; and
6. Need for more flexible and inclusive “paths to professor” that recognize a broader range of contributions.

Buch et al. (2011, 42) concluded that while men also encountered these barriers, “women were far more likely to report them as ‘preventing or delaying their own promotion’.” Given the gendered nature of these problems, it is not surprising that Khare and Owens (2006) found that men were more satisfied with their career progression at a public research university in the Midwest than women were.

Women and men experienced the promotion process differently (Gunter and Stambach 2003) with women typically reporting less positive experiences. According to Buch et al. (2011), female associate professors were significantly more likely than their male colleagues to disagree that the criteria for promotion to full professor were clear, that the decisions were made fairly, and that they had received guidance from the department chair about what they need to do to be promoted. Women holding faculty positions in business schools reported that they received less help with their careers than men did (Gersick, Bartunek, and Dutton 2000). Similarly, female engineering faculty indicated that they received less support from colleagues than their male peers (Jackson 2004). According to Riger et al. (1997), both male and female faculty felt more supported in departments comprising more than 60 percent female faculty. Fox and Xiao (2012, 11) found that for female computer science faculty “being in stimulating/collegial climate positively predicts the probability of reported chances for promotion.... The high-paced (competitive, stressful) department climate, on the other hand, negatively predicts chances.” In short, as Wright et al. (2004) concluded, faculty success was often a function of involvement with others.

Britton (2010, 17-18) argued that one factor explaining why so few women have been promoted to full professor is that “the standards for promotion to full professor are usually non-existent.” Another explanatory factor identified by previous research is that gender and other personal characteristics may affect how the standards for promotion are applied (Fox and Colatrella 2006). For example, women may be held to higher standards than men (Gorman and Kmec 2007, 844). Rothausen-Vange, Marler, and Wright (2005) found that women were held to higher research standards than men in more research-oriented management departments. A third is that women may be asked to spend more time on activities that do not count as heavily, if they count at all, toward promotion to full professor. According to Rosser (2004), women faculty had more committee responsibilities (to aid gender diversity) and more advising responsibilities, both of which took time away from research. As a result women spent more time than their male colleagues on activities that were not heavily weighted in promotion decisions. In short, previous research documented the disadvantages women faced in achieving promotion to full professor in colleges and universities in the US.

RESEARCH METHODS

This research focused on tenure-line faculty at two elite colleges in the US. Although both have been co-educational for 40 years, the former men’s college is 100 years older than the former women’s college. The two private colleges have somewhat different curricular emphases that reflect their gendered histories: the former women’s college has larger programs in the arts and humanities than the former men’s college while the former men’s college has larger programs in the natural sciences. In addition to the liberal arts, the former men’s college offers a major in engineering and the former women’s college offers majors in education, social work, and management. About 40 percent of students major in the natural sciences, mathematics, or engineering at the former men’s college while only one-quarter of the students at the former women’s college major in the natural sciences and mathematics. Both have approximately 2300 students, split evenly between men and women at the former men’s institution while the student body at the former women’s institution is approximately 60 percent female.

Data

This research draws on four sources of data: surveys, personnel records, focus groups, and published salary information. We administered a web-based questionnaire to all 341 tenured and tenure-track faculty at both colleges between March 15 and June 16, 2009. We achieved a response rate of 70 percent with 237 responses. The response rate was slightly higher at the former women’s college (71 percent) than at the former men’s college (68 percent).

The questionnaire contained items from climate survey instruments developed as part of National Science Foundation (NSF) ADVANCE programs at the University of Illinois at Chicago (Khare and Owens 2006) and Utah State University (ADVANCE at Utah State University 2006). Many of the items were constructed to be parts of scales, including one

measuring perceptions of the promotion process. These items were the focus of this particular phase of the larger research project.

Independent Variables. The questionnaire began by asking faculty to indicate which college they worked at. While the two colleges had the same number of faculty, the former women's college had a higher response rate. As a result, a slightly higher proportion of the respondents (52 percent) worked at the former women's college than at the former men's college (48 percent). This variable was used to split the data set so that the hypotheses could be tested separately for the two colleges.

The question asking faculty to identify their current rank was dummied for the regression analysis. Full professors were coded as 1 and assistant and associate professors as 0. Full professors constituted 38 percent of the overall sample, associate professors 40 percent, and assistant professors 21 percent.

The question asking faculty their sex was also dummied. Men were coded as 1 and women as 0. Women had a higher response rate (80 percent), especially those in the STEM disciplines (91 percent), than men (62 percent), probably because the NSF grant funding this research project focused on STEM women. As a result, women were overrepresented in the sample (50 percent) compared to their proportion in the population (38 percent of the faculty at the former men's college and 48 percent of the faculty at the former women's college).

Faculty were asked to indicate the department they worked in. These departments were then categorized as STEM/non-STEM following NSF's categories. As a result, the social and behavior sciences (Anthropology, Economics, Political Science, Psychology, and Sociology) were coded as 1 along with the natural sciences (Biology, Chemistry, Environmental Studies, Exercise Science, Geology, and Physics), mathematics (and Computer Science) and engineering. With the social and behavioral sciences included, 59 percent of the respondents were in STEM departments and 41 percent were in non-STEM departments.

Dependent Variable: Perceptions of the Full Professor Promotion Process. The full professor promotion process index drew on the same six items that Utah State University (ADVANCE at Utah State University 2006), University of Illinois Chicago (Khare and Owens 2006), and other public research universities used to assess faculty perceptions of the tenure and promotion processes. We revised the wording of the items to create two separate sets—one that referred specifically to promotion to full professor and another that referred only to tenure rather than a single set that referred to both tenure and promotion. The items in the scale were: I am/was satisfied overall with the process of being promoted to full professor; I understand/understood the criteria for achieving promotion to full professor; I receive/d feedback on my progress towards promotion to full professor; I feel/felt supported in my advancement to full professor; senior colleagues are/were helpful to me in working toward promotion to full professor; and I feel there is/was a strong fit between the way I do/did research, teaching, and service and the way it is/was evaluated for promotion to full professor. Respondents rated each statement in this index on a 6-point Likert scale (strongly agree = 6; agree = 5; somewhat agree = 4; somewhat

disagree = 3; disagree = 2 and strongly disagree = 1). To create the index, we added the scores on the six items and then divided by six. Therefore, as with the individual items, the scores on the index ranged from a low of 1 to a high of 6. Higher scores indicated a positive experience with the process of being promoted to full professor. The internal consistency of the Perceptions of Promotion to Full Professor Process index was excellent (Cronbach's alpha = .90).

These promotion questions were only administered to those faculty for whom promotion to full professor was the next step (i.e., associate professors) and those who had already gone through the promotion process at the college at which they were currently employed (i.e., those who had successfully navigated the process of promotion to full professor at one of the two colleges being studied), thereby eliminating from the sample assistant professors and anyone who was hired at the rank of full professor. The sample size therefore dropped from 237 to 185. Of those 185, only 143 answered the promotion-to-full questions. While almost all the associate professors answered these same questions about the tenure process (91 out of 95), only 67 of the 95 answered them about being promoted to full. In contrast to the 71 percent of associate professors who completed the questions about promotion to full, 83 percent of assistant professors completed the questions about tenure and 84 percent of the full professors completed both sets of questions. The associate professors completed the tenure questions at an unusually high rate (96 percent) and the promotion-to-full-professor questions at an unusually low rate (71 percent) compared to the other professorial ranks. The difference in their willingness to answer the two sets of questions hints at one difference between tenure and promotion—assistant professors focused on the tenure process from the day they were hired whereas associate professors did not tend to focus on the promotion process until they actually applied for promotion to full professor, providing evidence from these two colleges in support of Buch et al.'s conclusion that lack of attention to career planning by associate professors constituted a barrier to advancement.

Our second source of data consisted of personnel records for STEM tenure-line faculty at the former women's college that we received from the college's administration in the fall of 2009. These data included the date of hire, rank at hire, date of promotion for each successive rank, and dates of service as a program director or chair. Our personal knowledge of the faculty allowed us to divide them by sex. We limited the analysis to the 29 STEM faculty who had already achieved the rank of full professor through promotion at the college. We calculated years in rank as an associate professor for all faculty holding the rank of full professor in September 2009 by subtracting the year promoted to associate professor from the year promoted to full professor. We calculated the years of service as program director or chair in the same fashion—by subtracting the start date from the end date—for those who served when they were not yet a full professor. Those who had never worked in either administrative capacity while an associate professor were designated as having zero years of service.

Our third source of data came from focus groups the first author conducted with STEM women associate professors in the fall of 2008 at each college. The groups contained the eight

women who had been in the associate rank for the longest number of years at that college who agreed to participate. The focus groups lasted for 60 to 90 minutes. The participants of the two focus groups were asked to discuss their experiences, positive and negative, with the process of getting tenure and with the process of being promoted to full professor.

Finally, we analyzed salary data published in the March-April issues of *Academe* between 1985 and 2013. The American Association of University Professors (AAUP) publishes *Academe*, which devotes its March-April issue to an annual report on the economic status of faculty. These issues are available online from 1985 to the present. The reports display means for faculty compensation, benefits, and salaries for each college or university by gender and professorial rank. Using *Academe*'s data on the average salary for faculty at the former women's college by gender and rank, we calculated the average annual difference between men's and women's salary at the full, associate, and assistant ranks. Then we calculated the overall average difference for male and female faculty for each rank over the 29-year period.

Procedures

We used Excel to calculate mean years in rank for associate professors and to calculate mean salaries. The rest of the statistical analyses were conducted using SPSS version 21. First, we used crosstabulation and the chi-squared test of significance to analysis gender differences in rank. We conducted exploratory factor analysis to test whether the promotion-to-full-professor index measured a single underlying dimension at these two colleges. In addition, Cronbach's alpha (α) was used to confirm the reliability of the index.

To examine whether there were gender differences in perceptions of the full professor promotion process, we performed first an analysis of variance and then regression analyses to test the third hypothesis separately for each college. We split the data set so that we could compare the results for faculty teaching at the former men's college and those teaching at the former women's college. Given the small number of cases (72 associate and full professors at the former women's college and 71 at the former men's college answered the questions), we set the level for statistical significance as $p < .10$. Since 70 percent of the population of faculty at the two colleges responded to the survey, any differences we found in the sample are highly likely to exist in the faculty as a whole.

RESULTS

Gender Differences in Promotion to Full Professor

The first question is whether these two colleges exhibited the national patterns of vertical segregation in faculty ranks. We performed a chi-squared analysis to determine whether men and women were represented in the highest rank proportionally to their numbers in the survey sample. The analysis produced a significant X^2 value ($X^2 = 3.23$, $df = 1$, $p = .068$), indicating that women were underrepresented at the rank of full professor. According to Table 1, 44 percent of men and only 32 percent of women held the rank of full professor. Overall, men were more likely to be full professors than women, so we must reject the null hypothesis.

Table 1. Faculty Rank by Gender (in percentages, N=237)

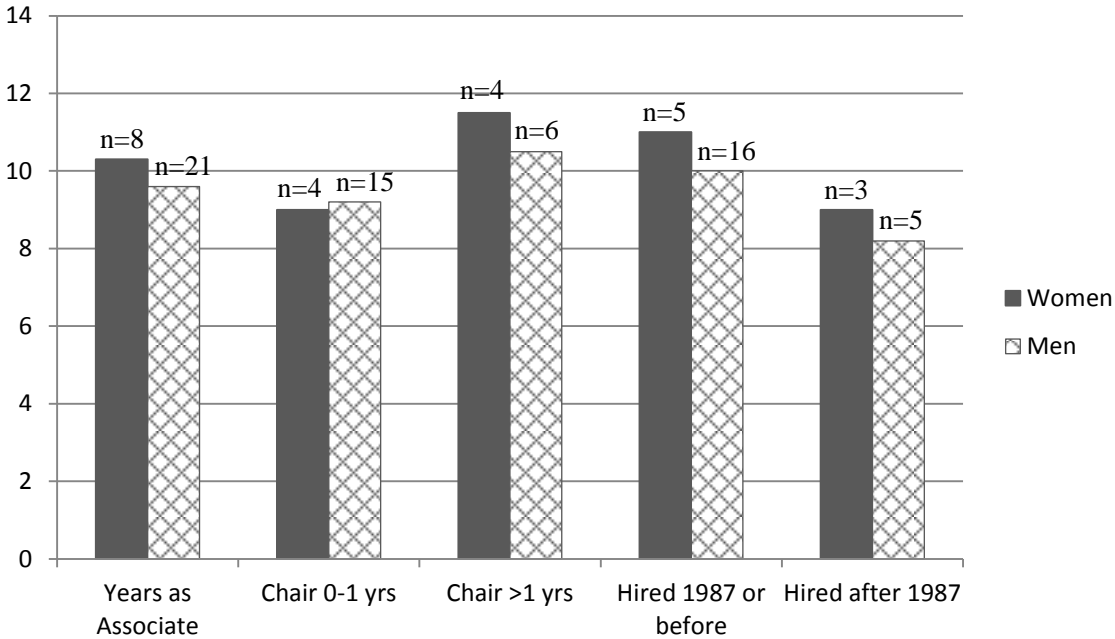
Rank	Male	Female	Total
Assistant/Associate Professor	56.3	67.8	62.0
Full Professor	43.7	32.2	38.0
Total	100	100	100

$$X^2 = 3.23, df = 1, p = .068$$

Gender Differences in Time to Promotion to Full Professor

Next, we analyzed the time it took for female and male faculty in STEM disciplines to be promoted to full professor. As of fall 2009, eight STEM women and 21 STEM men held the position of full professor at the former women's college. As the first pair of bars in Figure 1 shows, STEM women had held the position of associate professor for a mean of 10.3 years and men 9.5 years before being promoted to full professor. Britton (2010, 2012) defined a promotion delay as spending seven years or more at the associate professor rank while Geisler, Kaminski, and Berkley (2007) defined it as 13 or more years after earning the highest degree. Geisler et al.'s definition is equivalent to Britton's when the faculty member starts as an assistant professor immediately upon receiving his or her degree and his or her institution follows the AAUP standard of six years to tenure, which typically also brings promotion to associate professor when it is granted. The mean number of years as an associate professor for both men and women at the former women's college exceeded these equivalent definitions of a promotion delay by several years. The delay for women, however, averaged almost a year longer than for men. This gender difference was consistent with what the Modern Language Association (MLA 2009) found for English and Modern Language departments at baccalaureate institutions—that it took women a year longer than it took men to get promoted to full professor. They found an even larger gender gap at doctoral institutions.

Figure 1. Mean Years to Promotion to Full Professor for STEM Faculty at Former Women’s College by Gender



Because the women’s college had changed its norms to reduce the time to eligibility for promotion to full professor, the data were disaggregated by date of hire. This further analysis showed that it took women hired in 1987 or earlier an average of 11 years to be promoted from associate to full professor, while it took men 10 years (see the fifth and sixth pair of bars in Figure 1). The situation was better for both women and men hired after 1987 but the mean gender difference of one year still existed. Women hired after 1987 remained in the position of associate for an average of nine years before being promoted to full professor, while men were promoted after eight years. Thus even though faculty were now spending less time at the rank of associate professor, it was still more than the seven years Britton (2012, 2010) set as the standard for a timely promotion and the gender difference remained.

The focus groups the first author conducted with female associate professors in the STEM disciplines, one group on each campus, provided one possible explanation for the delay in promotion to full professor. Specifically, taking on administrative leadership positions came up as a barrier to promotion to full professor. When the first author asked, “How are things going in progress toward promotion to full?” a woman associate professor chairing her STEM department replied,

I’m finding it to be maybe even more challenging than the path to tenure. But also that’s been coupled with, you know, taking on chair. And I was director of [a program] for three years in there. And there have been a lot of other responsibilities in that way. But I have said sometimes I’ve gotten to my point where I say I will be happy and I will live with the fact and I will have this more balanced life and if I’m never full professor, that’s fine. And then I think do I really

feel okay with that. Should I be okay with that?

The other female associate professors on both campuses who were chairing their departments or administering programs made similar comments. We therefore explored the effect of serving as department chair or program director while still in the rank of associate professor on time to promotion to full professor. Specifically, we examined whether STEM faculty who took on these leadership positions at the former women's college spent more time as an associate professor before they were promoted to full professor than faculty who did not assume these positions.

For the 15 men and four women who never served as chair/program director or served for one year or less while in the rank of associate professor, the time spent at that rank was virtually identical, a mean of nine years (see the second pair of bars in Figure 1). The other four women who were chair/director for longer than one year while associate professors remained in the rank of associate professor for an average of 11.5 years, delaying their promotion to full professor by 2.5 years compared to both male and female associate professors who did not assume these administrative roles (see the third pair of bars in Figure 1). The six men who were chair or program director at this same stage in their careers were delayed by only 1.3 years (they held the rank of associate professor for 10.5 years). The gendered effect of this delay was exacerbated by the fact that 50 percent of the women (four out of eight) served as chair for longer than one year when they were associate professors, while only 29 percent of the men (six out of 21) did. At a public research university, Misra et al. (2011) reported a similar pattern of female associate professors taking on more major administrative responsibilities in their departments than males. They found that women who served as undergraduate program directors, but not those who served as department chair, averaged a five-year delay in promotion to full professor. In short, women disproportionately paid the price of administering departments or programs mid-career and the price they paid was twice as large as the one men paid. In contrast, there was no gender difference in time to promotion to full professor for those men and women who did not administer departments or programs for more than a year while associate professors. These data provide further evidence for Buch et al.'s conclusion that administrative duties interfere with the progress of associate professors toward full professor. These results confirmed the second hypothesis that STEM women at the former women's college spent more years as associate professor before being promoted to full professor.

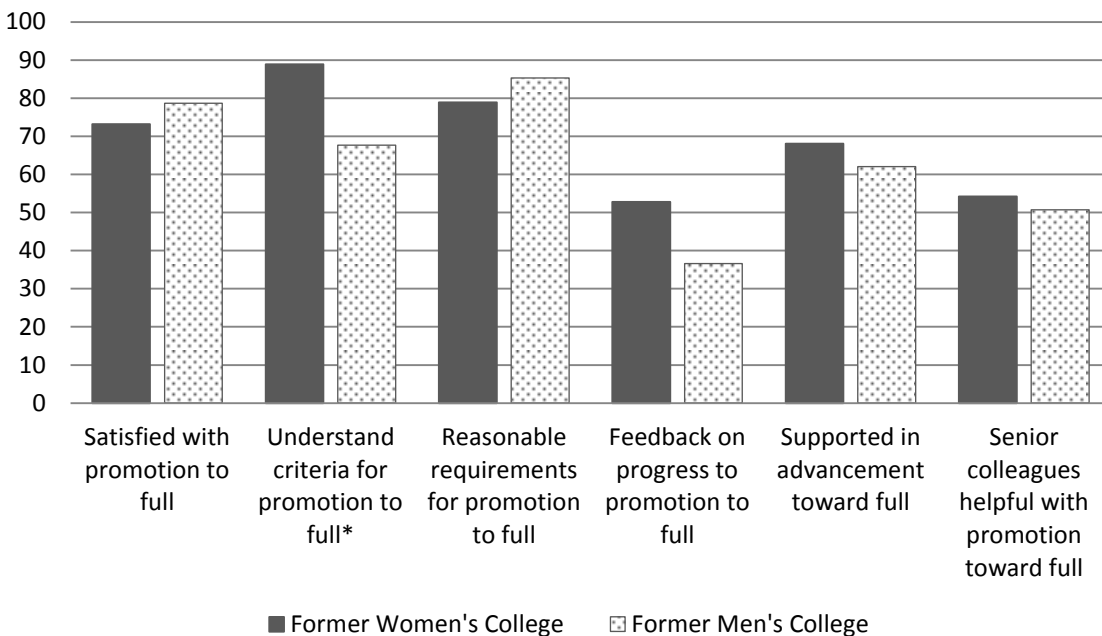
Gender Differences in Faculty Perceptions of the Process of Promotion to Full Professor

The third research question is whether there are gender differences in how faculty perceived the process of promotion to full professor. Figure 2 presents the percent of faculty who somewhat agreed, agreed, and strongly agreed with each statement assessing the promotion-to-full process. The percent agreeing with each of the statements making up the perceptions of the promotion-to-full-professor index ranged from 37 percent (received feedback on promotion to full at the former men's college) to 89 percent (understand criteria for promotion to full at the former women's college). In the only difference between the faculty at the two colleges, faculty

at the former women’s college were significantly more likely to at least somewhat agree (89 percent; $p < .05$) than faculty at the former men’s college (68 percent) that they understood the criteria for promotion to full professor. At the time that the survey was administered, the former men’s college had just revised its tenure and promotion processes, which might have accounted for this difference between the two colleges.

Most importantly, the responses to the individual promotion-to-full-professor items demonstrated that for both colleges, the lowest levels of agreement were on items related to guidance from colleagues: feedback on progress toward promotion to full professor and senior colleagues helpful with advancement toward promotion to full professor. We previously reported that faculty were twice as likely to strongly agree that senior colleagues were very helpful in working toward tenure than working toward promotion to full professor (Fox et al. 2010). We concluded that associate professors received almost no mentoring with regard to being promoted to full professor. These data suggested that the full professor promotion process was not working well at either college. Associate professors were not getting support for their career development from their institutions or from their departments, a problem that Buch et al. (2011) identified as one of the six barriers to promotion.

Figure 2. Positive Perceptions of the Promotion to Full Professor Process (percent somewhat agree, agree, and strongly agree, N = 143)



* $p < .05$

We performed a one-way ANOVA to compare men's and women's perceptions of the process of promotion to full professor at both the former men's college and the former women's college. Analysis of variance revealed a statistically significant relationship between gender and assessment of the process of promotion to full professor at the former women's college [$F(1,70) = 2.83$; $p = .097$], but not the former men's college [$F(1,69) = 0.02$; $p = .878$]. Men averaged half a point higher on a six-point scale ($M = 4.5$) in their perceptions of the process of promotion to full professor than did women ($M = 4.0$) at the former women's college while male and female faculty at the men's college had basically identical mean scores ($M = 3.8$), albeit scores that were lower than even the women's mean score at the former women's college. These results disconfirmed the third hypothesis for the former men's college but not for the former women's college. At the former women's college, men had a more positive assessment of the process of promotion to full professor than women did.

Explaining Differences in Faculty Perceptions of the Process of Promotion to Full Professor

Table 2 presents the results of a multiple regression analysis that tested whether the gender difference in perceptions of the promotion-to-full-professor process was still statistically significant at the former women's college after introducing controls for discipline and rank. We controlled for discipline because previous research revealed disciplinary differences in the percentages of full professors nationally (Britton, 2010; NSF, 2004). The analysis also controlled for rank since full professors were faculty for whom that process had worked successfully. As Table 2 indicates, gender, discipline, and rank accounted for more of the variance in faculty perceptions of the process of promotion to full professor at the former women's college (54 percent) than at the former men's college (38 percent).

Table 2. Regression of Perceptions of Promotion to Full Professor Index on Gender, Discipline, and Rank at the Two Colleges

Independent Variable	Promotion Assessment	
	Former Men's	Former Women's
	β	β
Gender (Male)	-.04	.17
Discipline (STEM)	.06	-.07
Rank (Full Professor)	.32****	.50****
R^2	.07	.25
F	2.73*	9.01****
N	71	72

* $p < .10$, ** $p < .05$, *** $p < .01$, **** $p < .001$

Current rank was the most powerful and only statistically significant predictor, with full professors having more positive perceptions of the process than associate professors at both colleges. Neither gender nor discipline was significantly related to assessment of the promotion process at the former women's college. Thus after controlling for rank and discipline, the relationship between gender and assessment of the process of promotion to full professor at the former women's college disappeared, suggesting that it was the gender difference in rank not gender per se, that explained the difference in perceptions of the promotion process.

Gender Differences in Faculty Salaries

Being promoted to full professor matters for several reasons, one of which is pay. Table 3 presents the mean salary for male and female faculty at the former women's college by rank for the past 29 years. Out of 87 comparisons (29 years by three ranks) in Table 3, men averaged higher salaries than women in 72 of the comparisons. At the full professor rank, men have always outearned women and, with the exception of 1987, they have outearned women by over \$1000 with a mean difference of \$3000. The gender gap in wages was not quite as large for associate professors; at this level, men have outearned women in only 22 of the 29 years. The average difference was half that of full professors (\$1500). The gender gap at the assistant level was one-third that of full professors with a mean difference in average salaries of only \$959 and men outearning women in 21 of the 29 years.

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Table 3. Mean Salaries by Rank and Gender from 1985 to 2013 for Former Women’s College

Year	Mean Salary for Male Faculty			Mean Salary for Female Faculty			Difference Male-Female Means		
	Full	Associate	Assistant	Full	Associate	Assistant	Full	Associate	Assistant
2013	112,600	88,000	63,800	109,300	89,100	64,600	3,300	-1,100	-800
2012	110,400	83,700	64,400	106,600	82,600	60,500	3,800	1,100	3,900
2011	108,900	83,600	62,300	104,200	80,800	61,000	4,700	2,800	1,300
2010	108,100	82,800	60,500	105,900	80,200	61,700	2,200	2,600	-1,200
2009	108,100	82,700	63,100	107,000	81,000	61,400	1,100	1,700	1,700
2008	105,900	77,800	64,600	104,600	79,000	63,500	1,300	-1,200	1,100
2007	101,200	76,400	59,600	97,900	75,400	57,400	3,300	1,000	2,200
2006	89,800	69,800	54,500	87,800	67,500	56,200	2,000	2,300	-1,700
2005	88,800	66,700	52,900	85,900	64,900	51,200	2,900	1,800	1,700
2004	85,900	66,500	48,500	83,400	62,600	49,300	2,500	3,900	-800
2003	86,000	66,900	48,500	82,900	63,100	52,800	3,100	3,800	-4,300
2002	84,100	64,700	48,800	81,200	61,900	51,400	2,900	2,800	-2,600
2001	81,700	62,800	47,200	77,500	59,400	47,900	4,200	3,400	-700
2000	79,500	61,300	45,800	75,800	58,100	46,200	3,700	3,200	-400
1999	75,500	59,400	44,000	71,900	55,800	43,400	3,600	3,600	600
1998	71,700	55,900	43,800	67,500	53,800	43,400	4,200	2,500	2,900
1997	71,000	54,100	43,300	64,500	53,400	40,900	4,200	2,500	2,900
1996	69,400	52,600	40,000	64,100	51,600	39,200	5,300	1,000	800
1995	66,900	51,100	42,100	62,800	50,100	38,500	4,100	1,000	3,600
1994	65,100	49,800	41,500	61,300	48,500	37,700	3,800	1,300	3,800
1993	62,100	48,000	39,300	59,900	46,800	36,900	2,200	1,200	2,400
1992	59,800	46,800	38,900	58,200	45,200	36,500	1,600	1,600	2,400
1991	57,200	43,700	36,500	53,300	42,300	35,400	3,900	1,400	1,100
1990	52,300	40,000	33,900	49,000	40,500	33,100	3,300	-500	800
1989	49,200	37,800	31,500	47,900	38,400	30,100	1,300	-600	1,400
1988	46,700	34,600	29,200	43,500	35,000	27,100	3,200	-400	2,100
1987	45,800	33,300	27,600	45,600	33,900	26,500	200	-600	1,100
1986	43,600	31,800	26,300	42,200	31,800	23,700	1,400	0	2,400
1985	41,000	30,200	24,500	39,500	30,000	23,700	1,500	200	800
Mean Difference Between Men and Women by Rank 1985-2013							3,003	1,459	959

These 29 years of data revealed that the gender gap in salaries was a longstanding and ongoing problem at the former women's college. Over the years, the size of the gender gap rose and fell for each rank, perhaps as a result of equity raises in some years, retirements in others, etc. The equity raises that were effective in 2013, for example, seem to have eliminated the gender gap for assistant and associate professors, although not for full professors.

As Table 3 indicates, the size of the gender gap grew as faculty progressed through the ranks, a pattern that may be explained by across-the-board percentage salary increases. It therefore hit women hardest at the full professor level for those few women who reached that rank. In fact, one reason for the lower salaries for women at the highest rank may be the delay they experienced in their promotion to full professor. Even the women who had been promoted to full professor were earning less than they would have had they been promoted in the same number of years as their male peers. National data documented a gendered wage gap within disciplines, even ones such as biology that have had an increasing number of female faculty (Shen 2013). Overall, these data confirmed the fourth hypothesis that men have higher salaries than women.

CONCLUSIONS

This research investigates the experience of faculty with promotion to full professor at two small highly selective private liberal arts colleges in the northeastern United States. It revealed, first, that women were less likely to hold the rank of full professor at these two colleges than were men. Second, it demonstrated that STEM women spent an average of one year longer at the rank of associate professor than men did before getting promoted to full professor at the former women's college and that difference may be largely attributed to their greater likelihood of having administered a department or program while still an associate professor. Third, analysis of variance showed that gender was related to faculty perceptions of the promotion process at the former women's college but not at the former men's college. Women had less positive perceptions of the process of being promoted to full professor at the former women's college than did men. This gender difference disappeared after controlling for rank and discipline, perhaps because women were more likely to still be associate professors. Finally, there has been a gender gap in salaries at the former women's college for at least the last 29 years, and that gap was largest at the full professor level.

As this research demonstrated, there is considerable room for improvement in the promotion-to-full-professor process. Buch et al. (2011) developed a six-step mid-career faculty planning process that requires both individual and institutional effort. For example, Step 2 included a campus-wide dialogue about "pathways to professor," which has culminated in a faculty forum of the same name that is now offered to associate professors each year; at it, senior administrators publicly share their perspectives on the processes and expectations regarding

promotion to full professor. Some units now offer workshops to associates on how to build and present a compelling case for promotion, and some have revised workload policies to help ensure that service loads are more equitably shared by faculty across rank. (Buch et al. 2011, 43)

Based on their own research as well as previous research on promotion to full professor, Buch et al. (2011, 44-45) recommended that:

- Criteria for promotion from associate to full professor need to be as clear and transparent as the ones for promotion from assistant to associate professor.
- Inclusive “pathways to professor” should recognize multiple models of faculty success.
- Service loads need to be equitably distributed across rank and gender.
- Training and tools should ensure that promotion decisions at all ranks are made fairly and are not influenced by gender, race, or other non-performance factors.
- Associates should receive regular developmental feedback on their progress toward promotion to full professor.

How, then, can colleges improve the process of promotion to full professor? First and foremost, they need to create a mechanism for letting candidates for promotion, department chairs, and voting department members know how the written standards for promotion to full professor are operationalized by the college promotion committee and the college administration. Britton (2010, 25) concluded that women’s ability to work toward promotion to full professor suffered from the “lack of clear and transparent policies around promotion—policies that literally quantify requirements in ways that allow women and their male colleagues to measure themselves clearly.” Fox and Colatrella (2006, 381) found that faculty were “less clear about the attributes needed for advancement to full professor” than those needed for tenure and promotion to associate professor. An associate professor they interviewed, when asked what it took to get promoted to full professor, replied, “You got me. I don’t know what it takes. I have no clue what it takes” (Fox and Colatrella 2006, 382). A female associate professor in Buch et al.’s study (2011, 40) noted, “You only find out what you are missing when you are denied. More importantly, you find that even though you have been busy doing what they asked of you, and doing it well, it suddenly doesn’t count.” Fox and Colatrella (2006, 383) concluded that “in promotion to full professor, compared to promotion to associate professor, the attributes reported to be needed are more subjective, less known and less understood” than those needed for tenure and promotion to associate professor. To address this lack of clarity, Fox and Colatrella (2006, 384) recommended “clear, written, and transparent guidelines for advancement.” Guidelines alone may not be enough, though. Following the practices described by Buch et al. (2011) and holding an annual forum or workshop for associate professors (and their department chairs) may be a better mechanism for translating abstract language in personnel documents to the concrete cases provided by individual faculty in specific disciplines.

Once faculty and chairs understand how the standards are operationalized in specific cases, associate professors need to receive systematic developmental feedback on their progress toward meeting those standards, probably annually starting at the end of their first year in rank.

Small departments at liberal arts colleges are often not in a position to provide the kind of guidance that associate professors need. They may not have anyone who has successfully navigated the promotion process and therefore cannot draw on anyone's experience to provide guidance on the process. If the department has any full professors, they may not have been promoted recently and so their experience may no longer serve as an accurate guide of how the process works currently. For example, research expectations may be higher than they were in the past or procedures about getting external reviews of the candidate's scholarship may have changed. In departments with few if any full professors, an associate professor may be serving as department chair. Indeed, many departments, perhaps even the majority, at the two colleges studied were chaired by associate professors. Associate professors are simply not in the same position to evaluate the progress of their colleagues towards promotion to full professor that a higher ranked colleague would be, if only because they themselves have not yet successfully achieved that rank. In short, neither department chairs nor department colleagues may be in a position to provide the necessary guidance to associate professors, so the annual developmental feedback on an associate professor's progress toward promotion to full professor may have to come from outside the department. If colleges develop personnel procedures for providing feedback to associate professors about their progress toward meeting the standards for promotion to full professor, associate professors could make rational choices about how to allocate their time and effort and about when they are ready to be promoted.

Third, colleges need to develop a mechanism for putting faculty, particularly women, up for promotion to full professor in a timely manner. Renzulli et al. (2006) observed that the lack of a specific timetable for promotion to full professor may be one reason for the promotion delay women experienced. When it is up to the faculty member to choose when to stand for promotion, some worthy faculty may be more reluctant than others to put themselves forward. Buch et al. (2011) reported a gender difference in associate professors' motivation to seek promotion to full professor with only 10 percent of the men unsure "whether they would seek promotion in the future, but almost a third of women (30 percent) reported being unsure." The women associate professors in the focus groups on both campuses expressed considerable uncertainty about when a faculty member is ready to apply for promotion to full professor and considerable reluctance to put themselves up for promotion if they were not sure they were going to be successful. Any promotion process that leaves faculty without systematic guidance about when to stand for promotion may disadvantage women more than men and as such will perpetuate the current patterns of the underrepresentation of women at the rank of full professor even in undergraduate colleges where they account for a growing proportion of the faculty.

Finally, colleges and universities need to provide sufficient support for women and men to be successful in achieving promotion to full professor. According to Bonawitz and Andel (2009), this support includes resources for research, such as space, supplies, and equipment, but also sufficient time for research. They urged female faculty to negotiate teaching schedules, course releases, and leaves, while simultaneously refusing the service and administrative responsibilities that would not be weighed heavily in personnel decisions so that women had

enough time to work on what did weigh heavily—their research and teaching. These two colleges need to stop asking associate professors to chair departments and direct programs as long as these administrative responsibilities delay a faculty member’s promotion to full professor. When there is no alternative to an associate professor assuming these critical administrative roles, which is all too often the case in small departments, the colleges must find a way to value the administrative work associate professors have done sufficiently to outweigh any negative effects that work may have on their teaching and research records. Implementation of these four suggestions should improve the process of promotion to full professor, for both men and women, resulting in both men and women being promoted in a timely manner.

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