

Is the Academic Climate Chilly?
The Views of Women Academic Chemists

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ABSTRACT:

The statistical picture of the gender composition of chemistry as reported in national data indicates that women are underrepresented in academia in comparison to their representation in the field as a whole. This paper presents data on the perceptions and views of a broad cross-section of women in academic chemistry departments and provides some clues as to why this under-representation may occur. In general, the data support literature that has posited a work climate that is problematic and less than welcoming for women. The results indicate that a large proportion of the women surveyed report that they receive little professional support through mentoring; that they perceive that there are strong differences in the resources and privileges awarded to men and women faculty, and that gender-related issues affect their department's ability to recruit and hire or to promote women's career progress after they are hired. Finally, the chemistry women were significantly less likely than those in a national sample of academics to report being satisfied with their jobs and were significantly less likely than those in the national sample to agree that women and minorities are treated fairly.

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Introduction

Recent government statistics indicate that although women comprised 46 percent of the total labor force in 2006, they made up only 34 percent of those employed as chemists and material scientists.¹ This underrepresentation parallels the percentage of women obtaining PhDs in these fields. For example, even though women received almost half of all doctoral degrees awarded in 2005-06, they earned only 30 percent of those awarded in the physical sciences and technology.²

The situation becomes even more extreme in the academic workforce, especially in some scientific areas, where the representation of women does not parallel the receipt of advanced degrees. For instance, while the proportion of doctoral degrees in chemistry that has gone to women has increased markedly over the past few decades, the representation of women among higher education faculty has not increased at the same rate. At the 50 schools with the highest chemistry research expenditures, 31% of all doctorate degrees in chemistry awarded between 1993 and 2002 were given to women. Yet, women remain quite underrepresented on chemistry

faculties, especially among the highest ranked departments, which have the highest levels of spending and receive the most research funds. In 2007 women comprised less than 15% of the faculties at these top-ranked schools and only 22% of those at the assistant rank, far below the representation of women in the rank of newly minted PhDs.^{3,4,5,6} The National Academy's recent "Beyond Bias and Barriers" Report concluded that when women reach a "critical mass" in their individual departments, a level that they placed near 20 percent, a transition occurs and women "start to perceive their common interests and join together to press for improvements in policies relevant to their needs."⁷ Most chemistry departments have not yet met that threshold.

Numerous authors have suggested that women's underrepresentation in academe reflects a negative gender-related climate. Studies of the climate within academic departments including, but not limited to, chemistry indicate that, when gender differences occur, women faculty are significantly more likely than men to report negative experiences, unfair treatment, and to be less satisfied with their positions. Women's lower levels of satisfaction and negative experiences, such as exclusion from networks and support, are related to a greater tendency to leave academe and to lower productivity. Several authors suggest that continuing experiences with this negative gender climate cumulate through a "weathering" or "cascading" process, which can exacerbate issues associated with women's under-representation.^{8,9,10} A study of graduate students suggest that women in mathematics and sciences are more likely than men to have concerns about the academic lifestyle and to alter their aspirations away from academic research careers.¹¹

To date, analyses of the gender related climate within the sciences have focused mostly on representatives of several disciplines. This no doubt results from the relatively small numbers of women within specific areas. Yet, the various science disciplines vary, often substantially, from each other, especially in the extent to which they have incorporated women. For instance,

women have been more integrated into the biological sciences than the physical sciences. In 2006, over 60 percent of all bachelors degrees and almost half of all PhDs in the biological sciences were awarded to women. In contrast, in the physical sciences, only 42 percent of the bachelor degrees and 30 percent of the doctorates went to women. In addition, the sciences vary in the extent to which women PhDs opt out of academe for other employment opportunities. In general, women have been underrepresented in new hires in academe relative to their representation in the pool of possible candidates in areas where doctoral recipients have employment opportunities in a variety of sectors, such as economics, engineering, medicine, and chemistry.^{3,5,12,13,14,15} Thus, relative to most other scientific fields, women chemists have more employment alternatives and appear to choose areas other than academe. One reason that women do not enter academe may involve the negative gender-related climate that has been documented in studies of broader groupings of academic areas.

This paper focuses on women's perceptions of the gender related climate within academic chemistry. This focus is important precisely because most previous studies have generally aggregated data across disciplines, thus potentially obscuring the true picture within the field. The focus is also important because women in academic chemistry represent only a sub-set of those with advanced degrees in chemistry. Understanding more about the views of women who have entered academe can be important for developing ways to help more women to pursue academic careers.

Our analysis is descriptive and exploratory and focuses on four general areas. First we examine the extent to which women report that they have received mentoring and support throughout the various stages of their careers, for numerous studies have cited the importance of mentoring and interpersonal support in encouraging women to pursue academic careers and to

stay within the profession. Second, we examine women's perceptions of the relative resources and privileges that women and men receive within their academic departments. No matter how much individual encouragement someone receives, actually having resources, material support, and privileges is crucial for ultimate career success. Third, we examine perceptions of issues that affect recruitment, hiring and career progress, with specific questions about aspects of the field and their own departments that may influence the ability to incorporate women. Finally, we describe the faculty members' general satisfaction with their work life and their overall view of the ways in which women and minorities are treated. These questions parallel those that have been used in national surveys of academics, allowing us to directly compare the views of the women chemists to others within academe.

We examine the views and experiences of all the women in our sample and also compare the views of women with greater job security, through higher rank and academic tenure, with the views of those at the beginning stages of their careers. It is possible that, as women have become more common within graduate programs, a chilly climate may have diminished and those at the early career stages will have had fewer negative experiences. Alternatively, those at the early stages may be more vulnerable and aware of negative environments. Our data were gathered over a seven year time span, from 2001 through 2008, and we also compare, when possible, the views and experiences described in the more recent part of that time span with the earlier views. This allows us to examine the possibility that there have been changes in the academic climate and that negative experiences may be less common in recent periods.

Methodology

The data for this analysis come from women chemistry faculty who attended workshops designed to develop leadership skills and provide a venue for them to network with other successful women chemists. The workshops were sponsored by the Committee for the Advancement of Women Chemists (COACH), which is comprised of senior women faculty members in chemistry from around the country and are described in the companion article to this piece.¹ Since 2001, COACH has sponsored workshops at national professional meetings. Over one third of the women faculty who hold tenure track positions at the top 100 chemistry departments along with over 200 more women faculty from other chemistry departments around the country have undergone training at either the COACH workshops at the national American Chemical Society (ACS) and American Institute of Chemical Engineering meetings. Dozens more (not surveyed) have attended COACH workshops held at their home institutions.

Before attending the COACH sponsored workshops all participants filled out a questionnaire that asked about their career experiences and views regarding their departments. The questionnaire was distributed and completed using a web-based format. Information is available from over 250 attendees. However, the content of the questionnaire changed somewhat over the years, so that, for some of the measures, information is available for only part of the attendees, resulting in slightly smaller sample sizes for some of the analyses.

The analysis below focuses on simple descriptive statistics, using percentages, means and standard deviations. When appropriate, chi-square tests and analysis of variance are used to compare responses between the tenured and untenured women and those who attended the earlier and later workshops. We also compare the respondents' global assessments of job satisfaction

and treatment of faculty to a national sample of faculty from the National Center for Education Statistics' 2004 Survey of Postsecondary Faculty.¹

Results

The analysis begins with a description of the demographic and career characteristics of the sample. We then examine the women's reports of their mentoring experiences and support from others, their perceptions of the relative resources and privileges accruing to men and women, their views of factors that affect recruitment and hiring of women, and, finally, their global assessments of job satisfaction and treatment of faculty.

Demographic and Career Characteristics

The women in the sample ranged in age from their late twenties to mid sixties and from those who were newly hired in their positions to those who had been in rank for over twenty years. Almost a third of the attendees were untenured assistant professors and another 14 percent held other untenured ranks. Among the tenured attendees slightly more women (one-third of the total) were at the associate rank, while the remaining women (almost one-quarter of the total) were at the rank of full. As would be expected, the tenured faculty members were significantly older than the untenured, had been hired in earlier years and had been at rank and in their positions for longer periods of time. In addition, the attendees at later workshops were slightly (but insignificantly) younger, but were significantly more likely to have received their PhDs in more recent years and to have been hired more recently into their current positions. The attendees' fields of study include all the major areas of chemistry, and the majority of the attendees were employed at Research 1 or 2 Universities.

¹ Data for the NCES survey are available on the web at (<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007175>).

Questions regarding family life were asked of only part of the respondents. Almost two-thirds of those who were asked reported that they were married. On average, the attendees reported having about 1 child, although this value ranged from none to four.

All attendees were asked to report their race-ethnicity. Three-fourths were non-Hispanic white, with relatively even representation of other race-ethnic groups. Members of minority groups were slightly more likely to be untenured. Fifty-nine percent of the non-Hispanic whites were tenured compared to 43 percent of the other attendees (chi-square = 5.17, $p = .02$).

Mentoring and Support

The participants were asked if they had someone they regarded as a mentor during their education and training, in the early stages of their career (first 10 years), and in later career stages. They were also asked if they had mentored others. The responses to these questions are summarized in Table 1. For comparative purposes, responses are also listed for tenured faculty and for those who attended the later workshops. Chi-square statistics were used to test for significant differences between the responses of tenured and untenured faculty and between earlier and later attendees.

Table 1: Mentoring Experiences, Total Group, Tenured Faculty, and Attendees at Most Recent Workshops

	Percentage Saying Yes			Significance of Differences by Tenure Status		Significance of Differences by Time of Attendance	
	Total Group	Tenured	Later Attendees	Chi-Square	p	Chi-Square	p
Had someone considered a mentor during education and early professional training	36.9	34.8	69.2	0.56	0.46	51.52	<.001
In the early stage (first 10 years) of career)	43.5	35.1	69.2	8.30	0.004	31.42	<.001
In the later years of career (11 years to present)	57.1	49.5	0	8.29	0.004	30.65	<.001
Have you served as a mentor at any point in career	33.2	24.8	74.4	9.55	0.002	88.66	<.001
Whether or not you indicated formal mentoring, are there colleagues who have been influential in career?	15.4	14.0	-----	0.411	0.52		

Note: The sample size for the group of later workshop attendees varied from 20 (for the question regarding later years of mentoring) to 76. The question regarding other influential people was only asked of the early attendees (n=162 for this question).

Overall, slightly more than a third of the attendees reported that they had someone they considered a mentor during their education and early professional training. This figure rose to 43 percent regarding the early years of their career and to even higher levels (57 percent) for the later career years. In contrast, only one-third reported that they had served as a mentor to others.

The results indicate rather striking differences between tenured and untenured faculty and also between those who attended the earlier workshops and more recent attendees. There were no significant differences between tenured and untenured faculty in their reports of mentoring during their education and early training, but the tenured faculty members were significantly less likely than untenured faculty to report that they had a mentor during either the early or more

recent periods of their career or to have served as a mentor to others. In contrast, the more recent attendees to the workshops were significantly more likely than the early attendees to report mentoring both during their education and early training and the early stages of their careers and to have served as a mentor to others. Interestingly, none of the later attendees reported having a mentor in the later stages of their career, although this portion of the sample included only 20 people in the later attendee group.

Participants in the early workshops were also asked a series of questions regarding the extent to which various groups with which they interacted were “supportive of women.” The percentages who agreed with each statement are given in Table 2. It can be seen that almost three-fourths of the participants felt that undergraduate students in their department were supportive of women and slightly less than two-thirds perceived that the administration and faculty and staff were supportive. Only slightly more than half felt that the community in which their institution is located or the graduate students in their department were supportive of women, while the least support was perceived as coming from students across campus. There were no differences in views of tenured and non-tenured women.

Table 2: Views of the Gendered Climate at their University

	% Agreeing
The undergraduate students in my department are supportive of women.	70.0
The administration at the department/college level is supportive of women.	65.6
The faculty and staff within my department are supportive of women.	63.6
The faculty and staff within the university at large are supportive of women.	62.0
The administration at the top levels of the college/university is supportive of women.	60.5
The community in which my institution is located is supportive of women.	53.4
The graduate students in my department are supportive of women.	52.9
The students across campus are supportive of women.	48.4

N varies from 157 to 163, Data only available from the earlier workshop attendees.

Resources and Privileges

All of the women were asked a series of questions regarding relative resources and privileges given to males and females within their departments. The responses to these questions are summarized in Table 3. A pattern of perceived privilege accruing to men faculty more than women is apparent. More than half of the respondents reported that men had higher salaries and almost that many reported that men got more recognition within the university for their research. Well over a third reported that men were taken more seriously by graduate students and

undergraduate majors in their departments and had better promotion rates. Close to one third reported that men had more or better space and find it easier to receive secretarial assistance. The only experience that was perceived as more likely for women than for men was having heavier teaching loads (reported by 20% of the attendees) and having heavier departmental and university responsibilities (reported by 36% of the attendees). Notably, neither of these experiences promotes research agendas or the traditional pathways to career success.

Table 3: Perceptions of Male Privilege in Departments

Male Faculty	%
Have higher salaries	53.1
Get more recognition within the university (in terms of general grants, research, professorships, awards) for their research	46.7
Appear to be taken more seriously by undergraduate majors in the department	42.4
Appear to be taken more seriously by graduate students within the department	38.1
Have better promotion rates	35.8
Have more or better space allocated for their work (e.g. office and lab space)	29.7
Finds it easier to receive secretarial assistance	28.9
Have greater equipment allocations	24.6
Have more hours of research assistance	16.0
Have more hours of teaching assistance	13.0
Get more funding for travel	12.6
Have heavier departmental, college, or university service loads	11.2
Have heavier teaching loads	2.1

Note: Sample size ranges from 236 to 241.

There were no significant differences between tenured and untenured faculty in their perceptions or experiences. In addition, there were only two significant differences between the early and later attendees. In both cases, the later attendees were more likely to report a pattern of male privilege. The later attendees more often reported that male faculty were taken more seriously by undergraduates (55% of the later attendees versus 37% for the earlier attendees, $F = 6.69$, $p = .01$) and that men had better promotion rates (45% of the later attendees versus 38% of the earlier attendees, $F = 13.34$, $p < .001$).²

Issues that Affect Recruitment, Hiring, and Career Progress

The later attendees were asked a series of questions regarding their departments' ability to both recruit women job applicants and eventually hire women as faculty, as well as issues that affect women's career progress relative to men's. Responses to these questions are summarized in Table 4. The first set of questions (Panel A in Table 4) asked the respondents to indicate the degree to which a variety of issues had limited their department's ability to *recruit* women in the last 5 years. Ninety percent of the women said that concerns about combining family responsibilities and an academic career presented either a moderate or major difficulty, and almost as many gave a similar score to uncertainty about obtaining employment for a spouse. In addition, more than three-fourths cited lack of mentoring of potential women faculty and having few successful women in the department as major or moderate difficulties. Finally, almost two thirds noted that an unwelcoming department environment made life difficult for women. Notably, only 15% of the respondents said that an unwelcome department was *not* an issue.

² The F values reflect the use of a two-way analysis of variance with tenure status and year of attendance as the two factors.

Table 4: Participants' Views of Issues Limiting Departments' Ability to Recruit and Hire Women and Factors that Hinder Women's Career Progress

A. Issues that make it difficult to recruit women to the department					
	Not Difficult (%)	Minor Difficulty (%)	Moderate Difficulty (%)	Major Difficulty (%)	Total (%)
Lack of Mentoring of potential women makes recruitment difficult	3.7	19.8	48.1	28.4	100
Uncertainty about obtaining employment for partner or spouse makes recruitment difficult	1.2	11.2	38.8	48.8	100
Unwelcoming departmental environment for women faculty makes recruitment difficult	14.8	22.2	33.3	29.6	100
Concerns of the female faculty candidate about having both a family and a successful academic career makes recruitment difficult	5.0	5.0	30.0	60.0	99.9
Few successful female faculty in the department makes recruitment difficult	6.2	10	33.8	50	100
B. Issues that have limited department's ability to hire women					
	Not a limitation	Minor limitation	Moderate limitation	Serious limitation	Total
Too few female applicants for advertised faculty positions limits department hiring	18.3	18.3	36.6	26.8	100
Female candidates are in such high demand, we have lost them to other institutions limits department hiring	32.9	24.1	26.6	16.5	100

Lack of commitment of department faculty members to increase the number of women faculty limits department hiring	46.3	22	17.1	14.6	100
Some current faculty members are opposed to hiring women faculty limits department hiring	69.1	13.6	8.6	8.6	100
Not enough financial support from the higher levels of administration for making a competitive offer to the women candidates limits department hiring	45.7	13.6	18.5	22.2	100
Inability to provide employment for spouse or partner limits department hiring	14.8	13.6	24.7	46.9	100

C. Issues that slow women's progress in their careers relative to their male peers

	Not an issue	Not important	Somewhat important	Moderately important	Very important	Total
Few female colleagues	3.7	2.4	25.6	37.8	30.5	100
Balancing professional and family obligations slow career progress	2.4	1.2	4.9	23.2	68.3	100
Women getting heavier teaching and what was here?	8.5	7.3	29.3	30.5	24.4	100
Unwelcoming departmental climate for women slow career progress	11	2.4	12.2	34.1	40.2	100
Women having less opportunities to be mentored by top chemists slow career progress	6.2	1.2	22.2	33.3	37	100

Women do less self-promoting and marketing of themselves than men slow career progress	3.7	1.2	8.5	34.1	52.4	100
Subtle biases against women faculty that accumulate over the years slow career progress	4.9	4.9	9.9	35.8	44.4	100
Women's lack of success in obtaining funding slow career progress	10	6.2	28.8	31.2	23.8	100
Women's inability to compete for the best graduate students slow career progress	19	10.1	21.5	31.6	17.7	100
'Women being excluded from important departmental and institutional decisions slow career progress'	20.7	7.3	17.1	19.5	35.4	100
'Gender discrimination in the peer review process of their papers and grants slows career progress'	15	10	26.2	20	28.8	100

Note: Sample size ranges from 79 to 82.

The second set of questions asked about issues that had limited the department's ability to *hire* women (Panel B in Table 4). Almost three-fourths of the women saw an inability to provide employment for a spouse or partner as a moderate to serious limitation, and almost two-thirds cited too few female applicants. A little more than one-third cited problems of losing women applicants to other institutions and not enough financial support from higher administration. Almost one-third saw a lack of commitment of department faculty to increasing the numbers of women as a moderate or major limitation, and another 22 percent saw this as at least a minor limitation. Finally, almost one-third saw opposition of some faculty to the hiring of women as posing at least some limitations to hiring.

The third set of questions (Panel C) asked about issues that *slow women's progress* in their careers relative to their male peers. Over ninety percent reported that balancing professional and family obligations was moderately or very important. Eighty percent or more gave these ratings to a tendency for women to promote and market themselves less than men and subtle biases against women faculty that accumulate over the years. Between two-thirds and three-quarters saw having few female colleagues, an unwelcoming department climate, and women having fewer opportunities to be mentored by top chemists as moderately or very important. Finally, almost half or slightly more gave a moderately or very important rating to women having heavier work loads, women's lack of success in obtaining funding, women's inability to compete for the best graduate students, being excluded from important departmental and institutional decisions and gender discrimination in the peer review process. Notably, only two items of the eleven within this section was rated as not an issue by more than ten percent of the participants: women being excluded from important decisions (seen as not an issue by 21% and gender discrimination in the peer review process (seen as not an issue by 15%).

Across these 22 items, there were only 2 for which tenured and non-tenured women had significantly different views, close to what would be expected by chance. Non-tenured women were significantly more likely ($p = .02$) to report that some faculty members' opposition to hiring women limited their departments' ability to hire women. Tenured women, however, were significantly more likely ($p = .01$) to believe that women's tendency to promote themselves less than men hindered their career progress.

Work Satisfaction and General Treatment

Finally, the participants in the later workshops were asked about their general satisfaction with their work lives and their views of the ways in which women and minorities were treated within their departments. As noted above, these questions were modeled on those asked of a national sample in the NCES's 2004 Survey of Post-Secondary Faculty. Tables 5 and 6 summarize the responses of the women chemistry faculty as well as the national data, looking at both the entire sample of post-secondary faculty men and women and men and women faculty members in the physical sciences.

The results in Table 5 summarize reports of satisfaction with workload, salary, and the job "overall." Panel A reports the percentage saying that they are either "very satisfied" or "somewhat satisfied," and panel B reports the percentage saying that they are "very dissatisfied."³ Almost one third of the chemistry women report they are somewhat or very satisfied with their workload and salaries, although somewhat more (almost one-half) give these

³ While the question wordings were the same for the NCES and the chemistry women sample, five possible responses (including a mid-range no opinion category) were included for the chemistry women. As a result, it was more appropriate to compare the proportion responding to specific categories than to analyze data with average values across an arbitrary scale. Note that the inclusion of five possible categories for the chemistry women would result in a smaller probability of responses in each category for the chemistry women, and thus our statistical results provide a conservative test of possible differences between the groups.

ratings to their overall work situation. In comparison to both all post-secondary faculty and just those teaching in the physical sciences, the chemistry women were significantly much less likely to report that they were satisfied. (All comparisons are significant at $p < .001$.) At the other end of the scale, slightly less than fifteen percent reported dissatisfaction with workload and salary, and even fewer were very dissatisfied with their job overall. The comparisons with the four other groups indicated that the chemistry women were significantly more dissatisfied with workload than those in the four other groups, but that there were no significant differences in dissatisfaction with salary or overall conditions.⁴

Table 5: Satisfaction with Workload, Salary, and Overall, Chemistry Women, NCES Full Sample, and NCES Physical Scientists

	Somewhat or Very Satisfied		
	Workload	Salary	Overall
Chemistry Women	32.2	32.2	49.9
NCES, All Men	86.0	66.4	85.5
NCES, All Women	75.2	62.6	82.1
NCES, Physical Scientists, Men	78.3	64.9	87.8
NCES, Physical Scientists, Women	73.3	57.2	85.0

	Very Dissatisfied		
	Workload	Salary	Overall
Chemistry Women	14.9	13.8	6.9
NCES, All Men	4.0	12.5	7.5
NCES, All Women	4.6	6.8	6.5
NCES, Physical Scientists, Men	5.6	13.8	2.2
NCES, Physical Scientists, Women	4.0	14.6	3.5

⁴ T values were calculated using the standard “single sample test,” where the proportion in the sample of chemistry women was compared to the proportion of each population separately (e.g. all faculty women, all faculty men, etc.).

Table 6: Perception that Women and Racial Minorities are Treated Fairly, Chemistry Women, NCES Full Sample, and NCES Physical Scientists

	% Agree or Strongly Agree	
	Women	Racial Minorities
Chemistry Women	60.9	51.7
NCES, All Men	90.2	87.7
NCES, All Women	76.1	89.9
NCES, Physical Scientists, Men	92.9	93.4
NCES, Physical Scientists, Women	86.2	90.8

	% Strongly Disagree	
	Women	Racial Minorities
Chemistry Women	4.6	8.0
NCES, All Men	0.9	0.01
NCES, All Women	2.9	0.4
NCES, Physical Scientists, Men	1.3	2.0
NCES, Physical Scientists, Women	2.8	0.7

Table 6 reports perceptions of the extent to which the respondents believed that women faculty and racial minorities are treated fairly. Half or slightly more of the chemistry women agreed that women faculty and newer faculty are treated fairly, although these beliefs are stronger regarding women than minorities. Again, however, the chemistry women were significantly less likely than the faculty in the national sample to voice agreement with this statement. Somewhat similar results occur at the other end of the scale. The chemistry women were much more likely than others to strongly disagree that women and minorities are treated fairly. These differences were statistically significant, except for the comparisons with other

women (either the total sample or only those in the physical sciences) regarding the treatment of women.

When the views of tenured and non-tenured women were compared, only one of the 5 comparisons was statistically significant. The tenured women were significantly more satisfied with their salaries than the non-tenured women ($t = 1.96$, $p = .05$).

Summary and Discussion

The statistical picture of the gender composition of chemistry as reported in national data indicates that women are underrepresented in academic departments in comparison to their representation in the field as a whole. This paper presents data on the perceptions and views of a broad cross-section of women in academic chemistry departments and provides some clues as to why this under-representation may occur. In general, the data support literature that has posited a work climate that is problematic and less than welcoming for women.

First, the results indicate that a large proportion of the women who were surveyed reported receiving little professional support through mentoring, especially while in school or in the early careers, and also perceiving that their campus environment was not always supportive of women. Second, the results indicate the women perceived that there were strong differences in the resources and privileges awarded to men and women faculty, especially in the areas that are most likely to be related to career advancement such as salaries, recognition for research, space, and workload. Third, substantial proportions of the women reported that gender-related issues affect their department's ability to recruit and hire or to promote women's career progress after they are hired. Finally, the chemistry women were significantly less likely than those in a

national sample of academics to report being satisfied with their jobs and were significantly less likely than those in the national sample to agree that women and minorities are treated fairly.

There was no indication that more recent cohorts of women, as indicated by their tenure status, were less likely to report negative gender climates. In fact, of the few cases when differences occurred, they often were in the direction of untenured women expressing more dissatisfaction. For instance, the untenured women were more likely to indicate that faculty opposition to women limited their hiring and were significantly less likely to express satisfaction with their salaries. Similarly, of the few differences that appeared with views regarding the allocation of resources and support, those who responded to the questionnaires in more recent years were significantly more likely to report a pattern of male privilege.

The only area that revealed a possible pattern of change over time and across cohorts involved mentoring experiences. While there were no differences between the tenured and untenured faculty in the extent to which they were mentored during their education and early training, the untenured faculty members were significantly more likely to report that they had a mentor during their early and more recent career periods. In addition, the untenured faculty members were significantly more likely to report that they had mentored others. Thus, even though there appeared to be no differences in views of the negative gender climate within their department, the more recent cohorts of chemistry faculty women may be more likely to have experienced mentoring, both as those who receive and who give such assistance.

Although comparisons to a national data set were only possible with one area that was examined, the results confirm those obtained with the other areas and bolster our confidence in the results. The findings indicate that substantial proportions of the chemistry women report serious issues with the gender related climate of their department and the comparisons with the

national data indicate that their views are usually significantly less favorable than either the total group of college and university faculty in general or the subset of faculty in the physical sciences.

The results reported here underscore the need for additional research on gender-related climates of specific academic areas. The tendency to combine results across several academic disciplines may well obscure important and serious differences. Future work should be careful to examine variations across individual disciplines. Future work should also include both men and women and a broader range of academic disciplines. This could allow researchers to explore the ways in which varying academic cultures influence gender climates and the extent to which men and women perceive such climates in similar or dissimilar ways. Finally, it would be important to replicate this study with a sample that has been selected in a representative manner. Even though the respondents to this survey comprise a substantial proportion of women in academic chemistry departments, the fact that all had chosen to attend a workshop for women on negotiation and leadership certainly introduces a possibility of bias. This bias could occur in at least two ways. First, the respondents may be more aware than others of gender-related issues and thus more likely to report such problems. Second, the potential audience of their responses (those who were conducting the workshop) could have prompted them to be more forthright and open about the gender-related issues that they faced in their work life. If so, the responses may be more accurate and revealing than might otherwise be obtained.

Our results may have important implications for those who wish to promote gender equity within departments and develop procedures and policies that can help attract and retain women in academic chemistry. The results indicate that substantial proportions of the women who are employed in academic chemistry departments report that they have received little

mentoring, perceive that men faculty receive more support and recognition, and that negative gender climates negatively affect recruitment, hiring, and career progress of women faculty. The women's views are significantly less positive than those of those in a national sample of faculty. Increasing women's representation in academic departments of chemistry will require that decision makers attend to these issues.

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