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University of Michigan

ADVANCE

ASSESSING THE ACADEMIC WORK ENVIRONMENT FOR WOMEN SCIENTISTS AND ENGINEERS

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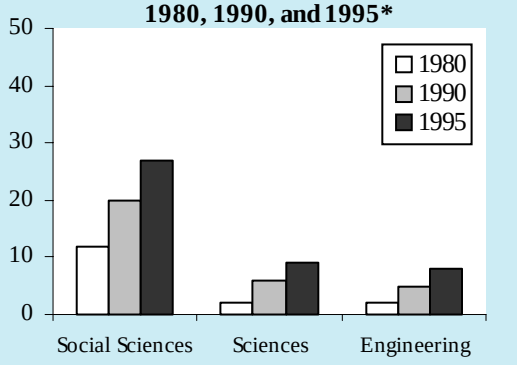
Assessing the Academic Work Environment for Women Scientists and Engineers

EXECUTIVE SUMMARY[1]

Background

Efforts to recruit, retain, and promote women scientists and engineers at research universities have had slow and uneven results (Figure 1). The increase in the proportion of women on the tenure track in science and engineering fields, both at the University of Michigan and nationally, has not only lagged far behind gains made by women in non-science fields, but also failed to keep up with the ratio of women earning Ph.D.s in science and engineering fields (Figure 2). Furthermore, studies reveal that women in academic science and engineering, as in academe more generally, are tenured and promoted more slowly, and earn less on average than their male counterparts, even when controlling for productivity.

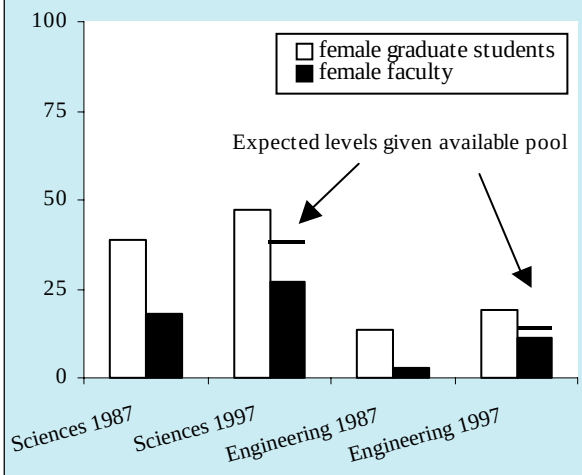
Figure 1: Percentages of Female Faculty in the Social Sciences, Sciences and Engineering at UM: 1980, 1990, and 1995*



*Source: NSF Reports

To address this problem on our own campus, Professor Abigail Stewart, then Director of the UM's Institute for Research on Women and Gender, worked with a team[2] that submitted a successful proposal to the National Science Foundation (NSF) for an ADVANCE Institutional Transformation Grant. This new initiative by NSF focuses on improving recruitment and retention of women science and engineering faculty at research universities.[3] The University provided funding to collect baseline data that would enable the project to target areas for change. The data collection included a climate survey administered in the fall of 2001. This report outlines the findings from the climate survey and related interviews and focus groups.

Figure 2: National Percentages of Female Graduate Students and Faculty in Science and Engineering: 1987 and 1998*



*Source: NSF Reports

Goals for the Study

The goal of the climate study was to observe how women and men scientists and engineers experience their working environments at UM. The study compared women scientists and engineers with two other groups: men scientists and engineers and women social scientists. This design allowed us to assess whether differences are attributable to gender (e.g., if the experiences of women scientists and engineers resemble those of women social scientists, but not men scientists), or to factors more generally relevant to the science and engineering context (e.g., if experiences are similar for men and women scientists and engineers, and different for women social scientists) or to factors affecting

women in science and engineering only (e.g., if experiences are unique to women scientists and engineers in comparison to both of the other groups).

We also conducted an analysis comparing men and women scientists and engineers on the three faculty tracks at the University of Michigan (the instructional or tenure track; the primary research track, and the clinical track), in order to assess similarities and differences in experiences across the three tracks.

Sample

The sample included:

- all female tenure track science and engineering faculty with paid appointments at the University of Michigan-Ann Arbor as of May 31, 2001; a random subsample of male tenure track science and engineering faculty, and all female social science tenure track faculty from schools or colleges with science faculty;
- all female primary research science (PRS) faculty at or above the rank of research investigator in science and engineering departments and research institutions; a random subsample of male primary research science and engineering faculty;
- all female clinical faculty at or above the rank of assistant professor in science departments; all male clinical faculty at or above the rank of assistant professor in science departments.

Due to the small numbers of faculty of color in academic science and engineering at the University of Michigan, we included nearly all faculty of color in those fields in the sample.

Comparing Women Scientists and Engineers on the Tenure Track with Two Groups

During the first phase of analysis we compared 135 women tenure track scientists and engineers with the two key comparison groups also on the tenure track: 100 male scientists and engineers and 73 female social scientists. In these analyses we controlled for differences between the groups in rank, age, experience, and household compositions.

Similar Career Patterns. All three groups were quite similar in career patterns (professional experience, household characteristics, career experiences, values, and satisfactions). There were no differences among the groups in reports of their own or their departments' view of their productivity, and few differences among them in the areas of career satisfactions, recognition, effort and satisfaction with resources and initial contract negotiation. These similarities provide an important backdrop against which to examine the differences.

Different Household Structures. Differences that are likely to be consequential involve the likelihood of having a spouse or partner, and the likelihood of having a spouse or partner who is employed full-time. Men in science and engineering were much more likely than both groups of women to share a home with an adult who was not employed full-time. Our data suggest that women scientists and engineers are more burdened by household responsibilities than their male counterparts, because they are both more likely not to be partnered (and therefore have no one at home to provide assistance, even if they have no dependents), and more likely to have a partner who works full-time (and therefore operate in a two-career household). More than half of their male colleagues have a partner who is not employed, or is employed part-time. Perhaps for that reason, women were less satisfied than men with the balance between professional and personal life.

Differences in Work Experiences. While they shared many workplace experiences, women and men scientists and engineers differed in the areas of changes in contract terms, service and mentoring, and on nearly all climate indicators.

Changes in Contract Terms. Men indicated that UM provided more items in their renegotiated terms of contract than the women identified, although this difference was small. If these results are verified by comparing the absolute size of renegotiated contracts to men and women (including formal counter-offers), one strategy for improving retention of women scientists and engineers might be increasing the terms of these contracts with women.

Service. Despite reporting a higher rate of service on formal committees than men, women scientists and engineers did not chair committees at a higher rate, even though they reported an interest in leadership roles. Qualitative data suggest that women scientists and engineers also carry an exceptional informal service and advising burden. These results indicate the importance of limiting routine service demands on women faculty, and of providing them with more opportunities to lead.

Mentoring. Among assistant professors, women scientists and engineers received substantially less mentoring than both comparison groups. In particular, these women reported having fewer male mentors in their own departments than men did—an important difference, since the vast majority of senior science and engineering faculty are men.

- While men scientists and engineers reported an average of nearly 5 male mentors in their departments, women reported an average of just over 2 male mentors in their departments, a significantly lower number.
- Women scientists and engineers reported no mentoring in an average of over 3 areas, compared to less than 1 for men scientists and engineers and 1-2 for women social scientists at the same rank.
- Obviously, women scientists and engineers report less mentoring in relative terms. In absolute terms the proportion of women scientists and engineers receiving little or no mentoring in some areas is quite striking. In fact, fewer than half of the women scientists and engineers reported any mentoring of any kind in 5 of the 8 mentoring areas: networking, department politics, obtaining resources, advocating for me, work-family balance.

These findings are significant in light of research connecting effective mentoring and positive career outcomes in science and engineering.

Differences in Climate. Men and women scientists and engineers reported striking differences in the areas of gender discrimination and sexual harassment.

Gender discrimination. Over 41% of the women scientists and engineers, in contrast to 4% of the men, reported experiences of gender related discrimination in the past five years at UM in at least one of the following areas: hiring; promotion; salary; space/equipment or other resources; access to administrative staff; graduate student or resident/fellow assignments. Women social scientists at UM reported levels of gender discrimination nearly as high, slightly over 35%. In each of three areas (salary, promotion and resources), over 15% of women scientists and engineers reported having experienced gender discrimination at UM within the previous five years.

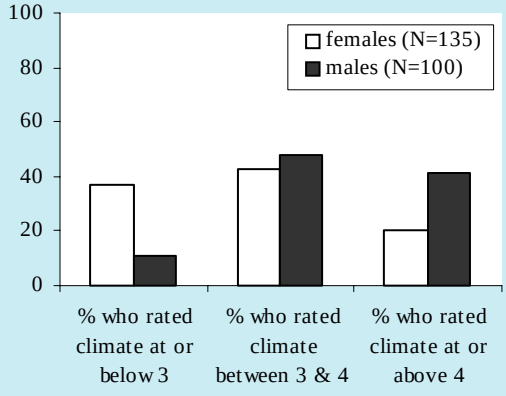
Unwanted sexual attention. About 20% of women scientists and engineers reported having experienced unwanted and uninvited sexual attention at UM during the past five years, compared to about 13% of women social scientists and just over 5% of men scientists and engineers. Over 38% of women scientists and engineers, 29% of women social scientists and 21% of men scientists and engineers reported that others have informed them of instances of unwanted and uninvited sexual attention.

Department climate. We found significant group differences on all but one (scholarly isolation) of the nine features of *departmental climate* we as-

sessed (positive climate, tolerant climate, egalitarian atmosphere, felt surveillance, race/gender tokenism, fairness of the chair, ability of the chair to create positive environment, chair's commitment to racial/ethnic diversity). We created an overall index of climate by combining all nine scales, and found that women scientists and engineers reported the most negative climate.

It is hard to assess the meaning of a mean difference on a 5-point scale. In order to evaluate the size of the difference, we examined the distribution of women's and men's ratings. The middle (mean and median) rating of the climate for women scientists and engineers was closest to 3 on the 5 point scale (1=low, negative to 5=high, positive), while the middle rating for men scientists and engineers (and women social scientists) was closest to 4. Half as many women scientists and engineers rated the climate at or above 4 (about 20%), compared to the men (40%), while three times as many women (37%) rated the climate at or below 3 compared to the men (11%). The difference in felt climate (between women and men scientists and engineers) appears to be substantial (Fig. 3).

Figure 3: Distribution of Climate Ratings by Gender



We also considered whether perceptions of climate are related to overall job satisfaction and found high and statistically significant correlations between negative climate ratings and overall job satisfaction, both for the survey respondents as a whole and for women scientists and engineers.

Finally, we considered whether reports of gender discrimination or harassment over the past five years "predict" current satisfaction and climate ratings. Among all tenure track faculty, and among women scientists and engineers, those who had experienced gender discrimination or sexual harassment reported significantly lower scores on overall satisfaction with UM position, tolerant climate, and gender egalitarian atmosphere, and higher scores on gender stereotyping and race/gender tokenism. In addition, among all tenure track faculty, those who reported either gender discrimination or sexual harassment reported higher scores on felt surveillance, and lower scores on positive climate, fairness of the chair, and the ability of the chair to create a positive environment.

Conclusions - Tenure Track Comparisons

The results show that in many areas pertaining to career patterns and satisfactions, and in terms of the relationship between climate and satisfaction, tenure track women and men science and engineering faculty at UM are similar. However, they differ in household composition, with the women scientists and engineers more likely than the men to be members either of two-career households or solo adult households. Perhaps as a result of this difference in household structure--which implies that women scientists and engineers have less assistance available at home than men--professional/personal issues are especially important to them. In this respect, these women are similar to women social scientists.Women scientists and engineers experience a more negative work environment than men in these fields or women social scientists do. The particular negative features for women include less robust renegotiated contracts, higher service demands, inadequate mentoring, and chilly departmental climates. Women report high levels of gender discrimination and sexual harassment. In most (but not all) of these respects, things are worse for women scientists and engineers than for women social scientists.

Comparing Women Scientists & Engineers on the Three Faculty Tracks

The second phase of data analysis consisted of a track by gender analysis, comparing the experiences of 187 male and 259 female scientists and engineers on the three faculty tracks at the University of Michigan: tenure, primary research, and clinical. Tenure track women social scientists are *not* included in the track by gender analysis.

Results suggest that gender plays a similar role in the lives of women scientists and engineers, regardless of track. While some gender differences seem to pertain only to tenure track faculty (e.g., the lack of mentoring), most others (e.g., service burdens and more negative climate) were similar across all tracks.

Track plays a significant role in the lives of UM science and engineering faculty. Tenure track faculty seem to be advantaged in several areas, with primary research and clinical track faculty feeling in many ways like second-class citizens.

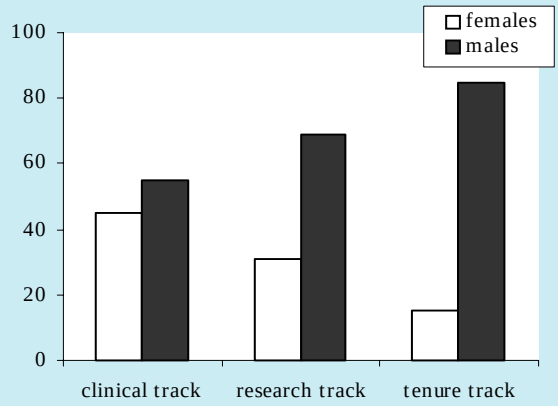
- Research track faculty find the ambiguities around their title "Research Scientist," teaching roles and access to resources (notably on arrival and in renegotiating their contracts) particularly difficult.
- Clinical track faculty struggle more with a sense of lesser productivity and status.
- There are signs that both groups are more alienated from the institution and its mission than tenure track faculty.

Relative gender ratios in the three tracks (Figure 4), as well as the status differentials felt across gender, suggest that the research and clinical tracks are lower status and more open to women than the tenure track (except in the College of Engineering where the research and tenure tracks both have few women and there is no clinical track).

Implications of the Findings

The results of these analyses, along with those from the salary and space analyses, will be used to make policy recommendations and identify practices that might improve the work environment not only for women scientists and engineers, but for all faculty. The survey findings have already informed the design and implementation of ADVANCE initiatives at the University of Michigan. Perhaps the single most important remedy suggested by our findings is increasing the "critical mass" of women science and engineering faculty by recruiting and retaining more women scientists and engineers. The following remedies are also indicated by our findings:

Figure 4: Percent Males and Females by Track



Work-family interface:

- ensuring that existing family-friendly policies are widely known, and improving the family-friendliness of the science and engineering departments, as well as the university more generally.

Negotiation of contracts:

- ensuring that equitable offers, counter-offers, and contract agreements are made and monitored.

Mentoring:

- increasing commitment to and understanding of mentoring among chairs and senior faculty leaders, as well as younger faculty;
- supporting on- and off-campus mentoring;
- creating formal and informal mentoring programs for tenure track faculty.

Service:

- increasing awareness of the crucial difference between "participation" in committee work and "power" in setting policy;
- limiting routine service demands on women science and engineering faculty, while providing them with more opportunities to lead.

Climate:

- ensuring that departments and colleges have clear and transparent policies and procedures that minimize negative experiences;
- improving training, selection and accountability of chair and senior faculty leaders in areas of mentoring, problem-solving, fair and judicious procedures and practices, and conflict-resolution;
- having departments engage in systematic evaluation of their own climates and take active steps to address their negative features;
- creating new mechanisms for addressing conflicts or difficulties women scientists and engineers face at the departmental level.

Research and clinical tracks:

- consider a change in title from "research scientist" to "research professor";
- create equitable arrangements for research and clinical faculty to teach and participate in governance in their appointment homes;
- provide improved recognition for faculty on these tracks;
- increase support to research faculty for their research activities;
- increase support to clinical faculty for scholarly productivity;
- offer opportunities to women scientists and engineers on these tracks to move on to the tenure track.

A study like this one can only be a beginning. This study examined many important aspects of the work lives of women scientists and engineers at one university. We need comparable data from other universities, and many other features of scientists' and engineers' work lives also need to be studied here and elsewhere: tenure and promotion processes and rates; attrition within and across fields; salary equity, equity in the allocation of space and other research resources; and so on. We believe that the best institutional strategy for improving the academic work environment for women scientists and engineers—as for all faculty—is to create and maintain systematic procedures for assessing that environment and acting on those assessments.

NSF's ADVANCE program provides us with crucial resources to implement some of the suggestions outlined here, but it will take a great deal of collaboration and commitment from many faculty and administrative leaders to put those and other resources to effective use. If we succeed in doing so, this study will have served its purpose—to provide a baseline against which to measure the institution's future success at improving gender equity among science and engineering faculty at the University of Michigan.

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[1] The full report can be read or downloaded from http://www.umich.edu/~advproj/reports.html. Printed copies of the full report can be requested by writing to dlavaque@umich.edu, or Dr. Danielle LaVaque-Manty, ADVANCE, Institute for Research on Women and Gender, 204 S. State St., Ann Arbor, MI 48109-1290.

[2] Co-Principal Investigators, now members of the Advance Steering Committee, are Professor Pamela Raymond (Senior Counselor to the Provost, Professor of Cell and Developmental Biology and former Associate Provost), and Deans Stephen Director (College of Engineering) and Allen Lichter (School of Medicine). Interim Dean Terrence McDonald (College of Literature, Science and the Arts) has joined the Steering Committee, replacing former Dean Shirley Neuman. Dr. Janet E. Malley, Deputy Director of IRWG, provided key support.

[3] Awards were announced in October 2001 for a January 2002 start date. Other recipients include the University of Wisconsin-Madison, the University of Washington, the University of California-Irvine, Georgia Institute of Technology, the University of Colorado-Boulder, New Mexico State University, the University of Puerto Rico-Humacao, and Hunter College of the City University of New York.

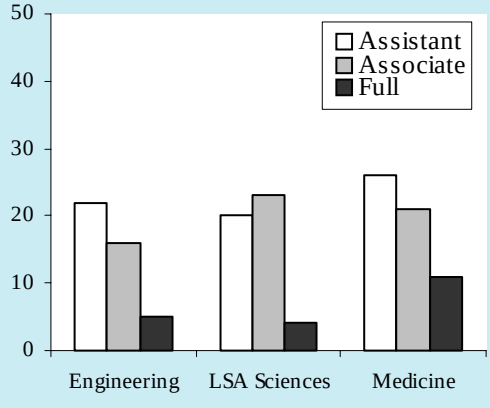
Assessing the Academic Work Environment for Women Scientists and Engineers

OVERVIEW

History of the Project

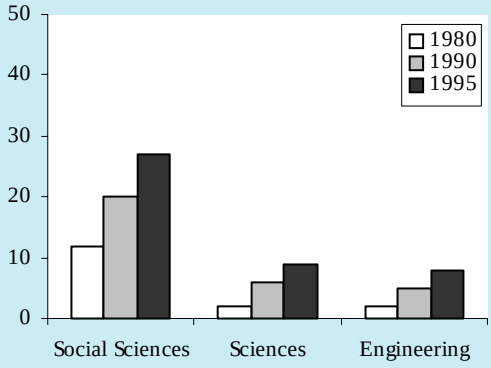
During the fall of 2001, staff at the Institute for Research on Women and Gender (IRWG) administered the University of Michigan Survey of Academic Climate and Activities as part of a larger effort to assess the work environment for scientists and engineers at UM. The University initiated this study as a result of increasing recognition that efforts to recruit, retain, and promote women scientists and engineers at research universities have not been very successful (Sonnert & Holton, 1996; Etzkowitz, Kemelgor & Uzzi, 2000; Zuckerman, Cole & Bruer, 1991). While there has been progress, it has been slow and uneven; in fact, it's been especially slow at the highest ranks, i.e., full professors (see Figure 1 for recent percentages of women faculty on the three tenure-track ranks at the University of Michigan).

Figure 1: Percentage of Female Tenure Track Faculty in Engineering, LSA Science Departments, and Medicine by Rank, 2000-01*



*Source: NSF Data

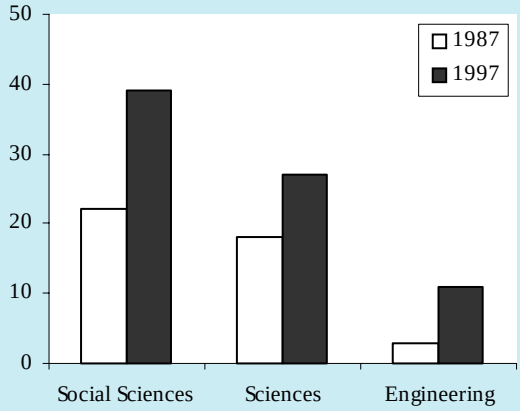
Figure 2: Percentages of Female Faculty in the Social Sciences, Sciences and Engineering at UM: 1980, 1990, and 1995*



*Source: CEW Report 1996

The increase in the proportion of women on the tenure track in science and engineering fields, at UM and nationally, has lagged far behind gains made by women in non-science fields (see Figures 2 and 3), and has not kept up with the ratio of

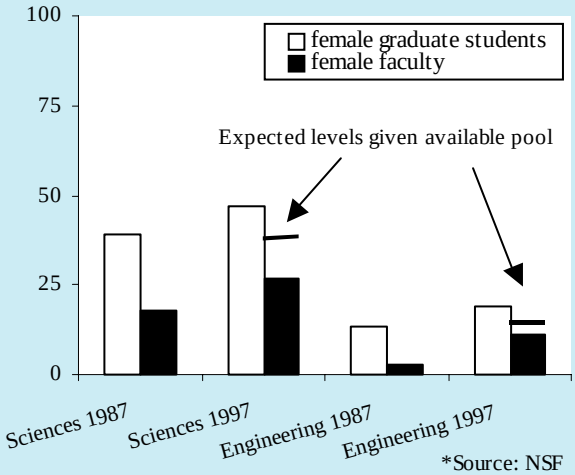
Figure 3: National Percentages of Female Faculty in the Social Sciences, Sciences, and Engineering: 1987-1997*



*Source: NSF Data

women earning Ph.D.s in science and engineering fields (Figure 4, see p. 12). Further, women who persist in careers in academic science and engineering, as in academe more generally, are tenured and promoted more slowly, and earn less on average than their male counterparts, even when controlling for productivity (Valian, 2000).

Figure 4: National Percentages of Female Graduate Students and Faculty in Science and Engineering: 1987 and 1998*



The low representation of women faculty in science and engineering fields was once considered only a "pipeline" problem, the result of too few women pursuing doctoral level graduate study in these fields. According to the pipeline theory, as women gain the relevant credentials, they will achieve the same career outcomes as men (Etzkowitz *et al.*, 2000). There is no doubt that there is a pipeline problem for women in science and engineering. It is extremely important to continue to address the lower participation of girls and women of all ages in science and engineering. However, the pipeline analysis does not account for many features of the problems associated with recruiting, promoting and retaining women in the science and engineering at the highest academic level, that is, on the faculty. The slow progress toward gender equity among faculty in science and engineering over the past twenty years, particularly at the highest ranks, in spite of an increased proportion of science and engineering doctorates earned by women, has caused researchers to question the ways in which the climate of academic science might contribute both to women "leaking" from the academic pipeline, and to their low status within the academy (Bronstein & Farnsworth, 1998; Etzkowitz *et al.*, 2000; Sonnert & Holton, 1996; Valian, 2000).

To address this problem at the University of Michigan, former UM President Lee Bollinger established a Gender in Science and Engineering (GSE) Committee following a meeting at MIT in January 2001, at which leaders of nine top US research institutions agreed to make serious efforts to improve gender equity in science and engineering on their own campuses.[4] At the request of this committee, in May 2001 Professor Abigail Stewart, then Director of the Institute for Research on Women and Gender at the University of Michigan, headed a team[5] that prepared and submitted a grant proposal to the National Science Foundation (NSF) for an ADVANCE Institutional Transformation Grant. These grants were a new initiative by NSF, focused on improving recruitment and retention of women science and engineering facul-

[4] Presidents and other senior administrators from the following research institutions attended the conference: Harvard, Princeton, Stanford, and Yale Universities, the Universities of California-Berkeley, Michigan, Pennsylvania, the California Institute of Technology and MIT. See Lawler, A. (2001). Representing UM at this meeting were former President Bollinger; Vice President and Secretary of the University Lisa Tedesco (Dentistry); former Associate Dean of Engineering Linda Katehi (Electrical Engineering and Computer Science); and former IRWG Director Abigail Stewart (Psychology and Women's Studies). Members of the initial Gender in Science and Engineering Committee included: former President Bollinger; former Provost Nancy Cantor; Dean Stephen Director (Engineering); Dean Allen Lichter (Medicine); former Dean Shirley Neuman (LS&A); Linda Katehi; former Associate Provost Pamela Raymond (Senior Counselor to the Provost, Cell and Developmental Biology); Abigail Stewart; and Lisa Tedesco. The Committee now includes President Mary Sue Coleman, Interim Provost Paul Courant, and Interim Dean Terrence McDonald (LS&A).

[5] Co-Principal Investigators, now members of the Steering Committee of the project, are Professor Pamela Raymond (Cell and Developmental Biology and Senior Counselor to the Provost), and Deans Stephen Director (College of Engineering) and Allen Lichter (School of Medicine). Interim Dean Terrence McDonald (College of Literature, Science and the Arts) has joined the Steering Committee, replacing former Dean Shirley Neuman. Key support was provided by Dr. Janet E. Malley, Deputy Director of IRWG.

ty at research universities. The University of Michigan was one of nine universities to receive an NSF ADVANCE grant in the initial round.[6] The University provided funding for the collection of baseline data before the grant award, in order to identify specific issues and needs that may apply to women scientists and engineers at UM, and to determine areas to target for change. The initial data collection included a climate survey administered in the fall, 2001 (see Appendix A for a copy of the survey), and studies of salary equity and space allocation equity, the latter conducted in the three largest schools (Engineering, Medicine and LS&A science departments), where most women scientists and engineers (68%) at UM work.[7]

This report outlines the findings from the climate survey, and related interviews and focus groups. The results will be used to make policy recommendations and identify practices that might improve the work environment for women science and engineering faculty and faculty generally, since many measures taken to improve the climate for women scientists and engineers[8] will likely benefit men as well. In particular, the survey findings inform the design and implementation of ADVANCE initiatives at UM. Separate reports will present analyses of space allocation and salary equity.

Goals for the Study

Our goal for the climate study was to observe how women and men scientists and engineers experience their working environments at UM. Wherever possible, we aimed to ascertain whether differences were attributable to gender (e.g., if the experiences of women scientists and engineers resemble those of women social scientists, but not men scientists and engineers), or to factors more generally relevant to the science and engineering context (e.g., if experiences are similar for men and women scientists and engineers, and different for women social scientists) or to factors affecting women in science and engineering only (e.g., if experiences are unique to women scientists and engineers in comparison to the other two groups).

In order to permit these kinds of inferences, the primary design of this study focuses on tenure track faculty at the University of Michigan, comparing female scientists and engineers to both male scientists and engineers and female social scientists. We added to this a secondary design analyzing appointment track and gender, which allows us to compare the experiences of male and female scientists and engineers on the tenure, primary research and clinical tracks. Tenure track scientists and engineers are the focus of the NSF grant, although campus climate initiatives are open to faculty on all tracks and in all science and engineering departments.

The study discussed in this report was initiated under the assumption that aggregate data about difficulties faced by women in science and engineering fields at the University of Michigan would help us target intervention efforts to improve the situation. We believe that our findings can in fact be helpful in this way. But we also offer a caution: aggregate data can only provide a picture of the overall group—that picture may in fact be misleading or simply irrelevant to any given individual or particular unit. What this study can do—and we

[6] Awards were announced in October 2001 for a January 2002 start date. Other recipients include the University of Wisconsin-Madison, the University of Washington, the University of California-Irvine, Georgia Institute of Technology, the University of Colorado-Boulder, New Mexico State University, the University of Puerto Rico-Humacao, and Hunter College of the City University of New York.

[7] Among 2000-01 tenure track women scientists at UM, 12% are in the College of Literature, Sciences and the Arts, 10% are in the College of Engineering, and 46% are in the School of Medicine. The remaining 32% of tenure track women scientists have an appointment in one of seven smaller colleges—School of Dentistry, School of Information, School of Natural Resources and Environment, School of Nursing, School of Public Health, College of Pharmacy, and the Division of Kinesiology.

[8] For the sake of brevity, the term scientists is sometimes used in this report; in all instances it is meant to include engineers.

hope it does—is to give us a picture in "broad strokes" across many different units and individuals. It does not fill in the crucial shading and detail that only individual units and faculty can provide.

It is important to keep this in mind both in the case where an obstacle identified here may seem not to apply, and in the case where an individual may feel she faces an obstacle, but it does not appear in the aggregate data. For example, particular women faculty who are untenured may feel they *are* receiving adequate mentoring from senior faculty on and off-campus. If that's so, it's great. But the aggregate data point to mentoring as something that, *on average*, is a problem for untenured women in science and engineering. So it is worthwhile for institutional decision-makers to think about the problem, even if there are individual cases that are working fine. In fact, it would be wise for them to examine those individual cases carefully, not because they conflict with the aggregate data, but so we can learn how to make mentoring work better for more women faculty in science and engineering.

Equally, an individual woman in science and engineering may feel that she carries an inequitable teaching load compared with men in her department. The fact that we did not find average gender differences in teaching load does not preclude the possibility that there are, in fact, important inequities at the individual level. These individual inequities deserve attention, regardless of the aggregate pattern. In fact, our data strongly suggest that individual men's and women's perceptions of inequities (whether they fit the aggregate pattern or not) have consequences for their own morale, and felt satisfaction with their jobs at Michigan. It is important, then, that data about women in science and engineering *in general* not be used to discount evidence about *individual cases*. Inequities that apply only in a few cases are just as unequal as those that are more common; they demand attention and correction at the individual level.

Theoretical Framework

There are several potential alternative explanations for any differences between women and men scientists and engineers in their experience of the academic workplace. These explanations focus on gender differences, deficits in the science and engineering environment, and the accumulation of advantages and disadvantages.

The *gender difference* model views women's difficulties in science fields as resulting from differences between men and women in biology, in gender role socialization or in gender-linked cultural patterns (Sonnert & Holton, 1996). One form of this theory, for example, argues that differences in academic career outcomes are a function of women's adoption of self-limiting behaviors as a result of internalized social values that underestimate women's competence. According to this explanation, women more than men suffer from "the imposter syndrome," which includes doubting that their success is a function of their own ability and effort. Believing that their success to date is the result of luck or pretense has been shown to result in greater evaluation anxiety, which in turn may negatively affect academic performance. Bronstein and Farnsworth (1998) argued that for this reason women may be less likely than men to submit and resubmit their work for publication.

Another form of the gender difference model emphasizes women's family role demands. Here Bronstein and Farnsworth (1998) point out that if women limit their job search to areas near their partners, or experience insurmountable conflicts between the biological clock and the tenure clock, these factors may cause women to leave academia. (It is worth noting that this kind of argument can be used to evaluate and critique the gender-fairness of academic job features such as the tenure clock, rather than to identify the source of the problem as lying in gender differences.) The gender difference model, in short, most often suggests that it is women scientists and engineers who need to change if they

are to be successful in academia. It is entirely possible, however, to identify gender differences (e.g., in the pressures of parenting and household roles) that suggest the need for changes in the academy or in science (or the broader society), rather than in women.

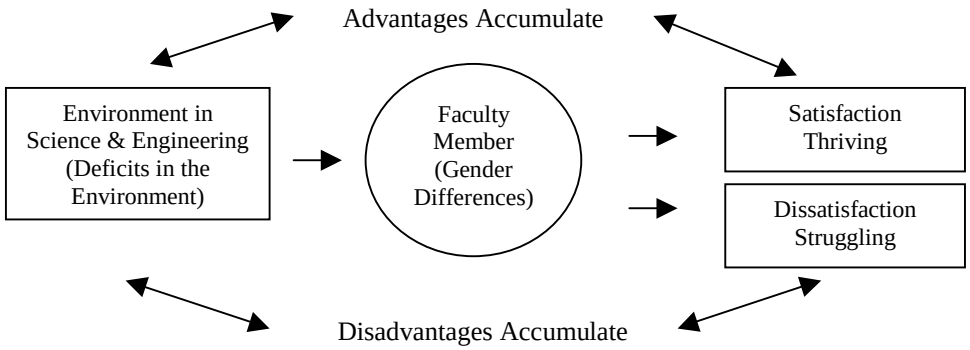
The *deficits in the science environment* model, in contrast, suggests that there may be some problem or feature of the science environment that accounts for women's failure to thrive, and that needs to change. According to this theory, structural barriers may limit women's success in scientific fields. These may include formal barriers such as open gender discrimination, and denial of good entry-level jobs, promotions, and tenure. In addition, and perhaps more commonly, they involve informal barriers such as women's restricted access to social capital, e.g. effective mentoring and networking opportunities (Etzkowitz *et al.*, 2000; Sonnert & Holton, 1996).

Many researchers argue that the low number of women in science and engineering, particularly at the upper echelons of the profession, is related to the *accumulation of advantages and disadvantages* that begin to accrue at early stages in one's career. According to this theory, small differences in prestige and success in early career stages are amplified in subsequent stages, leading to very different career outcomes (Cole & Singer, 1991; Fox, 1981, 1985; Long, 1990; Merton, 1968, 1973; Zuckerman, 1989). One researcher used an economic analogy to explain the theory: "Like interest on capital, advantages accrue. Like interest on debt, disadvantages also accumulate. Very small differences in treatment can, as they pile up, result in large disparities in salary, promotion, and prestige" (Valian, 2000). See Figure 5 for a graphic representation of these three theoretical models. Obviously these alternatives are not mutually exclusive; moreover, many observations would be difficult to attribute solely to "gender" or solely to the "science environment." We have used these two approaches to organize the questions we ask of the data, but we do not believe it is important (or possible) to separate gender and the science environment any more than it is possible to separate "nature" from "nurture."

Evaluating Alternative Explanations for Observed Differences

As we analyzed data from the climate survey, we generally tried to evaluate alternative explanations for observed group differences, within the limits of the variables we have available. We have noted that our design allows us to assess whether observed differences are related to something about the specific environmental situation for women scientists and engineers rather than something about women academics generally. If this were the case, we would expect the pattern of findings to identify

Figure 5
Reasons for Gender Differences in Career Outcomes



situations that are unique for women scientists and engineers in comparison with both men scientists and engineers and women social scientists. Evidence of this kind is, then, compatible with the deficits in the science environment model. If we find, however, differences between both groups of women and the male scientists and engineers, they could reflect some personal characteristic of women, supporting the gender differences model.

Gender differences could in turn result from women's different life situations (e.g., household responsibilities) or their personalities. For example, we sometimes hear skeptics suggest that women scientists and engineers may simply complain more than men (or women in other fields), or that they are less competent or aggressive than their male counterparts. We can, with our data, try to assess the plausibility of this kind of argument. For example, if women scientists score uniformly low on all measures of satisfaction with their careers, this might point to a personal characteristic leading to indiscriminate discontent with their environment. However, if women scientists and engineers target particular issues for complaint, then their satisfaction with many areas of their work environment would lend credibility to their critique of other areas. If women scientists are dissatisfied with their positions because as a group they are, or feel they are, less qualified than men scientists, we would expect to see evidence of this supposed incompetence in such areas as recognition and productivity. Likewise, if the observed differences relate to the family situation of women scientists and engineers, then we would expect to see large family situation effects on those variables that differentiate men and women scientists and engineers. Observed differences between men and women scientists and engineers also could be a reflection of differences between men and women in professional experience, for example years since Ph.D., or number of years at UM. If this were the case, we would expect to find that group differences disappear when we control for relevant variables.

Sample

The sample of faculty surveyed included the following groups of faculty with paid appointments at the University of Michigan-Ann Arbor as of May 31, 2001[9]:

Tenure Track Faculty

- All female tenure track science and engineering faculty at or above the rank of assistant professor (N=259).
- Random subsample of male tenure track science and engineering faculty at or above the rank of assistant professor, stratified by race and rank (N=339).
- All female tenure track social science faculty at or above the rank of assistant professor who were in colleges that also have science faculty (N=156).[10]

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[9] The Provost's Office and the Office of Budget and Planning prepared databases containing tenure track, primary research and clinical faculty from which we drew the survey samples. The Steering Committee identified the schools/colleges and departments that housed basic science faculty at the University of Michigan.

[10] The ADVANCE Evaluation Advisory Committee recommended that we limit our sample of female social science faculty to disciplines that are part of schools/colleges that also have science/engineering disciplines and sub-disciplines. Based on this advice, we surveyed faculty from LSA, Engineering, Medicine, Dentistry, Information, Kinesiology, Pharmacy, Public Health, Natural Resources and Environment, and Nursing. (See Appendix B for a complete list of departments surveyed.) Within the sample, faculty were tentatively classified as scientists and engineers or social scientists based on the following criteria: Faculty whose primary appointment (.5 fraction or higher) was in the Colleges of Engineering or Dentistry, and the Schools of Medicine or Pharmacy, were classified as scientists and engineers. Within LS&A, Astronomy, Biology, Chemistry, Geological Sciences, Mathematics, Physics, and Statistics were classified as science departments. Anthropology, Communication Studies, Economics, History, Political Science, Psychology, and Sociology were classified as social science departments. Within the School of Public Health, Biostatistics, Environmental Health Sciences and Epidemiology were classified as science departments, while Health Be-

Primary Research Track Faculty

- All female primary research science (PRS) faculty at or above the rank of research investigator in science and engineering departments and research institutions (N=115).[11]
- Random subsample of male primary research science and engineering faculty at or above the rank of research investigator stratified by race and rank (N=184).

Clinical Track Faculty

- All female clinical faculty at or above the rank of instructor in science departments (N=143).
- All male clinical faculty at or above the rank of instructor in science departments (N=202), since the numbers were roughly comparable to those of clinical female faculty.

Due to the small number of faculty of color in academic science and engineering at the University of Michigan, the ADVANCE Evaluation Advisory Committee recommended oversampling faculty of color, both to yield numbers large enough to permit analysis by race/ethnicity, and to protect confidentiality. We therefore included nearly all faculty of color in the sample sent the questionnaire.[12]

Questionnaire Design

The University of Michigan Survey of Academic Climate and Activities is a ten-page survey focusing on institutional and unit/department climate (see Appendix A for a copy of the survey). There are additional sections on professional employment, teaching, resources, career satisfaction, recognition, productivity, personal life, and demographics included to help us assess equivalence of faculty experiences. Women scientists and engineers at the University of Michigan suggested many of the survey topics during interviews conducted by Professor Abigail Stewart in 2000, in preparation for the MIT meeting. Where possible, we included questions from faculty surveys previously conducted at other universities. Many of the climate questions came from the 1996 University of Michigan Faculty Work-Life Study (described in a 1999 report) conducted by researchers from The Center for the Study of Higher and Postsecondary Education (CSHPE) and the Center for the Education of Women (CEW).[13]

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havior and Health Education, and Health Management and Policy were classified as social science. Faculty in the Division of Kinesiology, School of Information and School of Natural Resources were classified according to their field of highest degree. Survey respondents were also asked to self-identify as social scientists or scientists and engineers, and that identification was used in final classification of all individuals.

[11] PRS faculty from the following research centers and institutes were included in our survey sample: Center for Human Growth & Development; Biological Station; Museum of Anthropology; Herbarium; Museum of Paleontology; Institute for Environmental Sciences, Engineering and Technology; Space Physics Research Lab; Cooperative Institute for Limnology & Ecosystems Research; Substance Abuse (Medical School); Mental Health Research Institute; Substance Abuse Research Center; Research in Dentistry; Institute of Gerontology; Collaboratory for Research on Electric Work; Program for the Study of Complex Systems; Biophysics Research Division; Center for Great Lakes & Aquatic Sciences; UM Transportation Research Institute.

[12] We sampled all of the women of color scientists, engineers and social scientists across tenure, clinical and research tracks (N=93 scientists and engineers; N=52 social scientists). We also sampled all of the men of color scientists and engineers, with the exception of tenure track male scientists and engineers of Asian or Pacific Islander background. We drew a random sample of 50 (of 131) because the number of men in this category far exceeded the number of women of Asian or Pacific Islander background (N=25). This resulted in a total of 187 men of color in the sample, across ethnic groups.

[13] In addition, we incorporated items from a University of Michigan Medical School faculty survey (1994), a Texas A&M University Campus Climate Survey (1998), the University of Arizona Faculty Advancement Survey (2000), and the University of California at Los Angeles Higher Education Research Institute (HERI) Faculty Survey. We

In August 2001, approximately 20 scientists, engineers and social scientists completed a pilot version of the UM Survey of Academic Climate and Activities. Many of these individuals were UM faculty members serving on ADVANCE Committees; they were familiar with the faculty experience at UM, but excluded from the survey sample because of involvement with the project. (See Appendix C for ADVANCE committee membership lists.)

Due to the sensitivity of the information collected, and the limited number of women scientists and engineers and faculty of color in most science and engineering departments and colleges, the ADVANCE Steering Committee decided that survey responses should be anonymous, as well as confidential. No identification number connected the mailed surveys to the potential respondents. To further preserve anonymity, the questionnaire did not ask faculty to identify their appointing department(s), but only their school or college. This step was critical since in some departments an individual would be completely identifiable if she or he identified her/his gender and race-ethnicity. We were, however, concerned both to try to assess the representativeness of our sample of respondents, and to invite respondents to participate in focus groups and interviews. Therefore, we included in the survey mailing a return postcard on which we asked faculty to note their name and whether or not they had completed and returned the survey. Faculty mailed this postcard to IRWG separate from the survey.

adapted questions on gender equity from a Gender Fairness Environment Scale developed by the University of Virginia School of Medicine Committee on Women, and a scale to measure aspects of the working environment for female faculty developed by Riger, Stokes, Raja, and Sullivan (1997). Questions on sexual harassment were modified from items included in the U.S. Merit Systems Protection Board's survey of sexual harassment in the federal workplace (1994).

Response Rate

The survey was mailed to 1,398 faculty during the week of October 15, 2001.[14] To encourage participation, we sent a second mailing of the survey to non-respondents (identified by those who did not return the postcard) during the week of November 5, 2001. As of December 14, 2001, we received 536 responses for an overall response rate of 38%.[15]

This response rate is disappointing, though quite typical of surveys of this kind, as we discuss below. We cannot be sure what all the factors were that contributed to this response rate, but two seem particularly likely to have been relevant:

—The survey was designed to address faculty with three different kinds of appointments—tenure track, research and clinical—and in ten different colleges, and at all ranks. Care was taken to include questions that applied to all of the tracks and disciplines, but inevitably this meant that some items were irrelevant, and possibly frustrating, to the respondents;

—Partly as a result of the need to cover so many different kinds of experience, but also because we hoped to be quite comprehensive, the survey was quite long, requiring individuals to spend, in most cases, more than an hour to complete it.

[14] The sample of 1,398 excludes faculty who were removed from the database for the following reasons: membership on ADVANCE committees; termination of faculty appointment; moved, no forwarding address; administrative errors. A PDF version of the survey, identical in content to the paper version, was available online at http://www.umich.edu/~irwg/climatesurvey/ for those respondents who preferred to complete the survey using a computer.

[15] At that time we had received 485 return postcards. Since December 14, 2001, nine additional surveys were returned. Unfortunately, these surveys were returned too late to be included in the analyses.

Supporting our view that the length of the survey was a factor is the fact that our overall response rate is comparable to response rates for other surveys of similar length administered to persons of high status, such as university faculty.[16]

The actual rate of response is less important, in scientific terms, than the representativeness of the sample of respondents. This is, as we have noted above, difficult to assess. We have only five possible indicators with which to evaluate representativeness, because respondents report them on the questionnaire, and we have data from University records about the entire sample of individuals sent the survey. These indicators include: track (tenure, clinical, research), college, rank, race-ethnicity and gender. The three faculty tracks—tenure, research and clinical—were equivalently represented in the respondent sample and the pool of faculty included in the survey. Within the tenure and research tracks, there were no differences by race, rank or school between the survey respondents and the larger pool of faculty surveyed. This suggests that for the tenure and research tracks our survey sample is representative of the larger pool of faculty in terms of the type of appointment held, college of appointment, rank and ethnicity. (Among clinical faculty, faculty of color and assistant professors responded at a lower rate than white faculty and those at higher ranks.)

On the fifth indicator—gender—there was a difference on all tracks between suvery respondents and the pool of faculty surveyed. Women of both academic groups responded at a higher rate than men: 50% female scientists and engineers, 47% female social scientists vs. 26% male scientists and engineers. On the one hand, this is a matter of some concern, since we are attempting with these data to assess gender differences. Given this difference in response rate, it is possible that the sample of male respondents is less representative of all male scientists and engineers than is that of female respondents. To assess that possibility we compared male and female respondents to the overall sample pools of men and women separately. We found that for both men and women, respondents on the tenure and research tracks did not differ from the pool as a whole; thus, the male and female respondents on these two tracks appear to be equally representative. Respondents on the clinical track also did not differ by gender. Junior faculty and faculty of color were somewhat underrepresented on the clinical track for both men and women. In short, there was no evidence of differential representativeness of the sample by gender. In addition, the gender difference in response rates—and the rates of response themselves—are quite typical for social science surveys (Riger *et al.*, 1997). Overall, then, the evidence we have is that the respondent sample is representative of the larger pool of faculty surveyed. But we only have a few indicators to use to assess this issue, and we remain aware that the sample of male scientists and engineers may differ from the larger pool in ways we were not able to examine.

Interpreting Self-Report Data

Survey data are, by necessity, self-report data. For our purposes—assessment of the work environment experienced by women scientists and engineers—this is actually exactly what we want. By definition, the felt work environment can only be reported on by an individual from her or his point of view.

Nevertheless, it is often tempting to think of self-report differences as "merely" subjective. We must emphasize that the subjective and the objective are identical when we are assessing aspects of personal morale and satisfaction, and perceptions of the work environment. Of course it *is* possible to ask whether people in general (or some specific person—e.g., the "man on the Clapham omnibus" of British philosophy; or "Joe Sixpack" in US contexts) would see the situation the same way. But whether they would or would not is actually not

[16] For example, the response rate for the survey of UM faculty conducted by CEW and CSHPE in 1996 was 44% (CSHPE and CEW, 1999).

relevant to the assessment of any individual's perspective. In the same way, a particular individual may find an office or meeting room "too warm," while another finds it "too cool." The thermostat may indicate that the temperature is 72 degrees Fahrenheit, but that outside measure is really unrelated to the individual's perception that the room is too warm (for her) or too cool (for her). Her perception *is* the felt or relative temperature of the room. In the same way, we are interested in the felt workplace environment for women scientists and engineers.

There are instances in this report—though not many—when we believe readers may nevertheless be particularly tempted to wish for some external standard for evaluating the evidence. In one sort of case, the reader may be interested in whether self-reports fit evidence from other kinds of data. For example, we find that men scientists and engineers report being offered more separate inducements to stay at Michigan when the terms of their employment are renegotiated. The reader may wonder whether this difference reflects actual differences in the kinds of revised offers made to men and women faculty in science and engineering. We do too. The findings from this study cannot settle the question, but they can point the institution toward some practices that deserve further evaluation. On the basis of our findings—based on self-reports—we can only say that men scientists and engineers report that they are offered more items than do women scientists and engineers in revised offers (after controlling for rank and other experience factors). Perhaps these differences are fully warranted, or perhaps they do not reflect differences in the overall value of the offer. In this case, though, our data have helped to identify a topic for further study with different kinds of data.

A somewhat different set of issues arises in the case of individuals' reports of felt discrimination and unwanted sexual attention (or sexual harassment). One reason an external standard may seem important in these cases is that the legal system applies particular standards when legal remedies are being sought. In this study, as in other studies of faculty experience, we are not limiting our inquiry to experiences that would meet a legal standard (and in fact legal remedies are not in question); we are interested in experiences that may affect morale, whether or not they meet a legal standard. We have therefore provided some evidence about other findings in the literature with the measures we have used.

Finally, because we used some measures that were used fairly recently (1996) in a UM study of faculty work-life, conducted by the Center for the Study of Higher and Postsecondary Education and the Center for the Education of Women (see the 1999 report), we are sometimes able to make comparisons between the findings in this study (restricted to scientists and engineers on all three tracks and a comparison tenure track sample of women social scientists) and those in theirs (which included those groups as well as nontenure track instructional faculty and all fields, but not primary research faculty). These comparisons are particularly helpful in allowing us, in a few cases, to assess whether our findings are particular to science and engineering faculty at UM or reflect some broad features of the University environment for all or most faculty.

Structure of the Report

The remainder of this report is divided into two lengthy sections followed by a brief discussion of implications of the findings. The next section (pp. 21- 46) presents the results of comparisons of three groups of tenure track faculty: women scientists and engineers; men scientists and engineers; and women social scientists. The section following that (pp.46-71) presents the results of analyses of gender and track (tenure, research scientist and clinical faculty) differences using the entire sample of scientists and engineers (and no social scientists). Finally, we provide a discussion of potential implications of our findings (pp. 72-74). Tables and appendices are included at the end of the report.

ANALYSES OF TENURE TRACK FACULTY DATA: Women Scientists & Engineers, Men Scientists & Engineers, Women Social Scientists

During the first phase of analysis we compared women scientists and engineers on the tenure track with the two key comparison groups also on the tenure track: male scientists and engineers and female social scientists. Overall, the respondents included 308 tenure track faculty: 135 female scientists and engineers, 100 male scientists and engineers, and 73 female social scientists.[17] The overall response rate for tenure track faculty was 41%, with response rates of 52% for female scientists and engineers, 47% for female social scientists, and 30% for male scientists and engineers.

Qualitative Data: Focus Groups and Interviews

Along with the climate survey, we collected some qualitative data through faculty interviews and focus groups. On the survey return postcard, respondents were asked to indicate whether they would be interested in being interviewed to discuss the issues addressed in the survey. Of the 485 respondents who returned the postcard, 150 (30%) expressed interest in being interviewed.[18] Given the time frame for the completion of our study, we were not able to interview all faculty who indicated interest. We contacted twenty tenure track faculty for interviews, and nine interviews were completed, transcribed and analyzed in time for this report.[19] In addition to the limited number of individual interviews, we conducted three focus groups for tenure track scientists and engineers, one each for assistant professors, associate professors and full professors.[20] Sixteen faculty attended the focus groups for tenure track faculty.[21]

Obviously the sample of individuals who provided qualitative data was self-selected from among those who participated in the survey. For that reason, we cannot use the focus group or interview data to draw confident inferences about group differences. Our purposes in collecting these data were different. First, at the focus groups and in the individual interviews, we asked participants a series of questions regarding the climate survey itself. We invited them to identify particular questions from the survey that seemed valuable for un-

[17] Faculty with a tenure track appointment in addition to a primary research or clinical track appointment were classified as tenure track faculty for the purposes of our analyses, if their tenure appointment was at or above the rank of assistant professor. Faculty with multiple appointments whose tenure track appointment was as a lecturer or instructor were classified according to their primary research or clinical track appointment.

[18] This includes 115 women and 35 men; 68 tenure track scientists/engineers, 31 tenure track social scientists, 32 primary research scientists, and 19 clinical scientists.

[19] When selecting tenure track faculty for individual interviews, we chose faculty of various ranks, race/ethnicities, and from each of the three larger, and seven smaller colleges. Because this study is primarily concerned with women scientists and engineers, we chose more women than men for individual interviews. Tenure track faculty invited for an interview included nine assistant professors; seven associate professors, and four full professors. Among these faculty, eleven are white, and nine are faculty of color; three are men and seventeen are women; seven have appointments in "smaller" colleges, four in Engineering, five in LS&A, and four in Medicine. Those who completed interviews include four junior faculty women, three senior faculty women, and two senior faculty men.

[20] We also held a focus group with women primary research scientists and engineers, attended by six faculty, and interviewed three additional women research scientists and engineers. Unfortunately, due to scheduling conflicts, we were unable to arrange a focus group for women clinical track scientists. Instead we scheduled individual interviews with those who were interested. Three interviews were completed with women faculty on the clinical track.

[21] Two women attended the group for assistant professors; four women and two men attended the groups for associate professors; and seven women and one man attended the group for full professors.

derstanding their own situation and the situation of women scientists and engineers at UM, as well as misleading questions, or topics that should have been addressed on the survey, but were not. Participants were also asked to describe recruitment and hiring in their departments (an issue not covered on the survey), and to identify issues that might be particular to their school or unit, possible reasons that faculty choose to leave UM, and the types of interventions or policies that might improve the campus climate. Thus, the qualitative data were collected to help us clarify and understand the survey data, and to identify and fill in gaps that might not have been addressed adequately in the survey. Focus groups and interviews were audio-taped and transcribed.

As we discuss findings from the survey below, we incorporate quotations from the focus groups and interviews to illustrate important points. In this section of the report we are using the quantitative data to identify important features of women scientists' and engineers' experiences that differ from those of comparable men, and women social scientists. We are using the qualitative data to help give some greater sense of the lived experience that is indexed by the survey findings; our procedure, then, was to search the qualitative data for examples or discussions that might help us gain insight into the processes that produce the quantitative differences. A more systematic analysis of the qualitative data, aimed at identifying gaps in the evidence from the survey data, is presented at the end of each section of the report.

Data Analysis Strategy

We calculated analyses of variance (ANOVAs) on scales and items from the survey, comparing mean scores of women scientists and engineers, men scientists and engineers, and women social scientists. Analysis of variance is a statistical procedure that apportions variation in people's scores on a variable to different "factors"--in this case, their membership in one of the three groups (women scientists and engineers, men scientists and engineers, women social scientists). When the ANOVA indicated an overall significant difference among the groups, we pursued planned comparisons in which women scientists and engineers were compared with each of the other two groups. Frequency data (numbers of people, rather than scores) were evaluated by a different (more appropriate) statistical analysis: Chi-square tests. Chi-square detects whether two or more groups have different rates of occurrence of some phenomenon, beyond what would be expected by chance.

In the results discussed below, any references to significant differences or group differences refer exclusively to differences found to be statistically significant ($p<.05$--that is, differences or effects that would have occurred by chance less than 5 percent of the time, which is a generally accepted standard of statistical significance in social science research). Throughout this account, we report frequencies/percentages, means and standard deviations, as appropriate. We note that descriptive statistics reported for ANOVAs are raw scores, though all significance tests were conducted on scores controlling for rank, age, time at the University of Michigan, time in rank, time since Ph.D., and household composition. We report the raw scores for ease of interpretation because the controls (though sometimes themselves related to outcomes) did not affect significance tests on the group effects.

In many cases, we created scales of items as a data reduction strategy that minimized the likelihood of findings resulting from chance, and maximized measurement reliability (see Cronbach, 1990, for a general account of the measurement approach employed here). Thirteen scales were constructed to assess departmental and University climate and activities.[22] Within sections of the ques-

[22] For questions on departmental climate and activities, the survey afforded respondents with appointments in multiple departments the opportunity to rate two departments. The results discussed in this report apply to the first unit rated by respondents.

tionnaire, factor analyses were conducted to identify the structure underlying sets of items used in previous research. Using standard criteria for identification of meaningful factor structures (eigenvalues greater than 1; rotated factor loadings >.40 on the relevant scale and <.30 on all other scales), we identified groups of items for reliability analyses. Items that loaded relatively purely on a single factor and made conceptual sense as measuring a single underlying dimension were then assessed in terms of alpha reliability. Scales were created (by averaging unweighted items selected in this way) with alphas above .70 (and for which deletion of no item would increase the alpha).

A total of thirteen scales were created: two to assess university climate, eight to assess departmental climate (one additional item--evaluation of department leader as committed to racial/ethnic diversity--was also used to assess departmental climate), and three to assess other department and campus experiences. Following are the thirteen scales created by category; see Appendix D for lists of items comprising each scale.

University Climate

- gender stereotyping (4 items)
- ethnic and religious group stereotyping (4 items)

Departmental Climate

- egalitarianism of atmosphere (9 items)
- scholarly isolation (7 items)
- felt surveillance (4 items)
- felt tokenism (2 items)
- supportive environment (6 items)
- environment's tolerance of diversity (4 items)
- evaluation of departmental leader as fair (3 items)
- evaluation of departmental leader as able to create a positive environment (3 items)
- evaluation of departmental leader as committed to racial/ethnic diversity (1 item)

Other Department and Campus Experiences

- felt influence over educational decisions (5 items)
- felt influence over unit resources (salary, money for professional meetings, equipment) (3 items)
- career satisfactions (12 items)

In the course of analyzing these data, we conducted many statistical tests. Of course some of them might have been significant by chance, despite our reliance on conventional standards of statistical significance as a guide. We felt it was extremely important in this kind of research—in which there are few theoretical or empirical guides, and in which it might be consequential in policy terms to overlook or underestimate differences—to report on all significant findings. Consistent with practice standards for this kind of research, we have only written at any length about findings that are relatively robust, that fit with a pattern of other findings in this survey and/or in other studies, and that hold up in the context of several statistical controls.

Ruling Out Alternative Explanations

The findings reported below did not differ by school or college. It should be noted, though, that "school" was defined as Engineering, Medicine, LSA, or "other" (including the seven smaller colleges in one group). While this variable is probably adequate for assessing gross differences among the schools, it may conceal differences among the smaller colleges and within the large ones. Though we collected data on race/ethnicity, we will not present findings from analysis of these data in the current report. We believe the academic climate for faculty of color in the sciences and engineering is an important topic warranting thorough discussion in a separate report.

Results of Tenure Track Analyses

Overview: We begin by reviewing several areas in which female and male scientists and engineers (and female social scientists, too) were mostly quite similar (professional experience, household char-

acteristics, and career experiences and satisfactions). These similarities provide an important backdrop or context for the areas in which the groups differ, which is covered next. In addition, even in these areas of similarity we identify a few differences that are likely to be consequential. Perhaps most importantly we note differences in the likelihood of having a partner, and the likelihood of having a partner who is employed full-time.

In the next section we review the major areas in which men and women scientists and engineers differed: contracts, mentoring and many aspects of the institutional and departmental climate. Here the differences are substantial, and the reports from women scientists and engineers generally suggest greater difficulties for them than for either men scientists and engineers or women social scientists—indicating that the problems arise not for all women academics, or all scientists and engineers, but particularly for women scientists and engineers.

In the third section we examine the relationship between reporting that the climate has been negative in one or another way and individuals' overall job satisfaction. These relationships suggest that, for all three groups, negative ratings are related to less satisfaction.

Finally, we conclude with a thematic analysis of the qualitative data. These analyses focus on identifying particular issues that might not have been well-addressed in the survey. Specifically, we found that informal service responsibilities weigh heavily on women scientists, as do difficulties balancing personal and professional life. The qualitative data also indicate that women scientists and engineers find particularly troubling departmental and college practices that are not democratic or transparent.

***Professional Experience*:** The three groups (women scientists and engineers, men scientists and engineers, and women social scientists) did not differ in years employed in research in a non-academic setting, or in time spent out of the labor force. Male and female scientists and engineers did not differ in number of years in postdoctoral positions, though female social scientists had fewer than both. More relevant to our analyses, though (see Table 1, below, and Table 2), are the facts that male scientists and engineers are on average older than female scientists and engineers, and more likely to be at the rank of full professor. Female scientists and engineers completed their Ph.D.s more recently, and have been at UM fewer years than male scientists and engineers. Women scientists and engineers resemble women social scientists in these pro-

Table 1: Control Variables

	women scientists/engineers (N=135)		men scientists/engineers (N=100)		women social scientists (N=73)	
	mean	sd	mean	sd	mean	sd
Time since highest degree*	3.54 [a]	1.59	4.23 [a]	2.23	3.21	1.90
Time since first UM appointment*	2.57 [a]	1.50	3.19 [a]	2.10	2.21	1.64
	percentage		percentage		percentage	
Hired in last ten years	55 [a]		43		69 [a]	
Full professor rank	30 [a]		55 [a]		38	
Associate professor rank	36 [a]		17 [a]		33	
Assistant professor rank	34		28		29	

*1=1995-2001; 2=1990-1994, 3=1985-1989; 4=1980-1984; 5=1975-1979; 6=1970-1974; 7=1965-1969; 8=1960-1964.

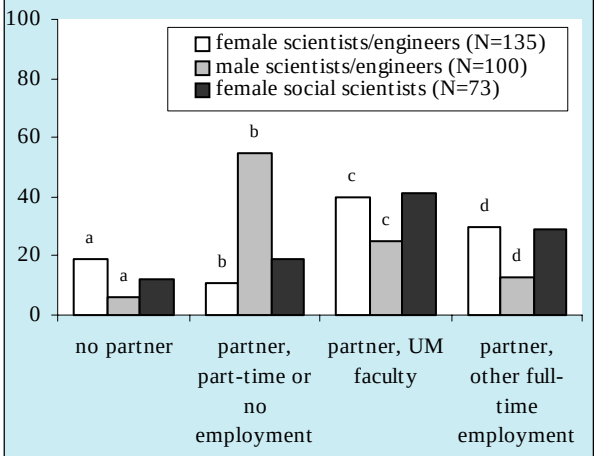
[a] *Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.*

fessional characteristics, and the respondent pool of tenure track faculty mirrors the sample. To control for these potentially confounding variables, we used the experience variables as covariates when running ANOVAs. Group differences and absences of differences proved very robust. With the exception of rank, which was related to a few variables (discussed below whenever relevant), the control variables were unrelated to climate variables. Even when there was a relationship with rank, the main effect for group remained. Therefore, group differences on climate variables cannot be explained by differences in professional experience.

***Household Characteristics*:** As with professional experience, there were some statistically significant group differences between women and men scientists and engineers with regard to household characteristics (Table 3). Female scientists and engineers are more likely than male scientists to be single, and are less likely to have both a partner and children; female scientists and engineers who do have partners are more likely to have considered leaving UM for their partners' careers. It is especially important to note that, if partnered, female scientists and engineers are more likely than male scientists and engineers to have a partner who works full-time, and that person is more likely to be a full-time UM faculty member (Figure 6a). Women social scientists resemble women scientists and engineers in these household characteristics. In the CSPHE & CEW study (1999), the pattern was similar in terms of gender differences in household characteristics across fields and types of appointments.

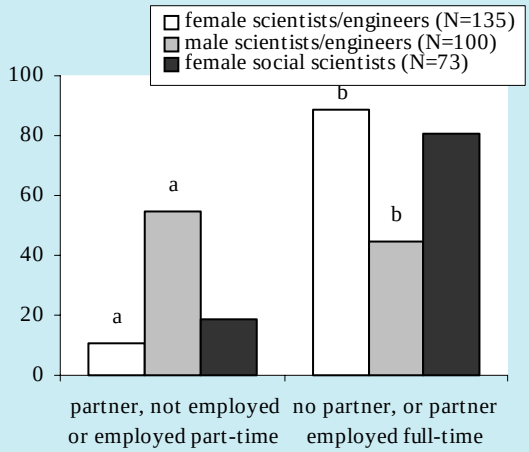
These data suggest that women scientists and engineers, because they are more likely to either not be partnered (and therefore have no one at home to provide assistance, even if they have no dependents), or to have a partner who works full time (and therefore operate in a two-career household), are more burdened by household responsibilities than their male counterparts, more than half of whom have a partner who has no or part-time paid employment (Figure 6b, Table 3). While we believe these household differences between men and women provide an important context for understanding the experiences of women scientists and engineers, we note that there is no evidence that the family situation of women scientists accounts for the observed differences (discussed later in the report) on climate variables. We included the household characteristic variables as covariates when calculating ANOVAs, and there were no family situation interactions or main effects.

Figure 6a: Partner Information



[a,b,c,d] Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

Figure 6b: Partner Employment

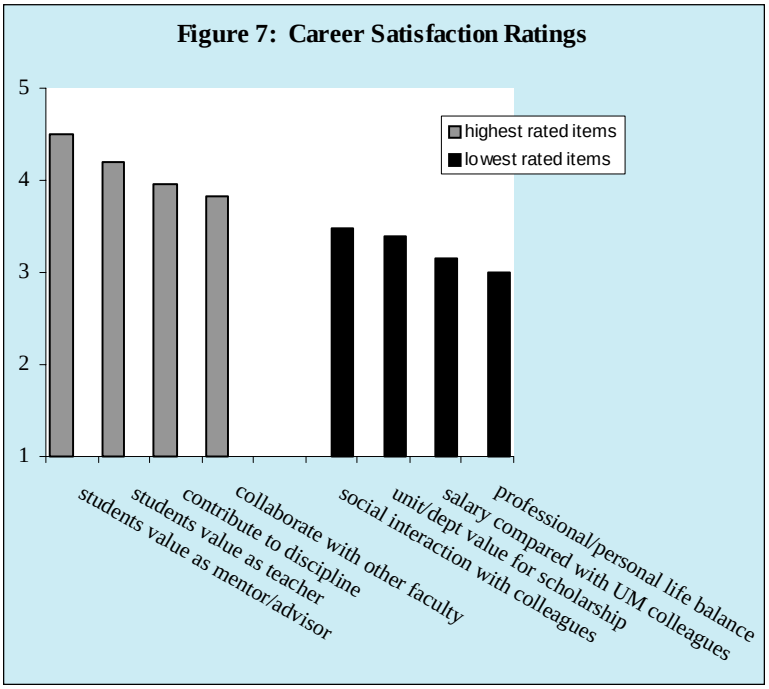


[a,b] Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

***Career Experiences and Satisfactions*:** The survey findings do not support the theory that group differences result from women scientists' and engineers' hypothesized inclination to complain. The findings reveal few differences between men and women scientists and engineers in many aspects of their experiences and satisfactions in their careers.

Career satisfactions. For the career satisfactions scale, and eleven of the twelve individual items comprising that scale, there were no group differences between women and men scientists and engineers (see Table 4a for a summary across groups, and Table 4b for details by group). Women scientists and engineers, men scientists and engineers and women social scientists derive satisfaction from many of the same aspects of their careers. Among the items rated highly by all three groups were a sense of being valued as a mentor by students, a sense of being valued as a teacher by students, a sense of contributing to theoretical developments in one's discipline, and the opportunity to collaborate with other faculty. The lowest rated item across the three groups was balance between personal and professional life (Figure 7). It should be noted that women scientists and engineers were significantly less satisfied than men scientists and engineers with this one aspect of their careers (Table 4b).

Figure 7: Career Satisfaction Ratings



Productivity. There is no evidence from the climate survey that the women scientists and engineers are less productive or less qualified than their male counterparts (Table 5). These data all depend on self-reports, but other research suggests that self-reports are broadly accurate estimates of productivity (Cole & Zuckerman, 1991, 158). Moreover, Xie & Shauman (1998) have demonstrated that there are no real gender differences in productivity. In our study, there were no reported differences among women scientists and engineers, men scientists and engineers, and women social scientists on two productivity items, one asking faculty to rate their own productivity, the other asking them to rate their departments' view of their productivity, compared to researchers in the same area and rank nationwide. While there were no group differences in productivity, there were rank effects; senior faculty reported higher levels of productivity (Table 5). Controls for rank, however, did not alter results for the three tenure track groups.

Recognition. There were no group differences in recognition (Table 6), measured by self-reported accounts of nominations for awards in the areas of teaching, research, clinical, or service work, once these analyses controlled for rank differences between men and women scientists and engineers. There were no group differences in perceived failure to be nominated for awards for which one was qualified. As with productivity, there were rank effects for the recognition items. A significantly lower percentage of assistant professors than associate and/or full professors reported having been nominated for awards in particular domains (teaching, research, service and clinical).

Additionally, more senior faculty than assistant professors reported failure to be nominated for an award for which they were qualified.

Felt influence on educational matters and resources. There were no differences between men and women scientists and engineers on scales constructed to assess felt influence over educational decisions (curriculum decisions; selecting new graduate students, resident/fellows, faculty members, and unit head), or unit resources (the size of salary increases; obtaining money for travel to professional meetings; securing research facilities and equipment; Table 7). Looking at the individual items, we found two significant differences between women scientists and engineers and social scientists; women scientists and engineers report less felt influence over choosing the next unit head, and obtaining money for travel to professional meetings. The questions about influence did produce rank effects, with senior faculty reporting more influence over educational matters.[23]

Resources—effort and satisfaction. There was only one reported difference between men and women scientists and engineers in the amount of effort it takes to secure resources such as office space, research space, lab equipment, and service from vendors (for repairs, supplies, upgrades), or in the level of satisfaction with the current allocation of those resources (Table 8). Women scientists and engineers reported that it takes more effort to secure computer equipment. However, there was no difference between the two groups in satisfaction with current allocation of computer equipment, or other resources. Compared to women social scientists, women scientists and engineers were significantly less satisfied with the allocation of office space and computer equipment.

[23] Measuring influence over educational matters on a scale of 1-5, with 1 representing no influence and 5 representing tremendous influence, the mean of scores reported by full professors was 2.99 (SD .86), compared to 2.77 (SD.88) for associate professors and 2.25 (SD .90) for assistant professors, $p<.01$.

Initial contract negotiation. Questions regarding the elements included in faculty's initial contract negotiation revealed no differences between men and women scientists and engineers, but several differences between women scientists and engineers and women social scientists.

All survey respondents who were hired within the past ten years were asked about fifteen key items that might be raised during contract negotiations, such as course release time, lab equipment and lab space, discretionary funds, etc. For this series of fifteen items, survey respondents were asked to indicate whether UM had offered the item during initial contract negotiation, whether they had bargained for the item, whether it was promised in the offer letter, and whether the item was received. There were no group differences in the *number* of items reported as offered by UM, bargained for by the individual, promised in the offer letter, or received (Table 9a). Looking at the *individual contract items*, we found one significant difference in the percentage of men and women science and engineering faculty who bargained for a particular item or were offered a particular item by UM (Table 9b). More women scientists and engineers reported being offered lab space by UM during the initial contract negotiation.

This picture of relative equity for women and men scientists and engineers in the elements negotiated at the time of hiring is important. It should be carefully interpreted, though. Most research suggests that gender inequities are smallest early in the career (see, e.g., Valian, 2000); moreover, none of our indices assess actual magnitude of the items or the overall offer—only the number of items requested and offered.

Looking at the percentage of women scientists and engineers and social scientists who were offered, bargained for, promised, and received individual contract items, we found a couple of significant differences, possibly disciplinary in nature (Table 9b). Women social scientists were more likely than both

men and women scientists and engineers to be offered course release time and a summer salary as part of the initial contract negotiation. In contrast, women social scientists were less likely than women scientists and engineers to be offered, or to bargain for, lab space. These findings may be related to disciplinary differences: social scientists carry heavier teaching loads, on average, and scientists and engineers require more lab space for their research.

Women social scientists were also more likely to request a position for their partners from the University of Michigan. This difference may be important, since women academics in both science and engineering and social science fields at UM are more likely than their male counterparts to have partners who are also academics. Though it is impossible to know for sure from the survey data, it could be that social science departments at UM are either more proactive about, or more receptive to, inquiries regarding partner positions during the process of initial contract negotiation. One indication that this might be the case is the large number of times this issue came up in focus groups and interviews with science and engineering faculty. For example, one junior woman said,

> …when I came…their efforts were like, 'ah well, let's see, I think my daughter knows somebody who….' It wasn't systematic, it wasn't an institutional thing at all.

Others reported similar experiences:

> I think for women particularly it's, 'Oh, well, what's your husband going to do?' Whereas it may be assumed, with a man [that] your wife will go wherever you want. And so I [said], 'No, don't worry, [he] will find a job here.' They said, 'Okay, good.' Because, otherwise, they won't believe you.... They won't even talk to you; they'll assume that women won't relocate.
>
> They said, 'What does your husband do?.... My husband was a Ph.D., and he was going to be looking for a research position…. I didn't specifically ask, 'Could you help him find a position?' and I don't think the thought ever occurred to them either.

A very different, and more positive, experience was reported by one woman:

> The day I arrived for my interview... I explained, 'As you know I am married, and my husband is currently applying for jobs. In fact, he did apply for an advertised position in [another] department and actually had not gotten a response.' We later learned it was because they didn't think they could hire a senior person. They were only looking at juniors. But I also had with me a c.v. and the head of the search committee said, 'May I have the c.v.?' And I said, 'Certainly'…. So then, months after my interview, when the chair called and said, 'We'd like you to come for a second interview,' again we spoke about my husband, and at that point, [the chair] had already done the groundwork and found…that [another department] could in fact offer him a tenured position. So those negotiations were well underway.

Contract renegotiation. Women scientists and engineers apparently did not do as well as men scientists and engineers or women social scientists

in the area of contract renegotiation. The question on contract renegotiation asked about the same fifteen items listed under initial contract negotiation, and respondents were asked to indicate the items offered by UM, received through the terms of an award, or bargained for by them during any renegotiation of their original contract. Two hundred thirty nine faculty (78%) across the three groups reported that they had renegotiated some aspect of their contract in the course of their appointment at UM. Of these, a little over half (124) reported having received an outside offer. Since these two groups (those receiving outside offers and those renegotiating arrangements for other reasons) might be different, we examined results both for the larger group and only for those with outside offers. While there were no significant group differences in the number of items bargained for in either case, there were small, but statistically significant, differences in the number of items offered by UM during contract renegotiation, as well as the total number of items received (offered by UM, bargained for, and given by terms of an award) in both cases. Tenure track women scientists and engineers reported being offered fewer items by UM, and receiving fewer items, during contract renegotiation than either men scientists and engineers or women social scientists (Table 9a). The former difference is also statistically significant in the subsample of outside offer recipients. The latter difference is only a trend ($p<.10$) in the smaller sample. However, given the consistency of the pattern and the fact that the sample is smaller, we view the findings as pointing toward an issue worth further exploration in both groups—those renegotiating generally and those renegotiating in the context of an outside offer.

Looking at the individual contract items, we found that women scientists and engineers were less likely than both men scientists and engineers and women social scientists to be offered travel funding or course release time. Women scientists and engineers were less likely than men scientists and engineers to be offered lab equipment, and less likely than women social scientists to be offered a summer salary, or a position for their partner/spouse. Women scientists and engineers were more likely than women social scientists to be offered lab space (also probably a disciplinary difference).

As with the finding of relative equity in initial contract negotiations, these findings must be interpreted cautiously. We cannot assess the overall magnitude of the counter-offers or other renegotiated contracts offered to men and women scientists and engineers from these data; they do, though, suggest that further study of University practices in these negotiations with male and female scientists and engineers is warranted.

Teaching. On average, women social scientists reported a heavier teaching load than did scientists and engineers, but men and women scientists and engineers did not generally differ from each other (see Table 10).[24] In particular, women social scientists reported a heavier "typical teaching load" of both undergraduate and graduate courses in their departments. During the winter 2001 and fall 2001 semesters, women social scientists reported teaching more non-lab courses. Women social scientists also developed more new courses for their departments, and reported being released from teaching more courses. Compared to women scientists and engineers, women social scientists reported serving as official advisor to more graduate students, but fewer postdoctoral fellows or residents. Compared with their male counterparts, women scientists and engineers serve as advisors to significantly more junior faculty.

Conclusions. Overall, men and women scientists and engineers and women social scientists value

[24] The measures included: number of undergraduate and graduate courses taught; number of lab and non-lab courses taught; total number of students taught; number of graduate student instructors (teaching assistants) assigned to them; average number of contract hours with medical students and residents/fellows; number of office hours per week; and the average number of hours spent supervising student research.

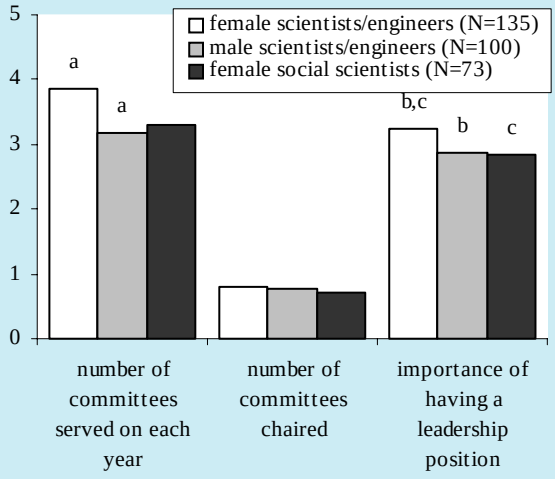
the same aspects of their careers, and have similar levels of satisfaction and frustration in many areas. There were no differences among women scientists and engineers, men scientists and engineers, and women social scientists in self-rated or department-rated productivity, and very few differences among the three groups in the areas of career satisfactions, recognition, effort and satisfaction with resources and initial contract negotiation. Women scientists and engineers were less satisfied than men scientists and engineers with the balance between professional and personal life, they reported more effort to secure computer equipment, and they did not fare as well during contract renegotiation. Compared to women scientists and engineers, women social scientists reported a heavier teaching load, but more influence over selecting the next unit head and securing money for travel to professional meetings. There were some disciplinary differences in the kinds of items included in start-up packages, and women social scientists were more likely to bargain for a partner/spouse position. Like men scientists and engineers, women social scientists did better than women scientists and engineers in contract renegotiation. However, these differences were generally small compared to differences in the area of institutional and departmental climate, which is the context of their work. As we shall see in the next section, women scientists and engineers are not indiscriminately dissatisfied with their work environment, but rather point to specific problems.

Areas in Which Women Scientists/Engineers Differ From Men Scientists/Engineers

While they share many workplace experiences, women and men scientists and engineers differ in the areas of service and mentoring, and on nearly all climate indicators.

Service: Respondents to the survey were asked to record their involvement on departmental, college, and university level committees over the past five years. On average, women scientists and engineers reported serving on more committees than did men scientists and engineers. This is consistent with findings from the CSPHE & CEW study's (1999) findings for faculty in the biological and health sciences. However, there were no differences in the number of committees men and women scientists and engineers reported chairing in the last year, despite the fact that women scientists and engineers reported a greater interest than their male colleagues in assuming department or college leadership positions at the University of Michigan (Figure 8; see Table 11). It is important to note here that women scientists and engineers also reported a great deal of informal service that is generally unrecognized. This is discussed in detail in the analysis of the qualitative data further on.

Figure 8: Committee Service and Leadership



[a,b,c] Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

According to our data, women scientists' and engineers' level of formal and informal committee service is frustrating, partly because committee leadership does not accompany it. Qualitative data indicate that in some cases women are passed over for committee chair even when they are qualified and interested in the position. As one senior faculty woman explained, an untenured man in her unit is holding a responsible position, "even though there were [several] tenured senior women that served on the committee, that could have been [appointed], that had expressed interest."

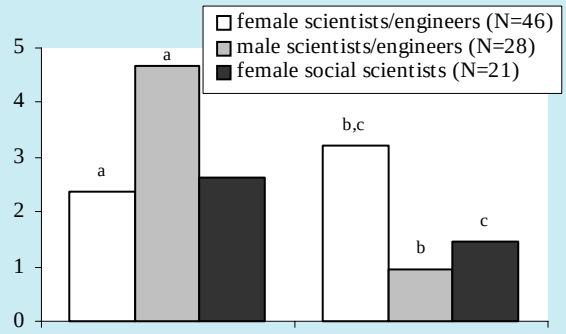
Mentoring: The survey asked several questions regarding the mentoring received by respondents, including whether respondents would benefit from mentoring at this point in their careers, and how much mentoring the respondents receive. To avoid relying on respondents' own definitions of mentoring, they were asked to give information regarding eight specific potential activities (see list following). They also were asked to report the total number of male and female mentors they had, and to indicate the kinds of support/advice provided by their mentors according to that mentor's institutional affiliation (in the same unit at UM, in a different unit at UM, at another institution, or outside academe). The eight activities included the following:

- role model
- advocate
- promoting career through networking
- advising about preparation for advancement
- advising about getting work published
- advising about departmental politics
- advising about obtaining needed resources
- advising about balancing work and family

It is worth noting that among the 230 tenure track faculty who rated the amount of mentoring they currently receive in eight specific areas or "other," none indicated that she or he was receiving "a lot" of mentoring in any, and none indicated that she or he was receiving "too much." Thus all responses were either "none" or "some."

The following analyses were limited to assistant professors, since over one-third of the senior faculty respondents considered the mentoring questions not applicable to them. Among assistant professors, women scientists and engineers reported receiving the least mentoring. In particular, women scientists and engineers reported having fewer male mentors in their own departments than male scientists and engineers—an important difference considering the vast majority of senior science and engineering faculty are men—and more areas of no mentoring from anyone, than both male scientists and engineers and female social scientists (Figure 9 and Table 12a).

Figure 9: Mentoring Among Assistant Professors



[a,b] Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

While men scientists and engineers reported an average of nearly five male mentors in their departments, women scientists and engineers reported an average of just over two male mentors in their departments, a significantly lower number. In addition, women scientists and engineers at the assistant professor level reported an average of over *three* areas of no mentoring, compared to less than one for men scientists and engineers and between one and two for women social scientists at the same rank. *Fewer than half of the women scientists and engineers who are assistant professors reported any mentoring of any kind in five of the eight mentoring areas: networking, department politics, obtaining resources, advocating for me, balancing work and family* (Table 12b).[25] These findings are disturbing in light of research connecting effective mentoring and positive career outcomes in science and engineering (Sonnert & Holton 1996; Etzkowitz et al 2000).

Focus group and interview data indicate that some faculty feel UM does not provide sufficient

[25] These findings do not hold for associate professors.

mentoring for junior faculty generally—men and women alike. In the words of one senior faculty woman, "This is not a place where junior faculty come and develop into senior faculty. This is a place where they're just going to buy senior faculty superstars and let those junior faculty struggle." To this, another senior woman responded, "We eat our young."

The qualitative data also point to ways in which women faculty may be excluded from mentoring activities that take place at more informal, social gatherings. Several women scientists and engineers reported that their senior male colleagues extend lunch, dinner, or drink invitations to junior men, but not women faculty. Even if women faculty are invited, these social activities tend to be held after-hours, making it difficult for faculty with family responsibilities to attend, for example, late-night drinks in the lab. Sometimes the activities stem from time-honored traditions that may be off-putting for some younger faculty, such as coffee breaks for which the original purpose was to ogle pretty "co-eds." While these gatherings may seem to be simple social occasions, they serve an important mentoring function through networking, and crucial information may be communicated quite informally. As one senior woman explained:

> I feel pretty strongly that there are certain men who are mentored, and the women are not. For example, more of the senior colleagues take the males out. There are some new male faculty that come in, and I have found that they go out to lunch all the time, they do all sorts of things [that] I was never asked to do. I'm not asked to be put in on proposals. I'm not mentored [in] the same way…. I am mentored by colleagues at other universities, which says something, doesn't it? I would say I have good mentors, but they're not here at UM.

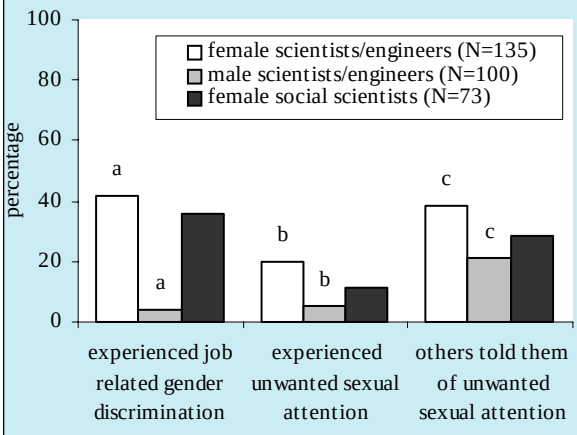
Another senior faculty woman described the important role male mentors played in the advancement of her career:

> I think I've been extremely lucky…in having a very positive experience, and I've been here since I was an assistant professor…. But what made it different for me was not the administration or the department. It was not the college. It was some older male colleagues who have been immensely supportive of me, very politically conscious, very supportive of women in general, but directly very personally supportive, since I have been here…. I always knew I was lucky, but I had no idea just how incredibly lucky I've been.

***University Climate*:** The survey asked several questions regarding climate that were not limited to faculty experiences in their unit(s)/department(s). Questions regarding institutional climate included items to assess the level of gender and racial stereotyping, discrimination, and unwanted and uninvited sexual attention that faculty experience on the UM campus. Some of the most striking differences in the reported experiences of men and women scientists and engineers are in the areas of gender discrimination and sexual harassment (see Figure 10, p. 33).

Stereotyping. Survey respondents were asked to indicate how often within the last five years they heard faculty or students make "insensitive or disparaging comments" about women, men, members of racial/ethnic minorities, or members of a particular religious group, as "typical" of that group. These items were combined into two scales: a gender stereotyping scale rating the frequency of

Figure 10: Gender Discrimination and Sexual Harassment in Past 5 Years at UM



[a,b,c]Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

disparaging comments about men and women, and a racial/religious stereotyping scale rating insensitive comments about members of a racial/ethnic minority or particular religious group (see Appendix D for a list of items in each scale). There was a small, but statistically significant, difference in reports of gender stereotyping. Women scientists and engineers reported a higher frequency of hearing faculty or students make disparaging or insensitive comments about women in general or men in general than the other two groups. However, there were no significant group differences in reports of ethnic or religious stereotyping (Table 13a).

Discrimination. Survey respondents were asked to indicate any job-related discrimination they experienced at UM within the last five years, noting the basis for the discrimination (race/ethnicity, gender, sexual orientation, physical disability, religious affiliation), and the areas in which the discriminatory behavior affected their career (hiring, promotion, salary, space or other resources, access to administrative staff, graduate student or resident/ fellow assignments). Overall, 60% of the tenure track faculty surveyed reported that they had experienced some kind of discrimination during the last five years (in comparison with figures ranging from 28 to 43% for the past two years found in the CSPHE & CEW study of a broader sample of UM faculty). Fewer than 3% of women scientists and engineers, men scientists and engineers, or women social scientists reported discrimination due to physical disability, religious affiliation, or sexual orientation, and there were no significant group differences for these items. Significantly more men scientists and engineers (9%) than women scientists and engineers (3%) reported having experienced racial/ethnic discrimination at UM over the last five years (Table 13a). This difference is, however, due to the fact that there are more faculty of color in the sample of male scientists and engineers; among the survey respondents, 24% of the tenure track men scientists and engineers were faculty of color, but only 13% of women scientists and engineers and 16% of women social scientists were faculty of color. When the analysis is limited only to European American faculty, fewer than 1% report racial-ethnic discrimination.

Of the different kinds of discrimination, gender discrimination was by far the one most frequently reported, and women scientists and engineers reported significantly higher rates than men scientists and engineers. Over 41% of the women , in contrast to 4% of the men scientists and engineers, reported having experienced gender related discrimination in the past five years at UM in at least one of the following areas: hiring, promotion, salary, space/equipment or other resources, access to administrative staff, graduate student or resident/ fellow assignments (Table 13b). In each of three areas (salary, promotion and resources), more than 15% of women scientists and engineers reported having experienced gender discrimination at UM within this five-year period. It is important to note that women social scientists at UM reported levels of gender discrimination nearly as high: slightly over 35% (see Figure 10; Table 13a).[26]

[26] Given the different gender ratio in Nursing than in the other schools, we ran the gender discrimination analyses removing the Nursing faculty from the sample. With nurses removed, the rates of gender discrimination among women scientists/engineers rose from 41.5% to 44.7%.

The percentage of women scientists and engineers at UM reporting gender discrimination in the past five years (41%) seems quite high. For example, another study found that 21.4% of women scientists and engineers who had held NSF and NRC fellowships reported having experienced gender discrimination *over the course of their careers* (Sonnert & Holton, 1995, 124). Even more potentially significant: when this sample was divided into those who had left science, 38.5% reported gender discrimination in their pasts, while 19.4% of academic scientists did (and 18.8% of non-academic scientists). Thus, reporting discrimination on the questionnaire at the rate we found among scientists and engineers at UM was related to having left science in this sample of women who were promising young scientists at the time of their postdoctoral fellowships.

The differences in rates may result, of course, from differences in the precise wording of questions or in the samples studied. There may also, though, actually be problems of *under*-reporting. Thus, when a subsample of the fellowship study respondents was interviewed, some women "reported that in hindsight they considered some experiences discriminatory but did not judge them to be so when they happened" (p. 127). Fully 72.8 percent of the women interviewed reported some form of gender-related discrimination in the interview (obviously a much higher figure than those reporting it on the questionnaire). Sonnert & Holton suggest that their interviews indicate that many women scientists adopt a variety of strategies for handling discriminatory experiences that "minimize" them: ignoring them; humor; compliance with trivial but demeaning demands; de-emphasizing gender and femininity; and avoidance of problematic individuals and situations. The fact that women scientists do adopt these "minimizing" strategies for handling discriminatory experiences may mean that it is important to overcome their reluctance to focus on these incidents in estimating rates of discriminating. Higher rates may result from studies, like ours and like Sonnert & Holton's *interviews*, that ask about experiences in very specific, concrete terms.

Focus group and interview data revealed some vivid examples of reported gender discrimination. Gender discrimination in the areas of promotion and space allocation were mentioned multiple times. A senior faculty woman indicated, "The promotion track for the women is not the same as for the men." Another senior woman recounted how her department chair stopped the tenure clock with the birth of her child, despite her wishes not to, and refused to put her up for promotion. She had to ask the dean to intervene.

> [O]ne of the reasons the department didn't put me up [for tenure] was they said, 'Well, she had a baby, so we don't have to put her up yet.' And I had not requested … [to] stop my clock.… [W]hen my paperwork went through …questions were raised about why I had not been put up earlier, and that my c.v. was as good as many full professors.

In the area of space allocation, one woman explained how the space assigned to her is not commensurate with her research and teaching responsibilities.

> I have the smallest office in the department, including post-docs, assistant professors, and visiting professors. And being somebody who has multiple research projects and a lot of student responsibility—my stuff just doesn't even fit.

Another senior woman said,

> …I walked in one day, and a post-doc had been put in my office, and I was never told about it. All my papers were shuffled; it took

> me three months to sort out my research.

A junior faculty woman recounted how the lab space explicitly promised in her contract letter as part of her start-up package was never delivered. Yet, despite inadequate resources she was expected to conduct basic science research. In her words,

> [Not getting a lab] is a little bit of a hindrance…. When that happened I started to switch my focus on my research [so that] I'd go toward clinical [work]. That doesn't take much space. And it's like, 'Well, we hired you to do basic science research.' [But] the ladies room isn't that big…. So we get really a lot of mixed signals in our department.

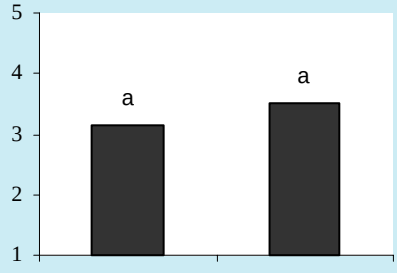
Sexual Harassment. One of the standard measures of "sexual harassment" used in national studies avoids using the term itself, since individuals disagree about its precise meaning. (Thus, social scientists are unable to be sure that individuals have the same behaviors in mind when respondents report that they have or have not experienced "sexual harassment.") Using this measure, which asks respondents about "unwanted and uninvited sexual attention," and then lists particular behavior that might reflect that,[27] about 20% of women scientists and engineers reported having experienced such behavior at UM during the past five years, compared to about 13% of women social scientists and just over 5% of men scientists and engineers (Figure 10, see p.33 and Table 13a).[28] Providing some cross-validation of these self-reported numbers, over 38% of women scientists and engineers, 29% of women social scientists and 21% of men scientists and engineers reported that others have informed them of instances of unwanted and uninvited sexual attention. The percentage of women scientists and engineers who reported having experienced sexual harassment at the UM within a five year time frame is quite high compared to other university studies, in which 11-15% of the women surveyed reported having experienced such behavior over their entire careers (Dey, Korn & Sax 1996; Sonnert & Holton 1995). The demographic character of the work setting for most women scientists and engineers at research universities like UM may, however, be quite different from that in other settings. National studies assessing the factors within and across fields and types of academic settings would be extremely valuable in pinpointing the sources of variation in women scientists' and engineers' experiences of unwanted and uninvited sexual attention.

Department Climate: Of the scales constructed to assess features of *department climate* (positive climate, tolerant climate, egalitarian atmosphere, scholarly isolation, felt surveillance, race/gender tokenism, chair as fair, chair as able to create positive environment, chair as committed to racial/ethnic diversity), we found significant group differences in all but one (scholarly isolation). Using an aggregate measure combining all of the scales, and on the eight indicators listed above, women scientists and engineers reported the most negative climate (Figure 11, see p.36, Table 14). Women scientists and engineers were less likely than their male counterparts to rate their departmental climate as supportive, less likely than both men scientists and engineers and women social scientists to rate their

[27] The UM Survey of Academic Climate and Activities adapted (using the same wording with different format) the definition of unwanted and uninvited sexual attention used by the Merit Systems Survey of Federal Employees; including unwanted sexual teasing, jokes, remarks or questions; unwanted pressure for dates; unwanted letters, phone calls, email; unwanted touching, leaning over, cornering, pinching; unwanted pressure for sexual favors; stalking; rape or assault.

[28] Removing Nursing faculty from these analyses, given its different gender ratio, the rate of sexual harassment reported by women scientists/engineers rose from 19.7% to 22.3%.

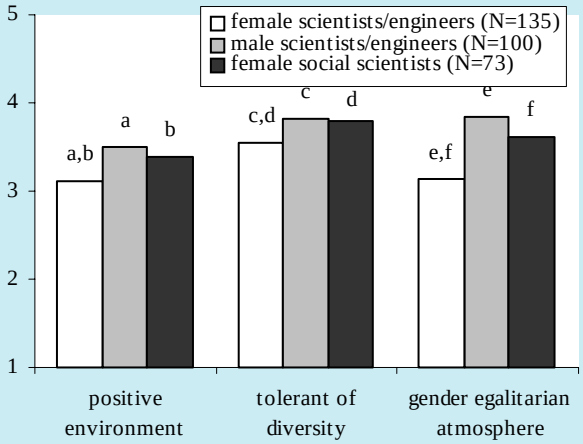
Figure 11: Mean Positive Climate for Men and Women Scientists and Engineers



[a]Matching symbols identify groups that differ from each other statistically significantly, p≤.05

departmental climate as tolerant of diversity, and their department gender atmosphere as egalitarian (Figure 12). Women scientists and engineers were more likely than both men scientists and engineers and women social scientists to report having felt race or gender tokenism in their department—being expected to represent the "point of view" of their race or gender. They were also more likely than men scientists and engineers to report having felt surveillance in their department (Figure 13); this scale includes items such as, "I feel under constant scrutiny by my colleagues," and "I have to work harder than my colleagues to be perceived as a legitimate scholar." These results are compatible with, but even stronger than, those found for a much broader sample of faculty in the CSPHE & CEW (1999) study. In that study the kinds of differences reported here were sometimes limited to women at lower ranks.

Figure 12: Department Climate as Positive, Tolerant, Egalitarian



[a,b,c,d,e,f] Matching symbols identify groups that differ from each other statistically significantly, p≤.05.

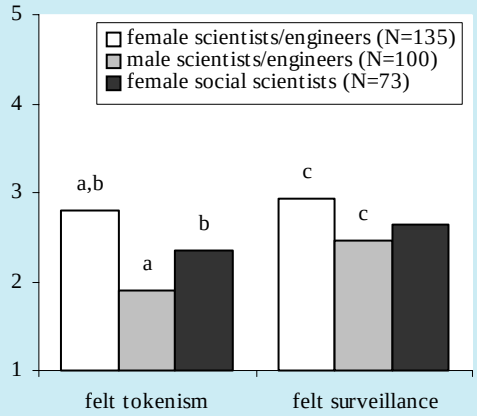
Focus group and interview data provided examples of how the department climate was chillier for women scientists and engineers than for their male counterparts. Women faculty reported receiving different, and less respectful, treatment from staff, students, and other faculty. A senior faculty woman stated,

> In [my] college, the women faculty are not treated the same as the male faculty by staff. For example, when we're addressed, we're addressed on a first name basis, instead of as 'Professor'…the other thing is that they will not take care of our needs similar to the male faculty.

Another senior woman added,

> It's very common for requests that

Figure 13: Department Climate Tokenism and Surveillance



[a,b,c] Matching symbols identify groups that differ from each other statistically significantly, p≤.05.

> were made by male faculty to be honored, and the women faculty to be not treated with the same amount of respect.

As another senior woman explained,

> Faculty meetings were typical of the treatment of women from all walks of life. I would say something and no one would listen. Another [man] would speak up with exactly the same thing I had said and everyone would say, 'What a great idea.'

The following story, also told by a senior woman, illustrates the preceding points.

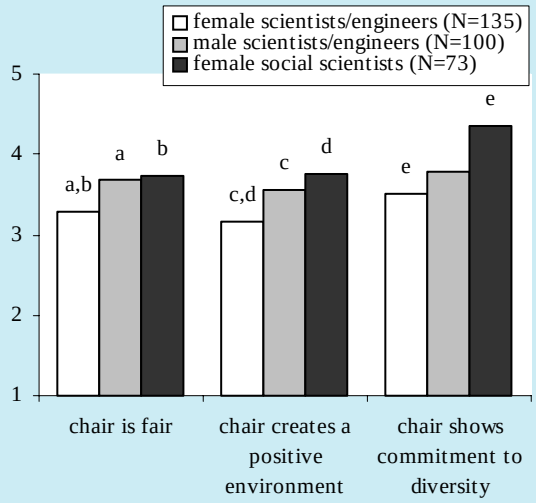
> When I first started working here, and I would have my door open, I had people coming in and treating me like a secretary, asking me to write letters…. I had a colleague two doors down, a faculty member, come in and ask me to write a letter for him, because he thought I was a secretary…. Students would come in, and they would take things from my desk--staplers, that kind of thing. I haven't gotten that in the last three or four years.

Department Chair: There were also significant group differences on ratings of the department chair. As with the other climate scales, women scientists and engineers were less satisfied than their male counterparts, overall, with this aspect of departmental climate. It may be important to note, here, that for the period under study all of the science and engineering department chairs were male (there was one female interim chair, but she had been appointed after the period being assessed), and all but one of the social science department chairs were male. There was, then, no opportunity to assess whether the gender of department chair was important, which is regrettable. Since nearly all chairs were male, discovered differences between *science and engineering* and *social science* faculty in their ratings of department chairs cannot be accounted for by the gender of the chair.

There were fifteen individual items that assessed aspects of the performance of the department chair. There were no group differences on eight of these items, which assess some general features of chair job performance in the areas of academic standards (e.g., the chair maintains high academic standards), and communication with faculty about important issues (e.g., the chair is open to constructive criticism, shows interest in faculty, helps me obtain needed resources, gives useful feedback about performance, articulates a clear vision, articulates clear criteria for promotion/tenure, and communicates consistently with faculty).

The remaining seven items were grouped into three separate measures. Three variables created a perceived fairness scale. Another three variables created a positive departmental climate scale. (See Appendix D for a list of the items comprising each scale, and the scale reliabilities.) This left one item assessing the chair's commitment to racial/ethnic diversity. Analyzing these measures, we found that women scientists and engineers were less likely than women social scientists and men scientists and engineers to rate their department chair as fair, and less likely than women social scientists to report that their chair shows a commitment to racial-ethnic diversity (Figure 14, see p. 38; Table 14). Interestingly, there were significant differences among all three groups for the scale rating whether the chair creates a positive environment. Women scientists and engineers rank their chairs the lowest, women social scientists the highest. The fact that men scientists and engineers also rank their chair significantly lower in this area than women social scientists indicates that there may be procedures or practices commonly employed by chairs of so-

Figure 14: Department Chair



[a,b,c,d,e] Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

cial science departments that, if adopted by science and engineering chairs, would benefit all science and engineering faculty.

In interviews and focus groups the department chair's power was often mentioned.

> My chairman—he is everything, or he is nothing. And because you have to report to that person, and you can't go talk to anybody else without going through that person, they can only make or break [things]. There isn't much of a buffer there.

Another senior woman commented:

> [My chair] shuts people up by being angry, or he tries to get his way by being angry…. That was his first response the first time I said I think there is an issue about offices…. It's very unpleasant. I'm sick of it.

Many women commented that there was no way to find solutions to problems that arose with the chair or which the chair did not help to solve. For example, a senior woman said,

> There's nothing formal, and there's no formal redress…. Basically what happens now is you draw a line in the sand and you say, 'You either sue, or you leave.'

A senior man observed, on this point, that,

> It would also be good to have some kind of mechanism for women to express their concerns, to raise concerns in a way that would be productive…a way that would seem safe.

Finally, many women commented that their chairs did not know about standard university policies affecting them, or actively resisted applying them:

> In my experience there was no knowledge at the level of the department, the chair, or the dean of my school about what those requirements [regarding maternity] were.... The rule is, you're supposed to have reduced duties. You're supposed to get teaching off…. I'm a person who had to have major intervention at the level of the dean in order for my department to act properly to begin with. It was not even possible for me to make a request to have what one should have.

Do These Differences in Climate Matter?

It is fair to ask whether the differences we have found in the climate as experienced by women scientists and engineers really "matter." It is always difficult to address the question of the magnitude of a difference found on a survey scale. The abso-

lute values (from 1 as low, negative to 5 as high, positive) do not correspond to any external standard (the way the values on a thermometer do), so we can't tell whether a mean difference of nearly 1/2 point (which is the difference between female scientists' and engineers' scores on the aggregate climate scale and the other groups), is large or small.

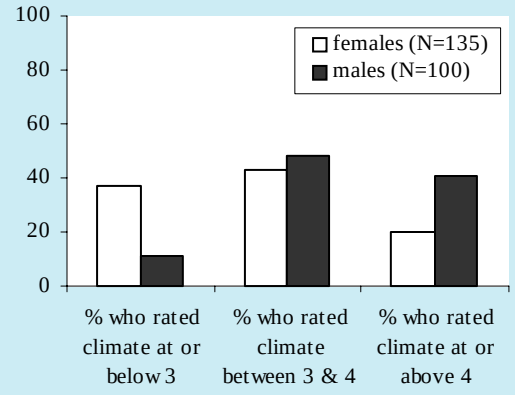
One way to decide might be to look not just at the middle of the distribution, but at the full range of scores. The two distributions do overlap substantially, with members of all three groups scoring near the top of the scale, though both groups of women include scores closer to the bottom than the group of men. What this suggests is that there are some women scientists and engineers who experience the climate as positively as the most positive men. But there are few men scientists and engineers who experience the climate as negatively as the most negative women. And there are more women than men who experience it negatively.

Another way of getting at this is to look at the middle of the distributions in absolute terms. The middle (both mean and median) rating of the climate for women scientists and engineers is closest to a 3 on the 5 point scale, while the average rating for both men scientists and engineers and women social scientists is closest to a 4. There are some women scientists and engineers who rated the climate at or above 4 (about 20%), but twice as many men did (40%). And some men scientists and engineers rated the climate at or below 3 (about 11 %), but more than three times as many women scientists and engineers did (37%). So the distributions of ratings do overlap, but they are also quite different (Figure 15).[29] On the basis of these findings, we believe it is reasonable to conclude that the difference in felt climate (between women scientists and engineers and both comparison groups) is substantial.

[29] Readers may be interested in where women social scientists fall for comparison. Only 12% rate the climate at 3 or below, and 44% rate it at 4 or above. Their scores are much more like men than women scientists and engineers.

Another way to evaluate the importance of the climate differences is to examine whether perceptions of climate are related to overall job satisfaction. We calculated correlations between these variables and overall satisfaction with current position at UM for both the tenure track faculty as a whole (including women and men scientists and engineers and women social scientists), and women scientists and engineers alone. To help us contextualize the meaning of these relationships, we also calculated correlations assessing the relationship between satisfaction and other campus experiences, and personal position indicators.

Figure 15: Distribution of Climate Ratings by Gender



***Institutional and Departmental Climate Ratings*:** We found that climate indicators were significantly correlated with overall satisfaction with position at UM. This held true for all tenure track faculty, and for women scientists and engineers (Table 15). These findings suggest that climate is connected with faculty satisfaction generally, though of course the relationships could operate in either causal direction or both.

***Departmental and Other Campus Academic Experiences*:** We found that the career satisfactions and felt influence over educational decisions scales, and the number of areas of no mentoring were strongly correlated with overall job satisfaction (Table 16). These findings underscore the

importance of a good working environment at the departmental level, and may point to possible areas of intervention to improve the campus climate for women scientists and engineers. Mentoring and career satisfactions are highly correlated with satisfaction, yet women scientists and engineers at the assistant professor level reported a deficit of mentoring, and women scientists and engineers were least satisfied with work-family balance (one of the items on the career satisfactions scale). Reforms in these areas may be warranted.

***Personal and Position Indicators and Household Characteristics*:** In contrast to the climate and campus experiences indicators, very few personal and professional experience indicators, or household characteristics, were significantly correlated with overall satisfaction with position at UM (Table 17). For example, age, ethnicity, years at UM, holding a joint appointment, rank, and appointment in a small college, were not significantly correlated with overall job satisfaction.

Among the household characteristics indicators, being single with no children was negatively correlated with overall satisfaction at UM for all tenure track faculty and women scientists and engineers specifically. Having a partner who is employed full-time is negatively correlated with overall job satisfaction for tenure tenure track faculty as a whole. However, separate analyses of the three groups revealed that this relationship holds only for the men scientists and engineers whose partners are employed full-time (r=-.26; p=.01); having a full-time employed partner was not related to overall job satisfaction for women scientists and engineers or social scientists.

We have seen that University and department climate indicators and other academic experiences relate to faculty satisfaction. This suggests that women scientists and engineers are at a distinct professional disadvantage because of their negative experiences with regard to University and departmental climate (as compared with both men scientists and engineers and women social scientists).

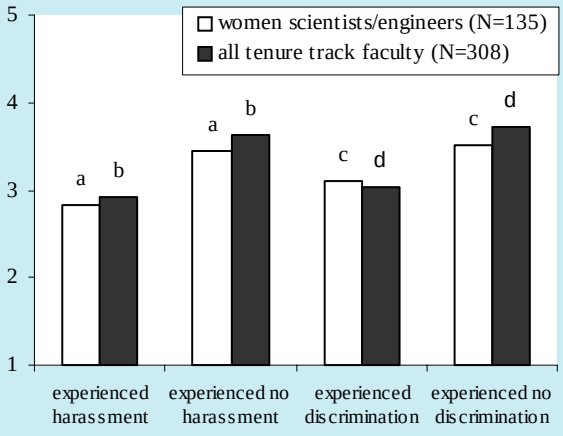
Do These Bad Experiences Cumulate?

Findings from the survey data indicate that the experiences of women scientists and engineers at the University of Michigan fit better with the *deficits in the science environment* model, than the *gender differences* model. But are we able to discern whether an *accumulation of advantages and disadvantage*s takes place? This question is impossible to answer with the data we have, given that they are cross-sectional in nature. There are, however, two questions that were rated for "the past five years"—gender discrimination and sexual harassment. To examine whether reports of gender discrimination or harassment "predict" current satisfaction and climate ratings, we calculated independent sample t-tests (Figure 16, see p. 41, Tables 18 and 19). Among all tenure track faculty, and among women scientists and engineers, those who had experienced gender discrimination or sexual harassment reported significantly lower scores on overall satisfaction with UM position, tolerant climate, and gender egalitarian atmosphere, and higher scores on gender stereotyping, race/gender tokenism, and felt surveillance. In addition, among all faculty, those who reported either gender discrimination or sexual harassment reported lower scores on positive climate, chair as fair, and chair as able to create a positive environment. Based on this evidence, it seems that bad experiences may in fact cumulate. It would likely be in the best interest of faculty and the University to work both to prevent the occurrence of negative incidents, and to minimize their impact on faculty through implementation of clear policies and procedures that address the difficulties women scientists and engineers experience.

Analysis of the Qualitative Data from Focus Groups and Interviews

As was described earlier, in the focus groups and the individual interviews, we asked participants a series of questions regarding the climate survey.

Figure16: Mean Scores on Satisfaction Grouped by Those Who Have and Have Not Experienced Sexual Harassment and Gender Discrimination



[a,b,c,d] Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

We invited them to identify particular questions from the survey that seemed valuable for understanding the situation of women scientists and engineers at UM, as well as misleading questions, or topics that should have been addressed on the survey, but were not. Participants were also asked to describe recruitment and hiring in their departments, and identify issues that might be particular to their schools or units, possible reasons that faculty choose to leave UM, and the types of interventions or policies that might improve the campus climate.

Thematic Analysis: Focus groups and interviews were audiotaped and transcribed. Two members of the ADVANCE research team, who did the interviews, searched the transcripts for key themes. A third member, who facilitated the focus groups and conducted one of the interviews, then further validated these. Interview and focus group data collected from tenure track scientists and engineers augment the survey data concerning the situation for women scientists and engineers at UM in three key areas: informal service, the balance between work and family, and department culture.

Informal Service. The survey findings identified no significant differences between men and women tenure track scientists and engineers in terms of teaching load, but revealed that women scientists and engineers did perform more committee service in the past year. Consistent with these findings and those from the CSPHE and CEW study for faculty more generally (1999, p. 11), data from focus groups and interviews confirmed that women scientists and engineers felt they were asked to undertake heavy committee service, and suggested that they also have more unofficial or informal advising duties, particularly in departments where the number of female students far exceeds the number of women faculty. When there are few women scientists and engineers in a given field, striving to have a woman on every departmental, college and University wide committee becomes a strain on women scientists and engineers, taking time away from the research key to their success. One senior woman commented,

> I do think that there is more pressure…for women to be represented on every single committee, and thank god there's [more than one] of us….

Another senior woman said,

> [W]hen the list came out of committees, who was on what committee…my name was on this list four times. And I could name at least two people who were not on this list anywhere.

The informal service duties often assumed by women scientists and engineers include serving as a role model and informal advisor to female undergraduate and graduate students, as well as coordinating social activities—what a senior woman faculty member termed being the "social guru or cruise director." Another senior woman described the mixed feelings she had about being expected to fill this role, particularly when she understood the benefit of providing networking opportunities

and role models for female students.

> The department wants me to have parties for the female grad students, this kind of stuff [and] I feel this pressure all the time, and I understand the importance of it. But I also sometimes feel that my role as a scientist is not the important one here. It's that you're the representative of all the female people and you have to do everything that they need done.

A senior male faculty member stated it was unfair to expect a small number of women faculty to take on these extra service duties:

> The fact is that since we have very few women, they tend to be called to do more than their share. The fact is that when we have a woman adviser advising undergraduates, they get a lot of work, because a lot of women students would like to meet with a woman. And so they get a lot of work, and so we keep calling on them, because we have a demand for it.... I think it's wrong to give in to these demands, to have the women do all kinds of services, too much.

Frequently, women scientists and engineers felt their service contributions, while expected, were not adequately rewarded or respected, suggesting that service duties are not uniformly recognized in departmental and University reward structure.

> At merit review time what they go by is your research. So this [service work] was a negative, because it did slow down my research. I wasn't able to spend time in the lab.

Another senior woman recounted the following disturbing story:

> I was told by a colleague that it was my job to take care of…lesser prepared students, or students not as good as other students--the women and minorities…. In the course of the conversation, he said, 'you were hired to deal with the junk.'

Faculty participating in the focus groups and interviews recommended the following measures to redress the problem of women scientists' and engineers' disproportionate share of informal and formal service duties:

- hiring of women faculty in equal proportion to women students;
- changing the reward structure to recognize faculty contributions in the areas of teaching and advising;
- avoiding assigning women to committees in which they have little interest or expertise simply to fill a slot with a woman.

Balance in personal/professional life. The interviews and focus groups revealed some ways in which the significant differences between men and women scientists and engineers in household situations may create difficulties for women scientists and engineers. The survey showed that women scientists and engineers are significantly less likely than men scientists and engineers or women social scientists to be married or partnered (Figure 6a, Table 3). If partnered, women scientists and engineers are significantly more likely to have a spouse or partner who is employed full time (Figures 6a and 6b, see p.25, Table 3). Many focus group and interview participants felt that these differences in household contexts disadvantaged women scientists and engineers professionally. In particular, the tendency for women, even women who work full-time, to bear a greater share of the childcare and domestic responsibilities, placed greater bur-

dens on women scientists and engineers. One senior woman faculty member stated,

> The expectations for what you have to do here, as a faculty member…I don't see how those expectations leave any time for a person to raise a family.

Men scientists and engineers, who more often have a partner who is employed part-time, or not in the labor force, do not confront these obstacles as frequently. In a telling exchange, a senior man suggested facetiously, "Everyone should have a wife," to which a senior woman responded, "That's right, and women faculty don't have wives."

Focus groups suggested that the "dual-career couple" problem is sometimes difficult for faculty at the University of Michigan, particularly women scientists and engineers. The survey findings indicated that a woman scientist or engineer is more likely to have a partner employed as a faculty member, if that partner is employed at the University. We heard a wide range of experiences describing how appointing departments handled the opportunity of a partner or spousal placement. Some junior women did not know that they could enquire about a spousal or partner position during their initial contract negotiation, while others reported that when they asked their department about employment opportunities for their partners, the chair did not know what resources were available at UM to assist partners of faculty in finding appropriate work. A few faculty mentioned encountering the gendered assumption that any man who would be willing to be a "trailing spouse" would not be qualified for a faculty position at UM. In these cases, the women scientists and engineers and their partners had to navigate the dual career path unassisted by the University. On the positive side, some faculty commented on how their chairs' proactive stance with regard to the partner placement issue helped in the successful recruitment of women faculty. This suggests that improvements in the area of partner hires would help UM science and engineering departments attract qualified women candidates.

There was a general consensus in the focus groups that UM was not a "family-friendly" place. It may be remembered that on the survey, from a list of twelve career satisfactions, all tenure track faculty were least satisfied with the balance between work and family in their lives. On this item, women scientists and engineers were significantly less satisfied than men scientists and engineers. The focus groups and interviews helped to explain this difference, revealing that some women scientists and engineers felt they had to choose between having a family and pursuing the scientific work they enjoyed. In the words of one senior woman, "I think if I were married, or had kids, I would not be sitting here, to be honest." Other women recounted difficulties in synchronizing the biological and tenure clocks. Implementation of UM policies regarding maternity leave, and stopping the tenure clock, was complicated by ignorance about such policies at the department level. Chairs would refuse to stop the tenure clock until a dean intervened, or would automatically stop the tenure clock when the woman scientist did not wish them to do so.

Focus group and interview participants expressed the belief that this opposition between work and family adversely affected men scientists and engineers also, though they may be more hesitant than women in voicing their frustrations. As one senior woman stated:

> I have had several men say to me--especially men who have come [to the University] from industry-- '…[T]his place is not a family-friendly place. I don't know what to do. I spend hours and hours and I never see my family.'…A lot of men feel this way… but they won't say that out loud.

To aid all UM faculty in achieving a balance between work and personal life, participants in the focus groups and interviews suggested:

- more on-site childcare facilities;
- the scheduling of regular meetings during normal working hours;
- increased knowledge at the department level of University policies regarding dependent-care leave and partner placement.

Departmental culture and transparency of policies and procedures. Based on the climate survey, we know that women scientists and engineers rate their departmental climate as significantly worse than either men scientists and engineers or women social scientists. They report higher levels of gender stereotyping, gender and racial/ethnic tokenism, and rate their units as less tolerant and positive. Both men and women scientists and engineers rate their department chairs less favorably, in terms of fairness and ability to create a positive atmosphere, than do women social scientists. Discussions with faculty in focus groups and interviews suggest that these problems may stem, in part, from an autocratic or oligarchic departmental culture, which is characterized by the uneven socialization of new faculty, secrecy regarding policies and procedures, and the placement of decision-making authority in the hands of a few. While this is frustrating for both men and women scientists and engineers, it may be particularly disadvantageous for women (Etzkowitz *et al*, 2000).

An oligarchic departmental culture can leave faculty feeling alienated. In the words of one senior woman:

> A major problem for me when I came here was people being unwilling to articulate what the rules are and understanding the customs of the department. I'd be in a committee meeting, and I'd ask about something, and they wouldn't tell me. They would just go on. I wasn't supposed to participate.

A junior woman described how decisions are "…made under the table, and are not public…. That's the way it is;…I'm totally shut off from the system most of the time." A senior woman described how democratic principles applied only to seemingly inconsequential decisions:

> I've been very surprised, since I moved here, at which decisions go for discussions and which don't. For example, in my department hiring decisions…are made by a very small committee, but [for] decisions about whether we renumber or rename a course we have to have [the entire faculty involved.]

The secrecy surrounding decision-making can be especially detrimental in the area of recruitment. Several faculty suggested that in their departments faculty recruitment still takes place via the "old boy network," even when official search committees are convened. One junior female explained,

> It's sort of word of mouth or from one chairman to another. My experience being on a search committee is that it is really a scam…. It's a committee that may never meet…and usually it's, 'my old buddy has a great guy that is graduating the program, so I think we really need [someone in that field].'

To create a better department atmosphere, faculty suggested that departments display transparent policies and procedures, and adopt mechanisms to redress problems, such as those regarding discrimination, harassment, unfair treatment. In the words of one senior woman,

> I think the most important thing is transparency…. They [should not] make any decisions under the table…. We want to know, we have a right to know, their policy-making process.… Transparency, that's a key word.

A junior woman described how such measures worked successfully in her department.

> When there is a problem [in our department], it's laid out for us clearly, well in advance, and then a mechanism is set up to solve it. So we all--we may not like it--but we've all had a chance to have input. So the transparency--the shared responsibility, the democracy, and then the shared goals and interests…[make us] all willing to work a little harder.

Because department chairs are trained as scientists and engineers, and not administrators, it may be advantageous to provide them with resources to help prepare them for the challenges of successful leadership and conflict resolution. Many faculty suggested that department chairs be required to complete an administrative training course. In the words of one senior faculty woman,

> I would make every department chair go through…training classes…. They need…training in some basic social skills--…learning how to deal with people, …how to treat employees, how to give feedback for improvement and have it be matter of fact, not personal…. [They need to] pay attention to morale issues.

This proposal focuses on the department chair as the key creator of the departmental culture, but we note that it may well be that a broader set of senior faculty leaders plays an important role in creating the problematic cultures we heard about, and could play a role in altering them.

Conclusions and Suggestions

Do the findings from the climate survey, interviews and focus groups suggest that the *gender difference* model best describes the differences in career experiences between women and men scientists and engineers? In most cases, they do not. The results show that in many areas pertaining to career patterns and satisfactions, women and men science and engineering faculty at UM are very similar. They are also similar in that satisfaction with their position is related to rating their departmental climate as positive. In one area, household composition, the fact that women scientists and engineers are more likely than men scientists and engineers to be members of two-career households, or solo households, makes professional/personal issues more important for women scientists and engineers. In this respect, women scientists and engineers are similar to women social scientists.

The survey findings reveal that women scientists and engineers experience a more negative work environment than do men scientists and engineers or women social scientists. These results tend to support the *deficits in the science environment* model. What are the particular deficits for women?

The mentoring of female assistant professors in science is inadequate in most areas, and the departmental climate is chilly for women in them. Women scientists and engineers report high levels of gender discrimination and sexual harassment. In most (but not all) of these respects, the circumstances are much worse for women scientists and engineers than women social scientists. While disheartening, these data also point to possible domains for intervention.

The climate survey data, though far from conclusive, are compatible with the *accumulation of*

advantages and disadvantages model. There is evidence that past gender discrimination and sexual harassment relate to faculty's current satisfaction with position at UM and evaluation of workplace climate. These results suggest that interrupting or preventing early experiences of disadvantage may have a long-term payoff in women scientists' and engineers' subsequent morale.

TRACK BY GENDER DATA ANALYSES

The second phase of data analysis consisted of a track by gender analysis, comparing the experiences of male and female scientists and engineers on the three faculty tracks at the University of Michigan: tenure track, primary research, and clinical. Tenure track women social scientists, included as one of the key comparison groups for tenure track women scientists and engineers in phase one of the data analysis, are *not* included in the track by gender analysis.

The overall report of cross-track findings follows the same pattern as the section presenting findings for the tenure track, but in this section we report on track differences (across men and women), and gender differences (across all three tracks). There were in fact virtually no track by gender interactions.

In the first section—which examines track differences in professional experience, household characteristics, career experiences and satisfactions, and climate—we see that tenure track faculty have advantages that research and clinical track faculty do not.

In the second section—which examines gender differences in these same areas—we see that women scientists and engineers across tracks have many experiences in common. Specifically, across tracks, women report higher levels of service and chillier climates than do men.

The third section presents qualitative data that identify perceived benefits of the non-instructional tracks, as well as difficulties with them.

Response Rate

The overall response rate for the UM Survey of Academic Climate and Activities was 38% across tracks; 50% of female scientists and engineers, and 26% of male scientists and engineers responded. Comparing response rates among the tracks, ten-

ure track faculty was the highest, with an overall return rate of 41%; 52% of women scientists and engineers, and 30% of men scientists and engineers responded.[30] The response rates for primary research faculty and clinical faculty were slightly lower. Among the primary research faculty surveyed, 48% of the women and 22% of the men responded, for a total response rate of 32%. Among the clinical faculty surveyed, 48% of the women and 23% of the men responded, for a total response rate of 34% (Table 20).

Data Analysis Strategy

For the track by gender analysis we conducted analyses of variance on scales and items, comparing mean scores by track, and by gender across track. We also checked for interactions of track by gender—gender differences within track that do not hold up across tracks, or track differences within gender that do not hold up across genders. We found virtually no track by gender interactions.

The analyses did identify several differences between the tracks across gender; in most areas where track differences surfaced, tenure track faculty reported more advantageous circumstances than research or clinical faculty. The gender differences across tracks in many ways mirrored those found within the tenure track. In the areas of service and particularly climate, women scientists and engineers across tracks do not fare as well as men scientists and engineers. The findings below are reported first by track, and then by gender.

Results of Track By Gender Analyses

This section reviews findings about professional experience, household characteristics, and career satisfactions and activities by track. Overall, results suggest that the clinical and research track science and engineering faculty face a number of difficulties that are quite attenuated for tenure track faculty. Tenure track faculty reported a heavier teaching load, but also high rates of productivity and recognition, and more felt influence over educational decisions compared to faculty on the other two tracks. In addition, tenure track science and engineering faculty reported that they fared better during initial contract negotiation and contract renegotiation than their clinical and research counterparts. Clinical faculty reported the lowest self-rated productivity, while research faculty reported the lowest rates of recognition for professional contributions. Although faculty across tracks derive satisfaction from being mentors and teachers, clinical and research faculty are less satisfied than tenure track faculty with others' perceptions of their professional contributions. Clinical track faculty also fared worse than research and/or tenure track faculty on institutional climate indicators.

***Level of professional experience*:** There were several track differences in professional experience (Table 21). Tenure track faculty tended to be older than either research or clinical faculty (who have been at UM fewer years, and to have fewer years since the Ph.D. or highest degree). Tenure track faculty were more likely to be at senior rank; clinical faculty were more likely to be at the middle rank; research faculty were more likely to be at the junior rank.[31]

Clinical faculty were most likely to be white/European American, while research faculty were more likely than clinical faculty to have an appointment in one of the smaller colleges. In these professional characteristics, the respondent pool and sample surveyed are equivalent.

As with the first phase of data analysis, we used the experience variables as covariates when conducting ANOVAs. The control variables did not produce effects on the climate variables, with the exception of rank (discussed following).

[30] In addition, 47% of women social scientists responded.

[31] To compare rank across tracks, we categorized research investigators and assistant research scientists at junior rank, associate and senior associate research scientists at middle rank, research and senior research scientists at senior rank.

***Household Characteristics*:** There were no significant track differences in household composition (Table 22). The majority of faculty across the tracks have a partner and children. Among those faculty who have a partner, over 60% have a partner who works full-time. Between 30-40% of faculty with partners working full-time have partners who also work at UM, the majority as faculty members. Roughly 40% of faculty with a partner have considered leaving UM to improve career opportunities for their partner. We included household characteristic variables as covariates when conducting ANOVAs, and the analyses identified no family situation interactions or main effects.

***Career Experiences and Satisfactions*:** The survey findings revealed several significant track differences in the areas of productivity, recognition, and career satisfactions. Clinical faculty self-reported the lowest level of productivity, research faculty reported the lowest rates of recognition for professional contributions, while tenure track faculty reported the highest levels of both productivity and recognition. Faculty across tracks derive satisfaction from many of the same aspects of their careers, but clinical and research faculty are less satisfied than tenure track faculty with others' perceptions of their professional contributions.

Productivity. The survey asked respondents to identify the most reliable and informative indicators of productivity in their area of research from the following list: number of external grants, total dollar amount of external grants, number of external fellowships, number of articles published in refereed professional journals, number of monographs written, number of books edited, number of book chapters, number of dissertations chaired, number of presentations at conferences, and number of patents. Clinical faculty were significantly more likely to choose number of book chapters, and number of books edited as important predictors of productivity in their field (Table 23). Tenure track faculty were more likely to choose the number of dissertations chaired, and research faculty were more likely to choose the number and total dollar amount of external grant proposals.

Based on the criteria they chose, respondents were then asked to rate their own productivity, and their departments' view of their productivity, in relation to researchers in their areas and at their rank nationwide. Clinical faculty reported significantly lower self-rated productivity than tenure track or research faculty, and significantly lower department-rated productivity than research faculty (Table 24).

Recognition. In the area of recognition, a significantly higher percentage of tenure track faculty reported being nominated for at least one award by their departments, but a higher percentage of this group also reported failing to be nominated for awards for which they were qualified (Table 25). Over 50% percent of tenure track faculty reported having been nominated for at least one award, compared to 33% percent of clinical faculty and 17% percent of research faculty. More tenure track faculty than research or clinical faculty reported being nominated for awards in teaching and research. More tenure track and clinical faculty than research faculty reported being nominated for a service award. Perhaps not surprisingly, more research faculty than clinical faculty reported being nominated for a research award, and more clinical faculty than tenure track faculty or research faculty reported being nominated for a clinical award.

Career satisfactions. The survey data indicate that faculty across the tracks value many of the same aspects of their careers. There were no track differences on the career satisfactions scale (averaging satisfaction with twelve particular aspects of professional development at the unit/department level; see Table 26a). Looking at the individual items, across tracks and within each track, being valued as a mentor and teacher by students were the most highly rated areas of career satisfaction (Table 26b). Rounding out the top aspects of professional development across the tracks were the

opportunity to collaborate with other faculty and contributing to the theoretical developments in one's discipline (Table 26b). For the research track faculty—for whom teaching and mentoring are not recognized or compensated aspects of their roles, as we will see below—this creates a paradox. An important source of career satisfaction is outside the defined career role structure.

There were a few track differences on the individual career satisfaction items (Table 26a). Tenure track faculty were less satisfied than clinical faculty with intellectual stimulation in day-to-day contacts with unit colleagues. Clinical faculty were less satisfied than research faculty with a sense of being valued for their research contributions, and rated satisfaction with contributing to the theoretical developments in one's discipline, and level of funding for research or creative efforts, significantly lower than either tenure track or research faculty. During interviews, several clinical scientists commented on the difficulties of conducting research as a clinical faculty member. Although clinical faculty are expected to produce scholarly work, they often find it difficult either to acquire the necessary resources, or to block off sufficient time. One clinical scientist reported that she was repeatedly denied lab space for funded research, and was told to ask a tenure track faculty member for permission to share their lab. Another clinical scientist explained the time constraints of trying to balance research and patient care:

> Well, …you're with patients 80% of your time and…that gets defined as a 60 hour week…. So four days a week, let's say, [is supposed] to be with patients and then the other day a week is supposed to be for me to do my scholarly work and my administrative work and all these patients' paper work that has to happen. And it [the time for scholarly work] doesn't get saved, it doesn't get protected, because patient things come up all the time. So it's really hard as a clinician to really get that day a week or two half days a week protected because it is always getting encroached upon by patient needs. And then you are supposed to be doing administrative work those two half days. So it's always getting encroached by some meeting or being on [a committee]. We're still supposed to produce some scholarly work, so most of us find out we are doing it on the weekends.

While clinical faculty did not feel as valued as faculty on the other tracks for their research contributions, research faculty were less satisfied than either tenure track or clinical faculty with a sense of being valued for teaching by their unit/department colleagues. Focus group and interview data helped to explain how research faculty could be very satisfied with being valued as a mentor and teacher by students, but also feel that their teaching contributions were not adequately recognized or valued by colleagues. The teaching that research faculty do in labs—supervising research, teaching techniques, providing intellectual oversight—is not recognized as official teaching. During an interview, one research scientist suggested,

> Were you to take a close look at what research scientists do, what you would find is that on many of these big projects that we are running, many of us have large numbers of people working with us that we are teaching things to everyday. Now people can call that training, they can call it whatever they want to call it. It's teaching. And you can't do it unless you have excellent teaching skills. You can't retain workers on a grant if

> you don't know what you are doing.

Research scientists and engineers usually are not considered the official advisor for those students whom they teach and mentor. One research scientist explained,

> I'm the person who...makes things run in the lab and the primary contact for all the students. So I'm not the head of the group. I'm the one that interacts with them everyday on a regular basis.

Similarly, another research scientist commented,

> There are three postdocs on this team. I am not their primary advisor. However, I am the person who is spending up to twelve hours a week with them, for which I get no credit.

Several research scientists and engineers expressed frustration that the "official" teaching that they engage in, such as serving on dissertation committees, is not recognized in the reward structure. So while research scientists and engineers may find teaching rewarding, they feel it counts against them during evaluation. During a focus group, one research scientist commented,

> I've been co-chair of a number of dissertations. Part of my dilemma is that I also get invited to be on a lot of people's dissertations, which takes a lot of time and energy...and there's nothing in the reward structure that acknowledges or recognizes that fact…. You know, my salary depends on my ability to bring in research funding and it's time away from that and there's no recognition for it in any of the ways that the structure is set up. So, it's unfortunate for the students. but I feel like I can't continue to do that.

Another research scientist responded,

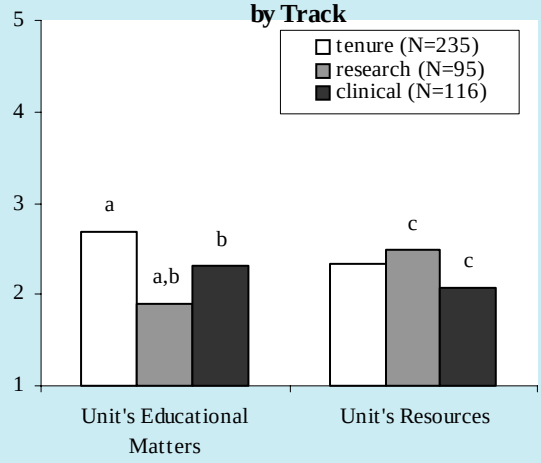
> I have not been able to find easy circumstances in which to teach graduate students unless I do it for nothing, which I have done. And then I just got tired of doing it for nothing because it was just too much.... I could see that it was cutting back on my productivity and that was the way I was going to get paid so, reluctantly, I stopped. Because I still would love to do it, but there just aren't opportunities to do it.

Felt influence on educational matters and resources. There were significant track differences on scales constructed to assess felt influence over educational decisions (such as curriculum decisions, selecting new graduate students, resident/fellows, faculty members, and unit head), and educational resources (the size of salary increases, obtaining money for travel to professional meetings, and securing research facilities and equipment; Figure 17, see p. 51, Table 27a). Tenure track faculty felt more influence than research or clinical faculty over educational decisions. Research faculty felt more influence than clinical faculty over unit resources.

Comments made during interviews and the focus group illustrate the lack of influence over educational decisions that many research and clinical faculty feel. In particular, research and clinical faculty mentioned their exclusion from, or restricted participation in, decision-making committees, which are the purview of tenure track faculty.

During the focus group, one research scientist explained,

Figure 17: Felt Influence on Unit's Educational Matters and Resources by Track



[a,b,c]Matching symbols identify groups that differ from each other statistically significantly, p≤.05.

> There's no mechanism for any of us to sit on any of the decision-making bodies. They're all teaching faculty who do that. So, there are no...mentors who are on a research science track, and there's no mechanism for us to participate in the decision making about tenure review and advancement.

A clinical scientist told a similar story during an interview,

> Another unique thing about clinical work is that the University doesn't really recognize us as equal to the other professor people… [S]ome committees have recently allowed us to be able to be on them, but there are still some that we are not allowed on.

Another research scientist commented,

> I'm just thinking about our most recent search in our department. The way that it worked was, again the research scientists in my department--we go to the faculty meetings--we're told that we're equivalent to faculty, but when it came down to the vote on on the hire, research scientists were explicitly told they could participate in the discussion about the candidates, then they had to leave while the tenure track faculty voted…. Only the senior faculty could vote on the rank in which they would hire somebody. So, there is a very explicit hierarchy and basically research scientists have no vote and no mechanism for participating in decision-making within the department.

Not surprisingly, rank was related to influence over curriculum decisions, securing facilities and equipment, selecting who gets tenure, and selecting the next unit head, with senior faculty reporting more influence over these matters.[32] We found that for both influence scales, and all individual items with the exception of money for travel to professional meetings, junior faculty across tracks reported less influence than faculty at middle and/or senior rank (Table 27b).

Resources—effort and satisfaction. Survey respondents were asked about the amount of effort it took to secure office and research space, computer and other lab equipment, and service from vendors. They were then asked to rate how satisfied they were with the current allocation of these resources in their unit/department. On the scale constructed to assess mean effort to secure the five resources there were no track differences (Table 28). However, research faculty were more satisfied than tenure track faculty with the allocation of resources.

[32] Statistically significant effects on *Hired in the last ten years (yes/no,)*, a variable highly correlated with rank, also were found for influence over educational matters, curriculum decisions and selecting the next unit head.

Looking at the individual items that comprised the effort and satisfaction with resources scales, we found very few track differences. Research faculty reported less effort than tenure track faculty to secure research space. Research faculty were also more satisfied than either tenure track or clinical faculty with the current allocation of computer equipment in their unit/department, and more satisfied than tenure track faculty with service from vendors.

Initial contract negotiation. There were many track differences in the area of initial contract negotiation, and in this area tenure track faculty did better than research or clinical faculty. Faculty hired at UM within the last ten years were asked to identify features of their initial contract negotiation from a series of fifteen items including course release time, lab equipment, lab space, renovation of lab space, research assistant, clerical/administrative support, discretionary funds, travel funding, special bonus, summer salary, special timing of tenure clock, moving expenses, housing subsidy, child care, and partner/spouse position. The survey asked respondents to indicate whether a particular item was offered by UM, bargained for, promised in the contract letter, and received. Tenure track science and engineering faculty, who are expected both to carry a formal teaching load and conduct research, were offered more items from UM, bargained for more items, were promised more items in their contract letter, and received more items during the initial contract negotiation, than either research or clinical faculty (Table 29a). Clinical faculty were offered more items from UM, and received more items, than research faculty.

In terms of individual contract items, a higher percentage of tenure track faculty than either research or clinical faculty reported that lab equipment, lab space, renovation of lab space, summer salary, and moving expenses were offered by the University during the initial contract negotiation (Table 29b). More tenure track faculty and clinical faculty than research faculty reported that the University offered discretionary funds and travel funding in their start-up packages. More tenure track faculty than either research or clinical faculty reported that they bargained for lab equipment, lab space, renovation of lab space, research assistants, discretionary funds, summer salary, special timing of the tenure clock, and moving expenses. Fewer research faculty than tenure track and clinical faculty bargained for course release time. More research faculty than clinical faculty bargained for a summer salary. More tenure track faculty than clinical faculty bargained for a partner/spouse position.

Contract renegotiation. Tenure track faculty also did better than research and clinical faculty in contract renegotiations. All respondents were asked to indicate the items offered by UM, and those items bargained for by them during contract renegotiation, by selecting from the same fifteen items listed under initial contract negotiation. During contract renegotiation, UM offered more items to tenure track faculty than to research faculty (Table 29a). Tenure track faculty bargained for, and received, more items than either research or clinical faculty.

Looking at the individual items offered by UM during contract renegotiation, a higher percentage of tenure track faculty than clinical faculty were offered lab space (Table 29b). Looking at the individual items faculty bargained for in contract renegotiation, more tenure track faculty than research or clinical faculty bargained for renovation of lab space. More tenure track faculty than research faculty bargained for course release time, a research assistant, and special timing of the tenure clock. More tenure track faculty than clinical faculty bargained for lab equipment, lab space, and a summer salary. More clinical faculty than tenure track or research faculty bargained for administrative assistance, and more clinical faculty than research faculty bargained for a special bonus.

Teaching. Overall, tenure track faculty reported the heaviest load of formal classroom teaching

courses, and clinical faculty the lightest. Survey respondents were asked about their official teaching load for the winter 2001 and fall 2001 semesters, including number of graduate courses, undergraduate courses, lab courses, and non-lab courses. Respondents also were asked to indicate how many new courses they had developed for their units in the past five years, and the number of courses they had been released from teaching within the same timeframe. Clinical faculty reported having taught fewer undergraduate courses than either tenure track or research faculty during the winter and fall 2001 semesters (Table 30). Clinical faculty also reported having taught fewer graduate courses, lab courses and fewer undergraduate students than tenure track faculty during the same time period. In addition, compared to tenure track faculty, clinical faculty reported serving as official advisor to significantly fewer undergraduate and graduate students.

It should be noted, however, that teaching load is frequently discipline specific, and it is particularly difficult to compare across tracks with survey data. For example, the kind of teaching carried out by clinical faculty during patient rounds is quite different, and more difficult to quantify, than teaching an undergraduate lecture course. During interviews, several clinical faculty said that they felt that the survey questions did not adequately capture their teaching responsibilities. As one clinical scientist explained, "It's not like a lecture format. I mean, there is some lecture format but the vast majority is more one-to-one teaching."

Assessing the teaching responsibilities of research faculty is also difficult. As was mentioned earlier, many research scientists and engineers felt the survey did not capture the more unofficial teaching that takes place in the labs (see career satisfactions, pp. 48-50). During an interview one research scientist commented,

> I think there's a whole piece of that teaching [section on the survey] which is very narrow and refers only to formal tenure track type behavior and misses out on a whole lot of other [kinds of teaching].

Some research faculty teach formal classes, in addition to the teaching and mentoring they perform in the lab, holding a second instructional (but not tenure-track) appointment as a lecturer or instructor. Of the ninety-five research faculty who returned the survey, sixteen reported a formal teaching load, and eighteen reported official advising responsibilities.

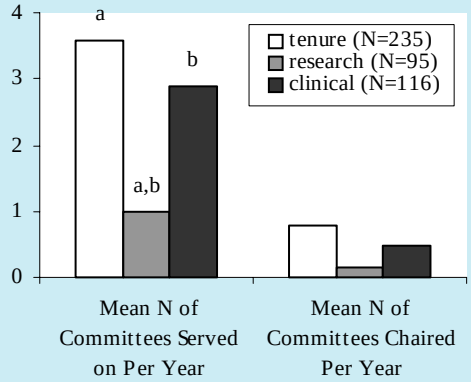
Mentoring. Analyzing survey data from junior faculty across tracks, we found only one track difference in the area of mentoring. To ensure a uniform definition of mentoring, survey respondents were asked to indicate whether or not they received mentoring in eight specific areas, such as advice on publishing, department politics, networking, etc. There were no significant track differences in the number of areas of no mentoring at all, the total number of mentors in same UM department, or the number of male mentors at UM (Table 31a). Additionally, there were no track differences in the percentage of faculty from each track who reported no mentoring in the form of a role model, networking, preparation for advancement, advice about publishing, advice about departmental politics, advice about resources, and advice about the balance between work and family. The one significant track difference was in the area of advocacy; a significantly higher percentage of junior clinical faculty received mentoring in this area than did tenure track faculty. Among tenure track faculty, 34% of assistant professors reported receiving no mentoring in this area, compared to only 16% of clinical assistant professors (Table 31b).

Service. Research faculty reported serving on, and chairing, significantly fewer committees per year than either tenure track or clinical faculty (Figure 18, see p.54, Table 32). Tenure track faculty reported serving on an average of close to four com-

mittees a year, compared to almost three for clinical faculty and one for research faculty. There were no significant differences, however, among the three tracks in faculty reports of the importance to them of having a department or college leadership position.

Conclusions. Looking at the career experiences and satisfactions variables, it seems that tenure track scientists and engineers have some demonstrable advantages over both clinical and research

Figure 18: Committee Service by Track



[a,b]Matching symbols identify groups that differ from each other statistically significantly, p≤.05.

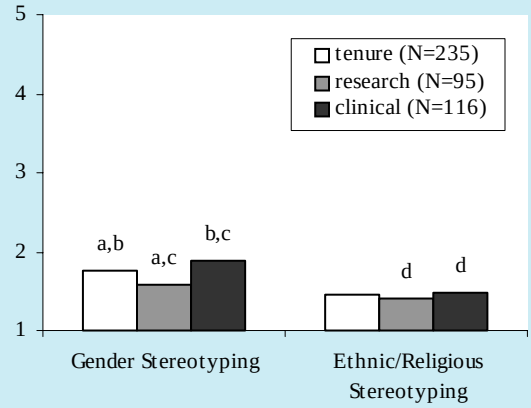
faculty at UM. Tenure track faculty reported a heavier teaching load, but also high rates of productivity and recognition, and more influence over educational decisions than faculty on the other two tracks. In addition, tenure track science and engineering faculty fared better during initial contract negotiation and contract renegotiation than their clinical and research counterparts. Clinical faculty reported the lowest self-rated productivity, while research faculty reported the lowest rates of recognition for professional contributions. Although faculty across tracks derive satisfaction from being a mentor and teacher, clinical and research faculty are less satisfied than tenure track faculty with others' perceptions of their professional contributions.

***University Climate*:** The survey asked several questions regarding climate that were not limited to faculty experiences in their unit(s)/department(s). Questions regarding institutional climate included items to assess the level of gender and racial stereotyping, discrimination, and unwanted and uninvited sexual attention that faculty experience on the UM campus. Clinical faculty fared worse than research and/or tenure track faculty on all of the institutional climate indicators.

Stereotyping. Survey respondents were asked to indicate how often within the last five years they heard faculty or students make "insensitive or disparaging comments" about women, men, members of a racial/ethnic minorities, or members of a particular religious group, as "typical" of that group. These items were combined into two scales: a gender stereotyping scale rating the frequency of disparaging comments about men and women, and a racial/religious stereotyping scale rating insensitive comments about members of a racial/ethnic minority or particular religious group (see Appendix D for a list of items comprising each scale). Analyzing the scales for track differences, we found that clinical faculty reported the highest level of gender stereotyping, significantly higher than either tenure track or research faculty, while research faculty reported significantly less gender stereotyping than either tenure track and clinical faculty (Figure 19, see p. 55, Table 33). Clinical faculty also reported a higher frequency of ethnic/religious stereotyping than research faculty.

Discrimination. Survey respondents were asked to indicate any job-related discrimination they experienced at UM within the last five years, noting the basis for the discrimination (race/ethnicity, gender, sexual orientation, physical disability, religious affiliation), and the areas in which the discriminatory behavior affected their career (hiring, promotion, salary, space or other resources, access to administrative staff, graduate student or resident/fellow assignments). Gender discrimination was the type of discrimination most frequently reported

Figure 19: Experiences of Stereotyping* by Track



[a,b,c,d]Matching symbols identify groups that differ from each other statistically significantly, p<.05.

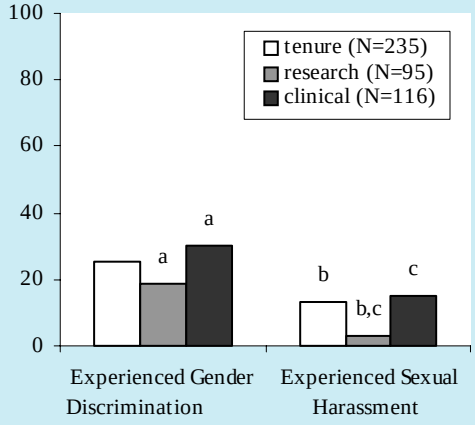
*Scale 1-5, 1=never, 2=once or twice per year, 3=couple of times per year, 4=more than once per month, 5=weekly

by faculty on all tracks. Across tracks 2% or fewer faculty members reported discrimination due to sexual orientation, religious affiliation, or physical disability, while 6% of tenure track and clinical faculty, and 8% percent of research faculty reported racial discrimination in at least one area (Table 34a). In contrast, 26% of tenure track faculty, 19% of research faculty and 29% of clinical faculty reported experiencing gender discrimination at UM over the last five years (Figure 20, Table 34a,).

Sexual Harassment. Fewer research faculty than tenure track and clinical faculty reported experiencing sexual harassment at UM within the last five years (Figure 20, Table 35). Using a standard definition of sexual harassment as unwanted and uninvited sexual attention (including sexual teasing, jokes, remarks or questions; unwanted pressure for dates; unwanted letters, phone calls, email; unwanted touching, leaning over, cornering, pinching; unwanted pressure for sexual favors; stalking; rape or assault), 13% of tenure track faculty, 15% of clinical faculty, but only 3% of research faculty reported experiencing sexual harassment at UM within the last five years. In addition, 31% of tenure track faculty, 30% of clinical faculty and 19% of research faculty reported knowing at least one other person who had been sexually harassed at UM during the last five years (Table 35).

Department Climate: Several sets of questions contained in the UM Survey of Academic Climate and Activities focused on climate at the unit/department level. To maximize measurement reliability we constructed scales from the individual items.[33] The department climate scales include the following: positive environment, tolerant (of diversity) environment, scholarly isolation, felt surveillance, gender egalitarianism, gender or racial tokenism, department chair as fair, department chair as able to create a positive environment, and department chair as committed to racial/ethnic diversity. There were no track differences on these scales, with the exception of scholarly isolation. This scale includes

Figure 20: Experiences of Gender Discrimination and Sexual Harassment in Past Five Years by Track



[a,b,c]Matching symbols identify groups that differ from each other statistically significantly, p<.05.

items such as, "I feel pressured to change my research agenda to make tenure/be promoted," and "my colleagues have lower expectations of me than of other colleagues." Clinical faculty reported a higher level of felt isolation than tenure track faculty (Table 36).

[33] The procedure is described on pp. 22-23 of this report.

Do The Track Differences in Climate Matter? What are the implications of track differences in work experiences? As in phase one of the data analysis, we calculated correlations to see if the climate indicator variables, other departmental experiences variables, and personal and position variables were related to overall satisfaction with UM position. We found that for faculty across tracks the departmental climate indicators, in particular, were more closely related to overall job satisfaction than were the other variables.

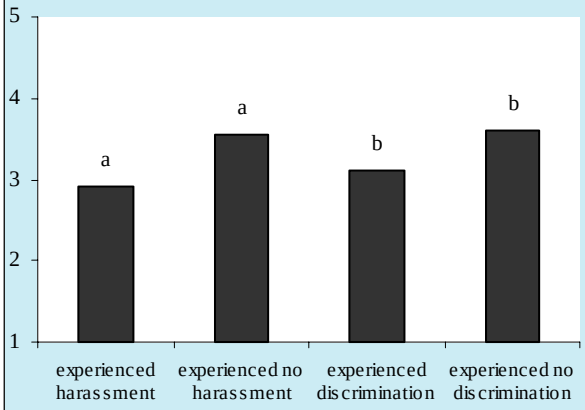
***Institutional and Departmental Climate Ratings*:** Departmental climate indicators (positive environment, tolerant environment, gender egalitarian atmosphere, scholarly isolation, felt surveillance, ratings of the department chair)—though they did not differ by track— were highly correlated with overall job satisfaction for all tracks (Table 37). Institutional climate indicators (stereotyping, discrimination and harassment), which did differ by track, were highly correlated with overall job satisfaction for tenure track faculty, but less so for research and clinical faculty.

***Departmental Experiences Indicators*:** The career satisfactions, influence over unit resources, effort and satisfaction with resources scales were all highly correlated with overall job satisfaction for faculty on all tracks, as were mentoring, and department rated productivity (Table 38). Influence over educational decisions was highly correlated with job satisfaction for tenure track and clinical faculty, but not research faculty. Committee service was not related to satisfaction for faculty on any of the tracks.

***Personal and Position Indicators and Household Characteristics*:** In contrast to climate indicators, most personal, position, and household indicators were not significantly correlated with overall job satisfaction (Table 39). Within the research track, being of a non-white ethnicity was negatively correlated with overall job satisfaction. For clinical faculty, age was positively correlated with overall job satisfaction. Within the tenure track, being single with no children was negatively correlated with satisfaction.

Do These Bad Experiences Cumulate? Given that the survey data are cross-sectional in nature, it is difficult to investigate whether an *accumulation of advantages and disadvantages* takes place for faculty across tracks. Using two questions that were rated for "the past five years," gender discrimination and harassment, we calculated independent samples t-tests to examine if reports of discrimination or harassment could "predict" current satisfaction and climate ratings (Figure 21).

Figure 21: Mean Satisfaction Scores for All Faculty Grouped by Those Who Have and Have Not Experienced Sexual Harassment and Gender Discrimination



[a, b] Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

For all tracks, faculty who had experienced sexual harassment rated their overall job satisfaction lower than faculty who had not experienced sexual harassment; for tenure track and research faculty this difference was statistically significant (Table 40). Likewise, for all tracks, faculty who had experienced gender discrimination rated their overall job satisfaction lower than faculty who had not experienced gender discrimination; for tenure track and clinical faculty this difference was statistically sig-

nificant. There was also a relationship between experiences of harassment and discrimination, and the rating of climate variables. Those who had experienced harassment and discrimination often reported a chillier climate, although the relationship was strongest among tenure track faculty (Tables 40 and 41). Based on this evidence it seems that bad experiences may, in fact, cumulate for faculty on all tracks.

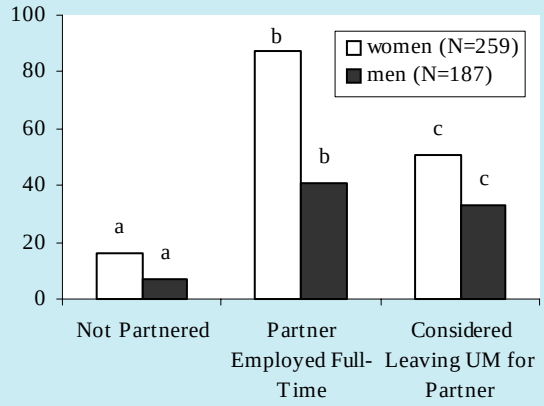
Results of Gender Analyses Across Tracks[34]

This section reviews findings about professional experience, household characteristics, and career satisfactions and activities by gender. Overall, results suggest that women scientists and engineers across tracks experience many of the same difficulties (specifically in the areas of service and institutional and departmental climate) that women scientists and engineers on the tenure track do. The exceptions are in the areas of mentoring, contract renegotiation, and some departmental climate indicators.

***Level of Professional Experience*:** There were several gender differences in professional experience among women and men scientists/engineers across the tracks (Table 42), many of which reflect the greater age and time in the field of men scientists/engineers. Women scientists and engineers tend to be younger than their male counterparts, have been at UM fewer years, and have fewer years since the Ph.D. or highest degree. Men scientists and engineers were more likely to be at the highest rank, women scientists and engineers more likely to be at the middle rank. Across the tracks, there were no gender differences at the lowest rank. Women scientists and engineers were also more likely to hold joint appointments, and an appointment in one of the smaller colleges.[35]

***Household Characteristics*:** There were many gender differences in household composition (Figure 22, Table 43). Across the tracks, women scientists and engineers were more likely than their male colleagues to be single with children, and less likely to be partnered with children. If partnered, women scientists were twice as likely to have a partner who is employed full-time. Women scientists were more likely to have a partner who works at UM, and is employed as a faculty member. They were also more likely to consider leaving to improve career opportunities for their partner. These data indicate that women scientists and engineers across tracks may have more household demands than men scientists and engineers; women scientists and engineers are more likely to be single or have a partner who also works full-time, while most men scientists and engineers have a partner who does not work full-time. These differences in household situation, however, do not account for the differences in climate ratings. Like professional experience variables, household characteristic variables were included as covariates when we calculated the ANOVAs, but resulted in no family situation interactions or main effects.

Figure 22: Partner Information by Gender



Note: N of partnered women=216; N of partnered men=172.

[a,b,c]Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

The topic of how professional life impacts house-

[34]Tenure track women social scientists are not included in these analyses.

[35] This gender difference is due to the large number of women in Nursing; if Nursing faculty are removed from the small colleges analysis, gender differences disappear.

hold situation prompted comments from women scientists and engineers from all tracks. Many felt that the work demands of a faculty position at the University of Michigan did not leave adequate time for family responsibilities, particularly if both partners worked full-time. Since the majority of women science and engineering faculty across tracks have partners who also work full-time, women are disproportionately affected by this tension between work and home. Some women reported achieving balance between work and family by prioritizing their careers over their partners'. As one senior tenure track scientist reported,

> Well, I think, the balancing act of profession and personal life is often more complicated for most--not all females--but for most females, and often they may not have the support. Whereas many male faculty members may have the support because their wives have secondary positions, for example. Now, I must say that I am just the opposite. My husband has a secondary sort of role in our family, from a career standpoint, and so I have that support.

A clinical woman scientist reported a similar household situation,

> I have the luxury of having a spouse who works at home. I think that is an important issue…. How do you make your spouse happy and yourself happy at the same time? I personally think you can't do it at the same time, you have to take turns.

Other women scientists and engineers struggled with the decision of whether or when to start a family. One research scientist stated,

> It seems difficult, for instance, for women, if you want to have children, have a family life. If you spend 12-14 hours at work, six days a week, seven days a week, then work when you are back home, it's just… you don't have time. And that's something that makes me feel uncomfortable, but I don't know if it's because I'm a woman, or because I do want to have a family life. It's related, but it's not necessarily specific to me being a woman, but that's something that is making me feel uncomfortable, I think.

The same research scientist went on to say,

> I know a few people who...have more or less decided to...just postpone family life or children for later, typically after tenure for teaching faculty. For some other people it seems like they...have maybe different priorities and they are willing, to some extent, to sacrifice part of their family, or maybe sacrifice is a bit extreme, but just... not take part as much in the family life and just focus on work and let their partner...take care of the kids.

During a focus group, a woman research scientist suggested that men faculty receive more credit and understanding when faced with childrearing demands,

> I understand the issue of parenting because I raised a child [as] a single parent for a long time. And I feel like there is a different attitude towards a person if they are a woman doing childrearing than

> if they are a man. For example, there is a professor in our department who has a child who needs a lot of care. And so he is off a lot to take care of the child. But everyone [says], 'aw, that's so nice he's taking care of his child.'…. I just think there is a very different attitude towards that and that men get a lot more slack when they have to do that.

Another focus group participant added, "And a lot more credit for it."

***Career Experiences and Satisfactions*:** In many areas, men and women science and engineering faculty reported equivalent career experiences and satisfactions. Men and women faculty value many of the same aspects of their careers, and there were no significant gender differences in productivity, effort to secure resources, satisfaction with resources, felt influence over unit resources, the number of items included in initial contract negotiation and contract renegotiation, or the amount of mentoring junior faculty received. Women scientists and engineers across tracks reported more influence over educational decisions, but also heavier undergraduate teaching loads and service responsibilities.

Productivity. There were no gender differences in either self-rated or perceptions of department rated productivity (Table 44). Women scientists and engineers, however, were more likely to select the number of external grant proposals and number of presentations at national and international conferences as important criteria of productivity (Table 45). Men scientists and engineers were more likely to select number of monographs and number of patents.

Recognition. Apparent gender differences in nominations for awards did not survive controls for rank. Thus, there were no significant differences by gender in reports of departmental nominations for awards for teaching, research, clinical work, or service work (see Table 46).

Career satisfaction. There were no gender differences on the career satisfaction scale, assessing satisfaction with twelve key aspects of professional development at the unit/department level (Table 47). Both men and women scientists and engineers, like faculty across tracks and within each track, rate being valued as a mentor and teacher by their students, and the opportunity to collaborate with other faculty, as the most satisfying aspects of their professional development. Looking at the individual items comprising the scale, the survey findings revealed only two differences in career satisfaction between men and women scientists and engineers: women scientists and engineers are significantly less satisfied with their level of funding for research and their current salary in relation to their UM colleagues.

Felt influence on educational matters and resources. There were significant gender differences on the scale constructed to assess felt influence over educational decisions (influence over curriculum decisions, selecting new graduate students, resident/fellows, faculty members, and unit head), with women faculty reporting more influence over these educational matters (Table 48). There were no gender differences, however, on the unit resources scale (the size of salary increases; obtaining money for travel to professional meetings; securing research facilities and equipment). Looking at the individual items that comprise the scales, we found two significant gender differences. Women faculty reported more influence than men faculty on selecting the next unit head, but less influence on money for travel to professional meetings. As noted in the track analyses section, there were rank effects on the influence items, with faculty at senior ranks reporting more influence.

Resources—effort and satisfaction. There were no gender differences on the scale assessing mean effort to secure office and research space,

computer and other lab equipment, and service from vendors, or the scale assessing satisfaction with the current allocation of these resources (Table 49). Looking at the individual items that comprised the effort and satisfaction with resources scales, we found only one gender difference. Men scientists and engineers reported higher satisfaction with the current allocation of computer equipment.

Initial contract negotiation. Faculty hired at UM within the last ten years were asked to identify features of their initial contract negotiation from a series of fifteen items including course release time, lab equipment, lab space, renovation of lab space, research assistant, clerical/administrative support, discretionary funds, travel funding, special bonus, summer salary, special timing of tenure clock, moving expenses, housing subsidy, child care, and partner/spouse position. Respondents were asked to indicate whether a particular item was offered by UM, and/or bargained for by them during the initial contract negotiation. There were no gender differences across tracks in the number of items offered by UM, or bargained for, promised in the contract letter or received during initial contract negotiation (Table 50a). With the exception of summer salary and partner/spouse position, there were no significant gender differences in the percentage of men and women scientists and engineers offered any individual item by UM during the initial contract negotiation (Table 50b). More women scientists and engineers than men scientists and engineers were offered a summer salary by UM during initial contract negotiation. More women also bargained for both a summer salary and a position for their spouse/partner.

Contract renegotiation. There were no gender differences in the number of items offered by UM, bargained for, or received during contract renegotiation (selecting from the same fifteen items listed under initial contract negotiation; Table 50a). There were, however, a few gender differences on the individual contract items. UM offered more men than women scientists and engineers both lab space and the renovation of lab space, while more women bargained for course release time (Table 50b).

Teaching. There were no gender differences in the number of graduate, non-lab, or lab courses taught during the winter and fall 2001 semesters, or in the number of undergraduate and graduate students taught during this time period (Table 51). The one significant gender difference in teaching load was in the number of undergraduate courses taught during the winter and fall 2001 semesters; women faculty across tracks reported a heavier undergraduate teaching load (though they did not within the tenure track). We found no gender differences in the number of new courses developed by faculty, or in the number of courses faculty were released from teaching during the past five years. In addition, there were no gender differences in the number of undergraduate students, graduate students, postdocs, or junior faculty for whom faculty serve as official advisor.

Mentoring. While there were significant, and disturbing, gender differences in the amount of mentoring junior faculty tenure track men and women scientists and engineers received (see pages 31-32), there were no significant gender differences in mentoring among junior faculty across tracks. We found no significant gender differences in the number of areas of no mentoring, number of mentors in the same department, or number of male mentors at UM (Table 52a). There were also no gender differences in the percentages of men and women science and engineering faculty who reported receiving mentoring in any of eight particular mentoring areas, including networking, preparation for advancement, department politics (Table 52b).

Although they did not report a deficit of mentoring, during the focus group and interviews, women research and clinical faculty lamented the lack of women mentors, due to the small number of senior women faculty in science and engineering. One woman research scientist stated,

> I have had mentoring by several different males and I mean, I suppose what I really have missed is having any female mentor there at all because for years and years and years there weren't any female faculty at all.

A woman clinical scientist further commented on the consequences of lack of a female role model.

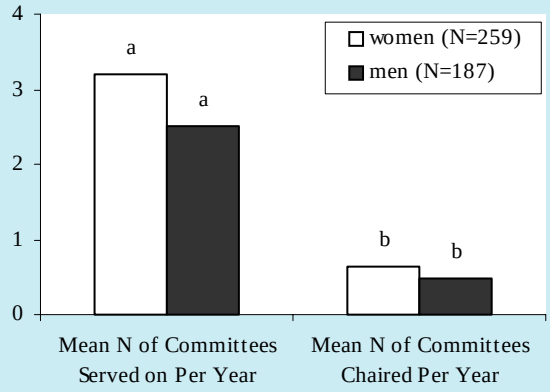
> There has never been a woman chair in the medical department in this University. How do you do that? …[H]ow do you learn to be that if that is an aspiration of yours?

Service. Across tracks, women faculty reported serving on, and chairing, more committees per year than men faculty (Figure 23, Table 53). Women faculty reported serving on an average of slightly more than three committees per year, while men faculty reported serving on an average of two and a half. There were no significant gender differences in the level of importance faculty attributed to having a department or college level leadership position.

***University Climate*:** To assess institutional climate—experiences not limited to one's unit/ department—we included questions on gender and racial stereotyping, discrimination, and sexual harassment. In the areas of discrimination and harassment, the institutional climate at UM is chillier for women faculty than men faculty across tracks.

Stereotyping. We found no gender differences across track on the scale to assess gender stereotyping over the last five years (how frequently faculty or students make insensitive or disparaging comments about women or men), or the scale to assess racial/religious stereotyping over the last five years (how frequently faculty or students make insensitive or disparaging comments about members of a racial/ethnic minorities, or members of a particular religious group, as "typical" of that group; Table 54). Looking at the individual items comprising each scale, we found only one significant gender difference; compared to their male counterparts, women faculty across tracks reported hearing disparaging comments made about women by faculty more frequently.

Figure 23: Committee Service by Gender Across Tracks



[a,b]Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

During an interview a woman clinical scientist described an incident of gender stereotyping through actions, if not words.

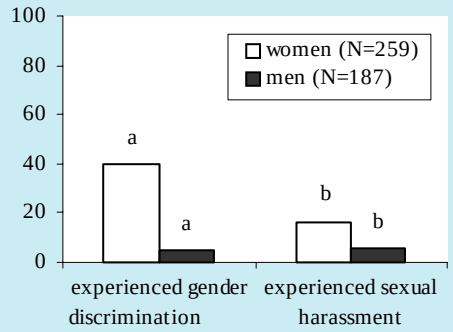
> I've heard stories even recently [about] women [on the] tenure track, good researchers, good people, having people leave things like *Good Housekeeping* magazines in their mailboxes at work, like you should really be at home doing this.

Discrimination. There were no gender differences in the reported rates of job-related discrimination experienced at UM within the last five years due to sexual orientation, physical disability, or religious affiliation. Across tracks, men faculty reported a higher instance of racial/ethnic discrimination, and women faculty reported a higher instance of gender discrimination (Table 55a). Ten percent of men

faculty and 4% of women reported experiencing racial/ethnic discrimination. (It should be noted, however, that among the survey respondents, 19% of the men scientists and engineers across tracks were faculty of color, compared to 13% of women scientists and engineers. This difference is the result of the larger proportion of faculty of color in the sample of men than in the sample of women.)[36]

Five percent of men and 40% of women reported gender discrimination (Figure 24). The percentage of women scientists and engineers across tracks at UM reporting gender discrimination in the past five years (40%) is quite high compared to another study, which found that 19.4% of women scientists in academe had experienced gender discrimination as an obstacle *over the course of their careers* (Sonnert & Holton, 1995, 128).[37] Of the six areas listed in the survey in which discriminatory behavior may affect a career (hiring, promotion, salary, space and other resources, access to administrative staff, graduate student or resident/ fellow assignments), women faculty reported significantly higher instances of gender discrimination in each area except hiring (Table 55b). Over 10% of women faculty reported gender discrimination in access to administrative staff. Between 15-20% of women faculty reported experiencing gender discrimination in promotion and the distribution of space and other resources. A full 38% percent of women faculty reported gender discrimination in the area of salary.

Figure 24: Experiences of Gender Discrimination and Sexual Harassment by Gender



[a,b]Matching symbols identify groups that differ from each other statistically significantly, p≤.05.

During the interviews and focus group, women research and clinical faculty reported instances of overt gender discrimination, such as the following situation described by a clinical woman scientist,

> [I]t's said in my department—one person said it to me directly—'Well, there will never be a women chair in this department. I'll make sure.'

However, women scientists and engineers more commonly described subtle cases of gender discrimination, which are difficult to label. A woman research scientist recalled,

> Now my salary is extremely low and I've been fighting for quite awhile to get my salary increased. I think my salary is the lowest in the entire [unit]. Now is it because I am a woman? Or, you know, is it because I've been there the shortest amount of time? And these are questions that I think would be very difficult to pin anybody down and say well, you know it's because I'm a woman or whatever.

Sexual harassment. Across tracks, 16% of women scientists and engineers, and 5% of their

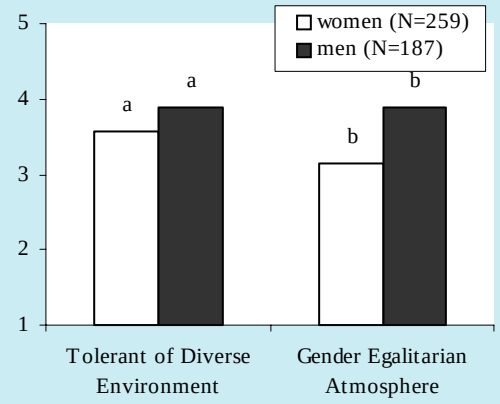
[36] Among the survey respondents, 24% of men and 13% of women scientists and engineers on the instructional track were faculty of color, as were 25% of men and 16% of women scientists and engineers on the research track, and 4% of men and 11% of women scientists on the clinical track.

[37] Among women scientists who had decided to leave science interviewed by Sonnert and Holton the rate of reported gender discrimination was 38.5%

male counterparts reported experiencing unwanted and uninvited sexual attention (sexual teasing, jokes, remarks or questions; unwanted pressure for dates; unwanted letters, phone calls, email; unwanted touching, leaning over, cornering, pinching; unwanted pressure for sexual favors; stalking; rape or assault) at UM during the last five years (Figure 24, see p.62, Table 56). The five year rate of unwanted sexual attention reported by women science and engineering faculty across tracks at UM is somewhat higher than similar faculty surveys, where sexual harassment rates of 11-15% were reported over the course of a career (Dey, Korn & Sax 1996; Sonnert & Holton 1995; see the section on the tenure track analyses for a fuller discussion of possible reasons for this). Significantly more women than men faculty reported experiencing sexual harassment themselves, and knowing of other faculty who experienced such behavior. Twenty-two percent of men faculty and 33% percent of women faculty reported knowing at least one person who has experienced sexual harassment at UM within the last five years.

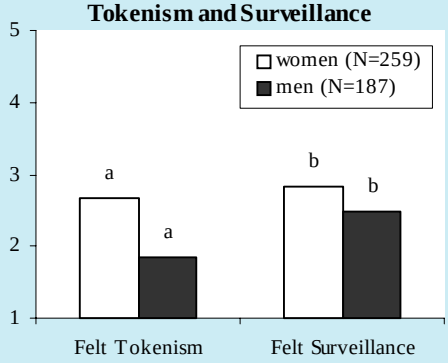
Departmental Climate: Of the nine scales assessing unit/department climate, there were significant gender differences on four. There were no gender differences on the three scales rating the department chair (as fair, as able to create a positive environment, and as committed to ethnic/racial diversity); analyses of the scholarly isolation and positive environment scales likewise resulted in no significant gender differences (Table 57). Compared to their male counterparts, women scientists and engineers across tracks rated their departments significantly lower on tolerant environment and gender egalitarian atmosphere (items such as "the environment promotes adequate collegial opportunities for women," and "women are appropriately represented in senior positions;" Figure 25). Women faculty across tracks rated their departments significantly higher on felt surveillance (e.g., "I constantly feel under scrutiny by my colleagues," and "I have to work harder than my colleagues in order to be perceived as a legitimate scholar"), and tokenism (e.g., "my colleagues expect me to represent the point of view of my race/ethnicity," and "my colleagues expect me to represent the point of view of my gender;" Figure 26).

Figure 25: Diversity and Gender Egalitarianism by Gender



[a,b]Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

Figure 26: Experiences of Tokenism and Surveillance



[a,b]Matching symbols identify groups that differ from each other statistically significantly, $p \leq .05$.

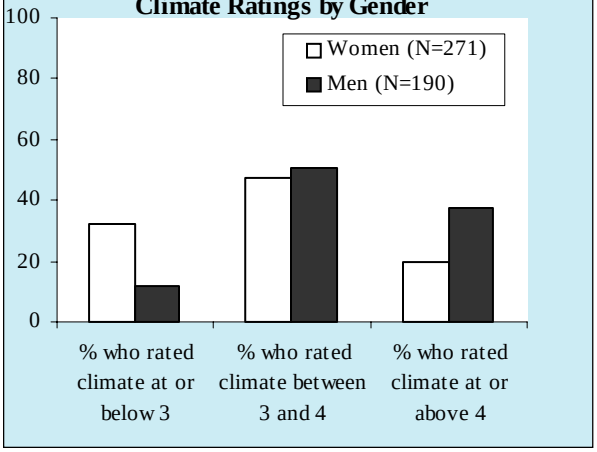
Do the Gender Differences in Climate Matter?

As with the analyses for the tenure track, we consider here whether the differences we have found in the climate as experienced by women scientists really "matter." First we consider whether they are large or small. One way to decide might be to look not just at the middle of the distribution, but at the full range of scores. The two distributions do

overlap substantially, with members of both groups scoring near the top of the scale, though the scores for women include scores closer to the bottom than the scores for men (the lowest male rating is 1.79, while the lowest female rating is 1.24). What this suggests is that there are some women scientists and engineers who experience the climate as positively as the most positive men. But there are few men scientists and engineers who experience the climate as negatively as the most negative women. And there are more women than men who experience it negatively.

Another way of getting at this is to look at the middle of the distributions in absolute terms. The middle (both mean and median) rating of the climate for women scientists and engineers is closest to a 3 on the 5 point scale, while the average rating for both men scientists and engineers and women social scientists is closest to a 4 (Figure 27). There are some women scientists and engineers who rated the climate at or above 4 (about 21%), but almost twice as many men did (37%). And some men scientists and engineers rated the climate at or below 3 (about 12 %), but nearly three times as many women scientists and engineers did (33%). So the distributions of ratings do overlap, but they are also quite different. On the basis of these findings, we believe it is reasonable to conclude that the difference in felt climate between women and men scientists and engineers is substantial.

Figure 27: Distribution of Climate Ratings by Gender



The second approach to evaluating the importance of these ratings is to examine the correlates of climate ratings. We have seen that for women and men scientists and engineers and women social scientists on the tenure track, and for faculty on each of three tracks, the climate indicators are significantly correlated with overall satisfaction with UM position. Is the same true for men and women faculty across the tracks? We calculated correlations to see if the climate indicator variables, the other departmental experiences variables, and personal and position variables were related to overall satisfaction with UM position for men and women faculty. We found that for faculty of both genders the climate indicators and departmental experiences variables were highly correlated with overall job satisfaction. In comparison to the climate and departmental experiences variables, the personal, position and household characteristics indicators were not strongly correlated with overall job satisfaction.

Institutional and Departmental Climate Ratings: With the exception of scholarly isolation, the other departmental climate indicators (positive environment, tolerant environment, gender egalitarian atmosphere, felt surveillance, ratings of the department chair) were highly correlated with overall job satisfaction for scientists and engineers of both genders (Table 58). Of the institutional climate indicators (stereotyping, discrimination and harassment), gender discrimination, gender stereotyping and sexual harassment were significantly negatively correlated with overall job satisfaction for women scientists and engineers across tracks, while only sexual harassment was significantly negatively correlated with satisfaction for the men.

Departmental Experiences Indicators: The career satisfactions, influence over educational decisions, influence over unit resources, and effort/satisfaction with resources scales were all highly correlated with overall job satisfaction for both men and women scientists and engineers across tracks (Table 59). Self-rated productivity was significantly

correlated with overall job satisfaction for the women, but not for the men, while committee service was significant for men but not women. The number of areas of non-mentoring was negatively correlated with job satisfaction for both men and women scientists and engineers; number of male mentors at UM and number of mentors in the same UM department was significantly positively correlated with job satisfaction for the women.

***Personal and Position Indicators and Household Characteristics*:** In contrast to the climate indicators, personal, position, and household indicators largely were not significantly correlated with overall job satisfaction (Table 60). None of the variables was significantly correlated with satisfaction for women scientists and engineers. For the men, being of non-white ethnicity was negatively correlated with overall job satisfaction, and years since Ph.D. and rank were positively correlated.

Do These Bad Experiences Cumulate?

Using two questions that were rated for "the past five years," gender discrimination and harassment, we calculated independent samples t-tests to examine whether reports of discrimination or harassment could "predict" current satisfaction and climate ratings for men and women faculty. Results from this kind of investigation during phase one of the data analysis indicated that for the three tenure track groups (women scientists and engineers, men scientists and engineers, and women social scientists) experiences of harassment and discrimination were related to satisfaction and climate ratings. Those who had experienced gender discrimination or sexual harassment were less satisfied with their UM position, and reported more negative climate ratings, than those tenure track faculty who had not experienced discrimination or harassment (Tables 18 and 19). Tests by track yielded similar results (Tables 40 and 41).

Women and men science and engineering faculty who had experienced sexual harassment rated their overall job satisfaction significantly lower than faculty who had not experienced sexual harassment (Table 61). Likewise, men and women scientists and engineers who had experienced gender discrimination rated their overall job satisfaction lower than faculty who had not experienced gender discrimination; for women faculty this difference was statistically significant (Table 62). Those who had experienced harassment and discrimination reported a chillier climate. Men who experienced sexual harassment reported a higher frequency of gender and racial stereotyping, and gave lower ratings for tolerant environment and gender egalitarian atmosphere (Table 61). Women who were harassed reported a higher frequency of gender and racial stereotyping, gave lower ratings on positive environment, gender egalitarian atmosphere, and higher ratings on felt surveillance and tokenism. Men who experienced gender discrimination reported higher levels of felt surveillance, and tokenism (Table 62). Women who experienced gender discrimination reported a more negative climate on all indicators except racial stereotyping and chair creates a positive environment.

Based on this evidence it seems that bad experiences may, in fact, cumulate. Therefore, it would be in the best interest of faculty and the University to work to prevent the occurrence of negative incidents, and minimize their impact on faculty through implementation of clear policies and procedures to rapidly address the difficulties women scientists and engineers experience.

Analysis of the Qualitative Data From Focus Groups and Interviews

We held a focus group with women primary research scientists and engineers, attended by six faculty, and interviewed three additional women research scientists and engineers. Unfortunately, due to scheduling conflicts, we were unable to arrange a focus group for women clinical track scientists. Instead, we scheduled individual interviews with clinical faculty who were interested. Three interviews were completed with women faculty on the clinical track.

At the focus group and the individual interviews, we asked participants the same series of questions regarding the climate survey that we asked the tenure track faculty. We invited them to identify particular questions from the survey that seemed valuable for understanding the situation of women scientists and engineers at UM, as well as misleading questions, or topics that should have been addressed on the survey, but were not. Participants were also asked to describe recruitment and hiring in their departments (an issue not covered on the survey), possible reasons that faculty choose to leave UM, and the types of interventions or policies that may improve the campus climate. Research and clinical faculty felt that the wording of certain items on the UM Survey of Academic Climate and Activities, particularly in the teaching section, were directed more toward tenure track faculty, but felt the items addressing institutional and departmental climate were beneficial and applicable across the tracks.

In addition to the questions outlined above, we asked research and clinical faculty to identify issues that might be particular to their tracks, including the major benefits and drawbacks of being either research or clinical faculty. Overwhelmingly, women research and clinical faculty believed that by not being on the tenure track, they were gaining flexibility at the cost of prestige and/or security. The women we talked to also agreed that a hierarchy of faculty tracks exists at the University of Michigan, privileging the tenure track over the other two tracks. Even among women who were pleased with their decision to pursue, and persevere, in a faculty position on the research or clinical track at UM, there was widespread concern that women, more than men, were pushed off, or steered away from the tenure track onto the research or clinical tracks.

Benefits of non-tenure track: When asked why they pursued a research or clinical track position at UM, the vast majority of the women we talked with stated that these tracks, more than the tenure track, afforded them flexibility in balancing work and family, or pursing their professional interests. Several women mentioned the desire to stay in the area because of family ties, or having a partner/spouse who was employed in Ann Arbor. Others, like this focus group participant, pursued a research track position because it allowed more flexibility to achieve a balance between work and family.

> I had young children and it gave me flexibility. You know, it wasn't a tenure track position that was going to demand so much of me. It was very, very tough to not be able to say, "My kid is sick today. Either I am going to be working at home or I'm not going to work' or whatever…. That was important to me. So, I was willing to do flex without a full-time position a lot of the time, or accept a lower salary, because I always knew I was trading off on flexibility.

A woman clinical scientist also spoke of flexibility and the need to balance work and family.

> I think most women are looking at their careers in medicine and saying, 'I'm not sure I want the triple threat of trying to get research grants, do my research, do my teaching, do my clinical care and still have a family and a life.' So, I think women are choosing-- many women are choosing--clinical track. I would never have chosen a tenure-track job at a university like this for my career.

The benefits of being affiliated with a major research institution led several of the women to choose the research or clinical track at UM over industry or private practice. A woman research scientist commented,

> I'm in a [unit] that is a very prestigious institute and so being part of that [unit] whether it is a part of the University of Michigan or somewhere else doesn't matter… [T]here are faculty in all kinds of disciplines doing [similar] research so there's a great advantage to being there as one of a team where you have all these faculty who have some other take on the area that you are working in. And so there is great advantage to being there.

A research scientist suggested that a position as research faculty at UM could be a stepping-stone to a tenure-track position elsewhere.

> I think it's the chance to be faculty status to write your first grant. At least in the basic science and research science that I'm in. That was the advantage to it coming right out of your post-doc.... You didn't feel that you had the chance to go straight to an assistant professor job, a tenure track job where you didn't feel like you were truly as marketable as you could be, because assistant professor jobs are very difficult to get.

A couple of women clinical scientists described how the clinical track fit their professional interests better than an tenure track appointment.

> My chair came to me and said, 'I want you to be on the tenure track and to get research money.' I said, 'No, that's not a job I want.' ...I want to do exactly what I am doing and exactly what I've done. And I feel like I've been respected. And maybe I've been lucky that the colleagues that I have interacted with have at least made me feel respect, so I have to believe that at least some people are having a similar experience.

Another clinical scientist reported that while she finds her work rewarding, others do not give her the respect she deserves, subscribing instead to a hierarchy among the faculty tracks that places tenure track faculty at the top.

> I actually am happy that I am not a basic scientist. I never had any intention of being one. I like teaching, and I like medical students and I like residents. So for me the clinical track is perfect. I just wish there wasn't that undercurrent of, 'well if you were good you'd be tenure track,' because it is very pervasive. It's not outwardly stated, but it's always there. I don't know if that's true in other departments but it's definitely true in [my department].

Drawbacks: A lack of respect, and being treated as "second class citizens" or "not real faculty" were frequently mentioned as disadvantages to holding a research or clinical faculty position. A clinical scientist reported,

> I've heard fairly significant people in the institution say, 'Well, the only reason you'd want to be a clinician here is so you can benefit from the prestige of the tenure track people.'

During a focus group, a research scientist commented,

> … [W]e sort of buy into the culture here and, there are times when I feel like well, maybe I'm not le-

> gitimate, because none of them think I am, so maybe I'm not."

This comment caused another research scientist to wonder if women more than men were willing to tolerate a second-class status.

> My husband is in the same exact position that I am… But it's funny—for him it has finally reached the breaking point. He just can't stand it anymore. He says he's leaving because he's tired of feeling like a second-class citizen and I just wonder how many more times--if it's a woman in that position, if she's more accommodating, more willing to deal, than the men.

Research and Clinical Tracks: Alternatives to the Tenure Track for Women?

Several research and clinical faculty expressed concern that women were being pushed away from the tenure track onto the research or clinical tracks. One clinical scientist recounted how she sought a tenure track position, but ended up on the clinical track.

> [E]ven though I asked to be on a tenure track, they said none were available, so I didn't have the option of being a tenure track faculty.

Another clinical scientist was steered toward the clinical track by her advisor.

> When I took this job I actually called my chairman and said they are offering me a job, but it's not a tenure-track job, and what do you think? And he said 'You know tenure is kind of really going out of fashion, and it's probably going to be dead in the next ten or fifteen years, and it's not a reason not to take a job.' But I think in this institution, the tenure-track is considered the real [scientists] and the clinical track is like, well, they couldn't cut it so they are on the clinical track.

Several clinical faculty mentioned that they felt more men were on the tenure track, and more women were on the clinical track. According to one clinical scientist,

> When I look at our department, we only have one… I can only think of, at the moment, I'd have to verify it, one woman on the tenure track. The rest are men. And the clinical track is mostly women. To me it would be interesting to see the statistics in other departments if that's the same thing. Women are being directed away from the real scholarly side in medicine.

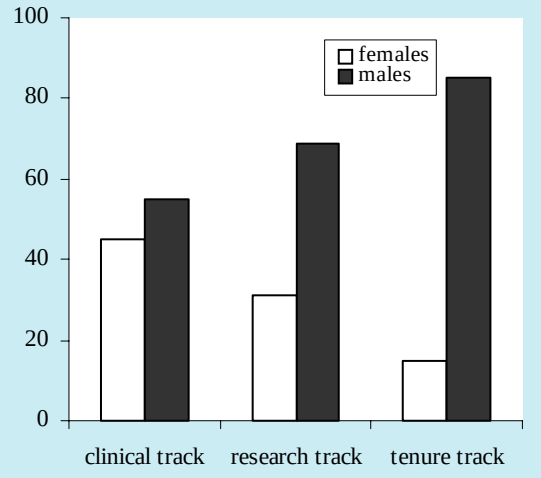
Another clinical scientist stated,

> And I think most women…are now coming…on the clinical track and a clinical track status means that you're a second-class citizen. Then most of our women are not coming in on the most prestigious track.

Based on data we received from the Provost's Office and the Office of Budget and Planning, there are more men than women on all of the tracks, at least in the schools and colleges we surveyed. However, the ratio of women to men scientists is twice as high for the research track (31% women) and three times as high for the clinical track (45% women at or above the rank of assistant clinical

professor) as for the tenure track (15% women at the rank of assistant professor or above in science fields; see Figure 28). This pattern does not hold for the College of Engineering, which does not have a clinical track, and in which the primary research track and tenure tracks are about equally male (89% on the tenure track and 92.1% on the primary research track). Examination of the remaining colleges suggests that this pattern is particularly prominent in Medicine, where the tenure track is 82% male, the research track is 60% and the clinical track is 56.6%. In LSA the tenure track is 88% male scientists, and the research track is 73.8% male scientists (the clinical track is not available).

Figure 28: Percent Females and Males by Track



***Track Difficulties**:* Research and clinical faculty reported frustration with the lack of concrete information regarding their tracks at both the department and University level, particularly with respect to criteria for promotion. To counteract this, faculty recommended more transparency in policies and procedures regarding progression in rank on the research and clinical tracks, including the publishing of University, school/college, and department handbooks for research and clinical faculty. One clinical scientist explained the uncertainty of her position in the following manner,

> I think that the clinical track…is still an evolving thing. You know, it didn't even really exist largely 15 years ago, 20 years ago… [M]ost of the clinical faculty are trying to figure out what we are expected to do for promotion purposes and where we stand in the culture of our departments and in the hierarchy of our departments.

In addition to the lack of information regarding progression in rank on their track, research and clinical faculty pointed to other ways in which their professional development is stifled. Clinical faculty expressed frustration with the constant pressure to bring in more patient revenue at the expense of time spent teaching, while research faculty pointed to the limitations imposed by the titles given to faculty on the research track.

Teaching. On the survey, faculty across tracks listed being valued as a teacher and mentor by students as two of the most satisfying aspects of their professional development (see p. 48). Interview and focus group data support this finding. Clinical and research faculty suggested that being part of the teaching mission of the University was one of the reasons they chose a faculty position at UM over a position in industry or private practice. However, research faculty felt that their teaching was not valued by colleagues, or in the reward structure for the research track (see pp. 48-50). Clinical faculty also spoke of the day-to-day disincentives for teaching. Many commented on the pressure to bring in more patient revenue, often at the expense of teaching. One clinical scientist said,

> Your emphasis is supposed to be taking care of patients and also time teaching and I think now we have these productivity targets: how many patients, how much money you generate.

Other clinical scientists explained how lack of time and the pressure to report more billable hours kept them from one of the most rewarding aspects of their careers.

> The department chairs are trying to meet their bottom line saying, 'No, I want my faculty to get grants and to see patients because teaching doesn't pay.' ...I think clinical faculty love teaching and we want to do it. What we don't want is to have our chair say, 'You can't do it because you have to do clinic.' And that's what's happening to some people.

> There is a disincentive to do that [teach], because it takes a lot of time. And it's fun and there are lot of intrinsic rewards, there really are, but when you are stretched in twenty-seven different ways, the intrinsic rewards just go away.

One clinical scientist concluded that if the pressure to make money at the expense of teaching continues, scientists will start to choose private practice over the clinical track.

> I just wrote a book, with the other residents. You know, having time to do that and think, well, in ten years…maybe I could look back and say maybe I contributed to something here and to the next generation of physicians. But if that kind of stuff gets pushed away, then the reason to be in academics will fade and a lot of faculty are asking that question now. … I know several faculty saying, 'Well, I could do this in private practice with less overhead, less stress. I could control my hours.'

Title. During the focus group meetings and interviews, research scientists and engineers often commented on how limiting the titles for research faculty were. The titles for this track—e.g., "research investigator," "assistant research scientist"—are not titles that mean anything outside of the University of Michigan, they suggested. Without the word "professor" in their title, research scientists recounted how they were often mistaken for research assistants or graduate students instead of faculty. The vague title also put them at a disadvantage when applying for national grants. In the words of one research scientist,

> We have to do more work to compete to make our salary on the basis of grant money, and yet we are saddled with a title that is amorphous.... Why can't we be "research assistant professor," "research associate professor" so at least it would be clear what the levels are. It's a huge problem I think. In fact, if you are going to ask people why they have left Michigan, the research track people that I know have left Michigan have left for the graduate student issue and for the title issue, because it is too hard to distinguish what you are. Outside of Michigan that title means nothing. So, that's a major issue, I think, for all research faculty.

Another research scientist added,

> When we send in an NIH grant, we are competing against people who are assistant professors and associate professors. And when you put assistant research scientist on there, there's no way for someone outside of the University of Michigan to have any idea of

what level of proficiency that means for you.

Conclusions and Suggestions

Results from the track by gender analyses point to the importance of track in the lives of University of Michigan science and engineering faculty across tracks. Tenure track faculty seem to be advantaged in a variety of areas, with both research track and clinical track faculty feeling in many ways like second-class citizens. Research track faculty find the ambiguities around their title, teaching roles and access to resources (particularly on arrival and in renegotiating their contracts) particularly difficult. Clinical track faculty struggle more with their sense of lesser productivity and status. There are signs that both groups are more alienated from the institution and its mission than tenure track faculty. Perhaps most troubling, there is some evidence that both the research and clinical tracks are lower status and, except in Engineering, track alternatives that are more open to women than is the tenure track.

Results of these analyses also suggest that in many ways gender plays a very similar role in the lives of women scientists and engineers, regardless of track. While some gender differences seem to pertain only to tenure track faculty (e.g., the lack of mentoring), most others (e.g., service burdens and more negative climate) are quite similar across all tracks.

Do the findings from the track by gender analyses suggest that the *gender difference* model best describes the differences in career experiences between women and men scientists and engineers? As with the tenure track faculty, in most cases they do not. The results show that in many areas pertaining to career patterns and satisfactions, women and men science and engineering faculty at UM are very similar. They are also similar in terms of the relationship between climate and satisfaction. In one area, household composition, the fact that women scientists and engineers are more likely than men scientists and engineers to be members of two-career households, or solo households, makes professional/personal issues more important for women scientists and engineers.

Results of these analyses also suggest that women scientists and engineers across tracks experience a more negative work environment than do men scientists and engineers. These results tend to support the *deficits in the science environment* model.

As with the tenure track data, data across tracks are compatible with the *accumulation of advantages and disadvantages* model. There is evidence that past gender discrimination and sexual harassment relate to faculty's current satisfaction with position at UM and evaluation of workplace climate. These results suggest that interrupting or preventing early experiences of disadvantage may have a long-term payoff in women scientists' and engineers' subsequent morale.

IMPLICATIONS OF FINDINGS

First, we hope that findings from our analyses will guide efforts to improve the recruitment, and particularly the retention, of tenure track women scientists and engineers at the University of Michigan. We believe these analyses point toward some particular problems that tenure track women scientists and engineers here are having in the areas of the work-family interface, negotiation of contracts, mentoring, service, and climate. Steps that seem most closely related to our findings include:

Work-family interface:

- ensuring that existing policies that are "family-friendly" are widely-known by administrators, faculty and search committees;

- improving the "family-friendliness" of the science and engineering departments and the university more generally, including by:
  - providing more assistance in securing quality child care, including childcare facilities;
  - scheduling all regular meetings during normal working hours.

Negotiation of contracts:

- ensuring that equitable offers, counter-offers and contract agreements are made; this may require systematic monitoring of equity as well as adoption of more transparent, universalistic procedures for negotiating terms of faculty appointments (e.g., sharing with candidates a list of potential areas of negotiation, and discussion of a fair package of elements).

Mentoring:

- increasing commitment to and understanding of mentoring among chairs and senior faculty leaders;

- increasing institutional mentoring activities (informational meetings, distribution and advertising of policies, opportunities for networking, etc.), partly as a method for increasing awareness of the importance of mentoring among the younger faculty;

- creating formal and informal mentoring programs aimed at tenure-track faculty; these may include programs aimed at within and across-field mentoring;

- recognizing that mentoring has both on-campus elements (e.g., departmental culture, college rules, etc.) and off-campus professional elements (e.g., contacts with and learning from senior colleagues in one's own field wherever they are), and providing travel and other kinds of discretionary funds so that women can invite senior colleagues to campus, or travel to meet with them on other campuses, spending time in their labs, and meeting them at conferences.

Service:

- increasing awareness of the crucial difference between "participation" in committee work, and "power" in setting department policy; for women scientists and engineers, the former is available too much, while the latter is offered too little;

- limiting routine service demands on women science and engineering faculty (avoiding assigning women to committees in which they have little interest or expertise);

- providing women scientists and engineers with more opportunities to lead;

- increasing "critical mass" of women science and engineering faculty by recruiting and retaining more women scientists and engineers; note that demand from students requires roughly equal representation of women among faculty as in student body.

Climate:

- ensuring that departments and colleges have clear and transparent policies and procedures that minimize the likelihood of negative experiences;

- improving training, selection and accountability of chairs (and senior faculty leaders) in areas of mentoring, problem-solving, fair and judicious procedures and practices, and conflict-resolution;

- having departments engage in systematic evaluation of their own climates, and take active steps to address their negative features;

- creating new mechanisms for addressing conflicts or difficulties women scientists and engineers face at the departmental level. Current procedures do not work adequately to address incidents of harassment, discrimination and unfair treatment; these mechanisms need to provide an alternative that actually resolves conflicts rather than exacerbating them (as existing formal mechanisms are perceived to do);

- altering degree of male dominance in departments, a demographic pattern that increases the likelihood of discrimination, harassment and negative climate, by recruiting and retaining more women science and engineering faculty.

It is clear that women faculty on the research and clinical tracks have some of these same problems, as well as some others. We note that the Office of the Vice President for Research has already been engaged in a range of efforts to address some of the issues noted in this report for research track faculty. For example, a "senior" track has been created, in the hope that this might improve the prestige of at least that track. Within our sample, only 12 faculty had a "senior researcher" title as their primary appointment, so we were unable to evaluate the efficacy of this effort. We note some other areas that were suggested by our respondents that seem promising:

Research track:

- consideration of a change in the titles from "research scientist" to "research professor";

- consideration of equitable arrangements for research faculty to teach and participate in governance in their various appointment homes;

- consideration of improved recognition for faculty on this track;

- increased support to research faculty for their research activities.

Clinical track:

- consideration of ways to support scholarly productivity for faculty on this track, given counter-pressures to bill hours;

- consideration of ways to support and recognize teaching by faculty on this track;

- consideration of improved recognition for faculty generally on this track.

Finally, the pattern (except for the College of Engineering) of finding a higher proportion of women on the research and clinical tracks than on the tenure track is disturbing. We recommend that the possibility be examined that these tracks are actually being used as alternatives to the tenure track, particularly for women. Meanwhile, given the higher rate of women on these tracks than on the tenure track (except in Engineering), we suggest that women scientists and engineers on these tracks be offered some opportunity to move onto the tenure track, through a formal review process.

A study like this one can only be a beginning. This study examined many important aspects of the work lives of women scientists and engineers at one university. We need comparable data from other universities, and many other features of scientists' and engineers' work lives also need to be studied here and elsewhere: tenure and promotion processes and rates; attrition within and across fields; salary equity, equity in the allocation of space and other research resources; and so on. We believe that the best institutional strategy for improving the academic work environment for women scientists and engineers—as for all faculty—is to create and maintain systematic procedures for assessing that environment and acting on those assessments.

NSF's ADVANCE program provides us with crucial resources to implement some of the suggestions outlined here, but it will take a great deal of collaboration and commitment from many faculty and administrative leaders to put those and other resources to effective use. If we succeed in doing so, this study will have served its purpose—to provide a baseline against which to measure the institution's future success at improving gender equity among science and engineering faculty at the University of Michigan.

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Tables

Note: Table 1 appears in the text.

Table 2: Professional History

	women scientists/ engineers (N=135)		men scientists/ engineers (N=100)		women social scientists (N=73)	
	Mean	sd	mean	sd	mean	sd
Age	46.52[a]	8.44	49.19[a]	11.11	46.40	9.32
Time since highest degree*	3.54[a]	1.59	4.23[a]	2.24	3.21	1.90
Time since first UM appointment*	2.57[a]	1.50	3.19[a]	2.10	2.21	1.64
	percentage		percentage		percentage	
Hired in last ten years	55[a]		43		69[a]	
Joint appointment	21		17		26	
Appointment in small college	31[a]		16[a]		28	
Full professor rank	30[a]		55[a]		38	
Associate professor rank	36[a]		17[a]		33	
Assistant professor rank	34		28		29	

*1=1995-2001; 2=1990-1994, 3=1985-1989; 4=1980-1984; 5=1975-1979; 6=1970-1974; 7=1965-1969; 8=1960-1964.

[a] *Matching symbols identify groups that differ significantly from each other, $p \leq .05$*

Table 3: Household and Partner Employment Characteristics (Percentages)

	women scientists/ engineers	men scientists/ engineers	women social scientists
Household Composition:	(N=135)	(N=100)	(N=73)
Single (no partner nor children)	12[a]	3[a]	9
Children, no partner	6	1	4
Partner and children	67[a]	84[a]	64
Partner, no children	15	11	23
Partner Employment:	(N=110)	(N=94)	(N=64)
Partner works fulltime	86[a]	41[a]	79
If partner employed at UM (N=52), employed as faculty	79[a]	44[a]	68
Considered leaving UM to improve partner's career	51[a]	34[a]	59

[a] *Matching symbols identify groups that differ significantly from each other, $p \leq .05$*

Table 4a: Career Satisfaction

	Tenure track faculty (N=312)	
	mean	sd
Highest Rated Items*		
Sense of being valued as a mentor or advisor by students	4.50	.86
Sense of being valued as a teacher by students	4.19	1.05
Sense of contributing to theoretical developments in my discipline	3.96	1.07
Opportunity to collaborate with other faculty	3.82	1.29
Middle Rated Items*		
Ability to attract students to work with	3.71	1.27
Level of funding for research or creative efforts	3.62	1.28
Sense of being valued for my teaching by members of unit/dept	3.51	1.29
Level of intellectual stimulation in day-to-day contacts with faculty colleagues	3.49	1.38
Lowest Rated Items*		
Amount of social interaction with members of unit/department	3.47	1.37
Sense of being valued for research, scholarship, or creativity by members of unit/department	3.40	1.38
Current salary in comparison with the salaries of UM colleagues	3.16	1.30
Balance between professional and personal life	2.99	1.33

*Scores on all items ranged from 1 to 5 (1=very dissatisfied; 5=very satisfied).

Table 4b: Career Satisfactions Scale and Item Ratings by Tenure Track Group

	women scientists/ engineers (N=135)		men scientists/ engineers (N=100)		women social scientists (N=73)	
	mean	sd	mean	sd	mean	sd
Career satisfactions (total scale)	3.53	.75	3.74	.82	3.72	.65
Individual items:						
Sense of being valued as a mentor or advisor by students	4.52	.86	4.35	0.99	4.64	0.65
Sense of being valued as a teacher by students	4.17	1.06	4.11	1.07	4.32	1.00
Sense of contributing to theoretical developments in my discipline	3.87	1.09	3.96	1.11	4.12	0.98
Opportunity to collaborate with other faculty	3.77	1.31	3.95	1.26	3.77	1.29
Ability to attract students to work with	3.78	1.24	3.46	1.36	3.92	1.16
Level of funding for research or creative efforts	3.49	1.31	3.84	1.15	3.60	1.36
Sense of being valued for my teaching by members of unit/dept	3.38	1.34	3.64	1.28	3.60	1.18
Level of intellectual stimulation in day-to-day contacts with faculty colleagues	3.44	1.44	3.55	1.22	3.51	1.35
Amount of social interaction with members of unit/department	3.33	1.40	3.60	1.38	3.57	1.29
Sense of being valued for research, scholarship, or creativity by members of unit/department	3.24	1.42	3.56	1.33	3.51	1.37
Current salary in comparison with the salaries of UM colleagues	3.02	1.24	3.29	1.30	3.25	1.40
Balance between professional and personal life	2.80 [a]	1.34	3.29 [a]	1.27	2.95	1.35

*Scores on all items ranged from 1 to 5 (1=very dissatisfied; 5=very satisfied).
[a] *Matching symbols identify groups that differ significantly from each other, $p \leq .05$.*

Table 5: Productivity

by Gender/Field Groups:	women scientists/ engineers (N=135)		male scientists/ engineers (N=100)		women social scientists (N=73)	
	mean	sd	mean	sd	mean	sd
Perception of Own Productivity	7.12	1.97	7.32	1.56	7.35	1.64
Perception of Department's View of Own Productivity	6.03	2.31	6.54	1.87	6.05	2.04
by Rank:	assistant professor (N=95)		associate professor (N=123)		full professor (N=90)	
	mean	sd	mean	sd	mean	sd
Perception of Own Productivity	6.54[ac]	2.11	7.15[ab]	1.81	7.71[bc]	1.33
Perception of Department's View of Own Productivity	5.77[a]	2.18	5.90	2.03	6.73[a]	2.06

*Scores on all items ranged from 1 to10 (1=much less productive; 10=much more productive).

[a,b,c] *Matching symbols identify groups that differ significantly from each other, p≤ .05.*

Table 6: Recognition

by Gender/Field Groups:	women scientists/ engineers (N=135)	male scientists/ engineers (N=100)	women social scientists (N=73)
	percentage	percentage	percentage
Nominated for teaching award*	26	38	36
Nominated for research award	28	32	39
Nominated for service award	13	14	19
Nominated for clinical award	2	3	0
Nominated for at least one award*	47	60	58
Dept failed to nominate for appropriate award	16	18	9
by Rank:	assistant professor (N=95)	associate professor (N=123)	full professor (N=90)
Nominated for teaching award	18[ab]	42[a]	33[b]
Nominated for research award	23[a]	26[b]	43[ab]
Nominated for service award	2[ab]	18[a]	23[b]
Nominated for clinical award	0[a]	0	5[a]
Nominated for at least one award	33[ab]	60[a]	63[b]
Dept failed to nominate for appropriate award	8[a]	14	21[a]

* Difference not significant when controlling for rank

[a,b] *Matching symbols denote statistically significant differences, p≤ .05*

Table 7: Influence over Educational Matters and Resources

	women scientists/ engineers (N=135)		men scientists/ enigneers (N=100)		women social scientists (N=73)	
	mean	sd	mean	sd	mean	sd
Unit educational decisions (total scale)	2.68	.93	2.71	.91	2.83	.84
Individual items:						
Unit curriculum decisions	2.82	1.16	2.85	1.26	2.84	1.07
Selecting new graduate students or residents/fellows	3.30	1.36	3.45	1.29	3.41	1.17
Selecting new faculty members to be hired	2.88	1.15	2.99	1.20	3.08	0.93
Determining who gets tenure	2.13	1.21	2.26	1.30	2.43	1.42
Selecting the next unit head	2.09[a]	1.15	2.01	1.08	2.41[a]	1.19
Affecting the overall unit climate/culture	2.68	1.00	2.92	1.16	2.73	1.07
Unit resources (total scale)	2.33	.91	2.34	.92	2.51	.86
Individual items:						
Size of salary increases I receive	1.84	0.96	1.79	0.94	1.97	0.98
Obtaining money for travel to professional meetings	2.30[a]	1.27	2.55	1.35	2.87[a]	1.17
Securing the facilities or equipment I need for my research	2.90	1.12	2.97	1.11	2.98	0.95

Scores for all items range from 1 to 5 (1=no influence; 5=tremendous influence).

Note: Statistically significant effects on *rank* (assistant, associate, full) were found for salary, securing equipment, selecting new faculty members, and tenure decisions. Statistically significant effects for *Hired in last 10 years* (yes/no) were found for selecting new faculty, overall influence, and influence over curriculum decisions.

[a]*Matching symbols denote statistically significant difference, $p \leq .05$.*

Table 8: Efforts to Secure and Satisfaction with Resources

	women scientists/ engineers (N=135)		men scientists/ engineers (N=100)		women social scientists (N=73)	
	mean	sd	mean	sd	mean	sd
Efforts to secure the following resources*:						
office space	2.36[a]	1.43	2.37	1.47	1.62[a]	0.99
research space	3.37	1.33	3.46	1.45	3.00	1.22
computer equipment	2.80[a]	1.25	2.42[a]	1.08	2.46	0.85
lab equipment	3.23	1.29	3.43	1.22	2.77	0.95
service from vendors (repairs, supplies, upgrades)	2.74	1.01	2.97	1.05	2.65	0.97
Satisfaction with the following resources:**						
office space	3.73[a]	1.37	3.73	1.48	4.14[a]	1.20
research space	3.32	1.43	3.09	1.53	3.32	1.27
computer equipment	3.53[a]	1.29	3.74	1.22	3.98[a]	1.06
lab equipment	3.51	1.33	3.77	1.23	3.65	1.06
service from vendors (repairs, supplies, upgrades)	3.40	1.14	3.26	1.04	3.61	1.02

* Scores on all items range from 1 to5 (1=no effort; 5=tremendous effort).
** Scores on all items range from 1 to 5 (1=very dissatisfied; 5=very satisfied).

[a]*Matching symbols denote statistically significant differences, p≤ .05.*

Table 9a: Frequency of Contract Negotiation and Renegotiation Items

	women scientists/ engineers (N=65)		men scientists/ engineers (N=34)		women social scientists (N=46)	
	mean	sd	mean	sd	mean	sd
Initial Contract Negotiation (for those hired in last 10 yrs)						
Number of items offered by UM	3.34	2.42	3.00	2.55	3.33	1.93
Number of items bargained for	2.80	2.65	2.74	2.88	2.46	1.99
Number of items promised in offer letter	2.66	2.65	3.03	2.98	2.57	2.24
Total number of items received	4.51	2.48	4.29	2.60	4.39	2.15
Contract Renegotiation	(N=109)		(N=72)		(N=58)	
Number of items offered by UM	1.29[ab]	1.57	1.74[a]	2.11	2.16[b]	2.09
Number of items bargained for	1.74	1.88	2.00	2.02	2.05	1.83
Number of items received by terms of award	1.02	1.62	1.15	1.66	.86	1.30
Total number of items received	4.06[ab]	3.52	4.89[a]	4.01	5.07[b]	3.73

[a,b] *Matching symbols denote statistically significant differences, p≤ .05.*

Table 9b: Contract Negotiation and Renegotiation Items

	Initial Negotiation (for those hired within last 10 yrs):			Later Renegotiations:		
	women scientists/ engineers (N=74)	men scientists/ enigneers (N=43)	women social scientists (N=50)	women scientists/ engineers (N=106)	men scientists/ engineers (N=74)	women social scientists (N=60)
Course release time						
Offered by UM	27.7 [a]	20.9	44.0 [a]	8.5[a,b]	18.9 [a]	31.7 [b]
Asked/bargained for	17.8	18.6	24.0	23.6	17.6	36.7
Lab space						
Offered by UM	45.2 [a,b]	25.6 [b]	14.0 [a]	13.2	20.3	5.0
Asked/bargained for	41.1 [a]	32.6	24.0 [a]	28.3 [a]	27.0	15.0 [a]
Lab equipment						
Offered by UM	24.7	25.6	20.0	6.6 [a]	16.2 [a]	6.7
Asked/bargained for	37.0	37.2	28.0	19.8	28.4	11.7
Renovation of lab space						
Offered by UM	16.4 [a]	14.0	2.0 [a]	6.6 [a]	13.5	0.0 [a]
Asked/bargained for	13.7	16.3	6.0	16.0 [a]	20.3	3.3 [a]
Research assistant						
Offered by UM	8.2	7.0	6.0	4.7	1.4	6.7
Asked/bargained for	24.7	14.0	12.0	17.0	17.6	21.7
Clerical/administrative support						
Offered by UM	27.4	16.3	14.0	14.2	20.3	13.3
Asked/bargained for	8.2	7.0	2.0	13.2	17.6	11.7
Discretionary funds						
Offered by UM	41.1	46.5	52.0	24.5	27.0	33.3
Asked/bargained for	41.1	44.2	36.0	23.6	24.3	33.3
Travel funding						
Offered by UM	30.1	20.5	26.0	17.9 [a,b]	31.1 [a]	35.0 [b]
Asked/bargained for	17.8	18.2	26.0	17.9	20.3	23.3
Summer salary						
Offered by UM	27.4 [a]	25.6	54.0 [a]	9.4 [a]	9.5	25.0 [a]
Asked/bargained for	23.3	9.3	22.0	8.5 [a]	9.5	20.0 [a]
Special bonus						
Offered by UM	1.4	2.3	2.0	18.9	9.5	18.3
Asked/bargained for	2.7	4.7	0.0	9.4	2.7	3.3
Special timing of tenure clock						
Offered by UM	6.8	4.7	10.0	10.4	4.1	8.3
Asked/bargained for	8.2	11.6	4.0	14.2	8.1	10.0
Moving expenses						
Offered by UM	58.9	60.5	70.0	17.0	18.9	26.7
Asked/bargained for	26.0	25.6	28.0	5.7	10.8	10.0
Housing subsidy						
Offered by UM	2.7	0.0	0.0	0.0	1.4	0.0
Asked/bargained for	1.4	0.0	0.0	0.0	0.0	0.0
Child care						
Offered by UM	0.0	0.0	0.0	0.0	0.0	0.0
Asked/bargained for	1.4	0.0	2.0	0.0	0.0	1.7
Partner/Spouse position						
Offered by UM	4.1	2.3	12.0	1.9 [a]	0.0	8.3 [a]
Asked/bargained for	12.3 [a]	9.3	28.0 [a]	5.7	2.7	11.7

[a,b] *Matching symbols denote statistically significant differences, $p \leq .05$.*

Table 10: Teaching

	women scientists/ engineers (N=135)		men scientists/ engineers (N=100)		women social scientists (N=73)	
	mean	sd	mean	sd	mean	sd
Typical yearly teaching load in department						
Number of undergraduate courses	1.18[a]	1.18	1.18	1.12	1.94[a]	.86
Number of graduate courses	1.44[a]	1.15	1.40	1.00	1.74[a]	.74
Number new courses developed in past 5 years	1.77[a]	1.74	1.68	2.44	3.69[a]	2.24
Number of courses released from teaching in past	1.68 [a]	2.87	1.58	2.62	4.11[a]	4.30
Teaching load winter and fall semesters 2001						
Number of undergraduate courses	1.05	2.05	.91	1.42	1.49	1.96
Number of graduate courses	.96	1.40	1.06	1.33	1.12	1.27
Number of non-lab courses	1.42[a]	1.61	1.68	1.64	1.99[a]	1.59
Number of lab courses	.58	1.37	.28	.72	.62	1.71
Number of undergraduate students	42	72	66	108	65	111
Number of graduate students	44	83	44	79	23	25
Official advising						
Number of undergraduates	2.10	4.48	1.39	4.18	1.39	3.16
Number of graduate students (masters, PhD, medical)	3.28[a]	3.32	3.39	3.83	6.97[a]	5.60
Number of postdocs or residents/fellows	1.50[a]	2.16	1.45	2.77	.19[a]	.54
Number of junior faculty	.38[a]	.81	.13[a]	.42	.67	1.56

[a] *Matching symbols denote statistically significant difference, p≤ .05.*

Table 11: Service

	women scientists/ engineers (N=135)		men scientists/ engineers (N=100)		women social scientists (N=73)	
	mean	sd	mean	sd	mean	sd
How many committees do you serve on in a typical year?	3.8[a]	2.4	3.2 [a]	2.5	3.3	1.2
How many committees do you chair in a typical year?	.8	.9	.8	.9	.7	.7
How important to you is having a department or college leadership position?*	3.2 [a]	1.3	2.9 [a]	1.4	2.8	1.3

*Rated on a scale from 1 to 5 (1=not important; 5=very important).

[a]*Matching symbols denote statistically significant differences, p≤ .05.*

Table 12a: Mentoring

	women scientists/ engineers (N=135)		men scientists/ engineers (N=100)		women social scientists (N=73)	
	mean	sd	mean	sd	mean	sd
Number of areas of no mentoring from anyone	3.21[ab]	2.58	.95[a]	1.68	1.44[b]	1.58
Number of mentors in same UM unit/department	3.03	3.70	5.58	4.02	5.28	4.04
Number of male mentors at UM	1.95[a]	2.50	4.05[a]	2.93	2.17	2.20

[a,b] *Matching symbols denote statistically significant difference, p≤ .05.*

Table 12b: Percent With No Mentoring in Each Area, for Assistant Professors Only

Percent who received no mentoring from anyone in- or outside UM in each of the following areas:	women scientists/ engineers	men scientists/ engineers	women social scientists
Assistant Professors only	(N=46)	(N=28)	(N=21)
role model	37[a]	14[a]	38
networking	54[a]	21[a]	52
advancement	37	21	24
publishing	46[a]	21[a]	33
department politics	54	32	38
resources	52	32[a]	48
advocacy	50	29	43
balancing work/family	70	64	71

[a]*Matching symbols denote statistically significant differences, p≤ .05.*

Table 13a: Stereotyping, Discrimination and Sexual Harassment Indicators

	women scientists/ engineers (N=135)		men scientist/ engineers (N=100)		women social scientists (N=73)	
Stereotyping*	mean	sd	mean	sd	mean	sd
Gender stereotyping	1.92[a,b]	.75	1.52[a]	.62	1.65[b]	.67
Ethnic/religious stereotyping	1.50	.65	1.41	.70	1.35	.52
Discrimination at UM in past 5 years	percentage		percentage		percentage	
Gender	41.5 [a]		4.0 [a]		35.6	
Race/ethnicity**	3.0 [a]		9.0 [a]		5.5	
Sexual orientation	2.2		0.0		1.4	
Physical disability	0.0		0.0		0.0	
Religious affiliation	0.0		0.0		1.4	
Sexual harassment at UM in past 5 years	percentage		percentage		percentage	
Individuals reporting sexual harassment	19.7 [a]		5.1 [a]		11.1	
Individuals reporting others reported sexual harassment	38.1 [a]		20.9 [a]		28.8	

*Scores range from 1(low) to 5 (high) on all variables.
**Note that the percentage of faculty of color is different by group (women scientists 13%; men scientists 24%; women social scientists 16%).

[a,b]*Matching symbols identify groups that differ significantly from each other, p≤ .05.*

Table 13b: Gender Discrimination (Percentages)

	women scientist/ engineers (N=135)	men scientists/ engineers (N=100)	women social scientists (N=73)
Experienced gender discrimination at UM within past 5 years in:			
Hiring	7.0 [a]	1.2	0.0 [a]
Promotion	15.7[a]	0.0 [a]	6.7
Salary	36.0 [a]	1.2 [a]	36.7
Space/equipment, other resources	19.1 [a]	1.2 [a]	10.0
Access to administrative staff	11.3 [a]	0.0 [a]	10.0
Graduate student or resident/fellow assignments	6.1	1.2	3.3

[a]*Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 14: Departmental Climate Scales*

	women scientists/ engineers (N=135)		men scientists/ engineers (N=100)		women social scientists (N=73)	
	mean	sd	mean	sd	mean	sd
Positive climate	3.14[a]	0.96	3.52[a]	0.87	3.45	0.95
Tolerant climate	3.54[a,b]	0.84	3.84[a]	0.74	3.86[b]	0.90
Gender egalitarian atmosphere	3.13[a,b]	0.90	3.84[a]	0.77	3.62[b]	0.87
Scholarly isolation	2.75	0.52	2.66	0.51	2.76	0.60
Felt surveillance	2.92[a]	1.05	2.46[a]	0.92	2.63	0.91
Tokenism	2.79[a,b]	1.19	1.89[a]	1.23	2.34[b]	1.19
Department chair as fair	3.29[a,b]	1.13	3.68[a]	0.97	3.74[b]	1.06
Department chair creates positive environment	3.15[a,b]	1.14	3.55[a]	1.03	3.76[b]	1.16
Dept chair committed to ethnic/racial diversity	3.54 [a]	1.21	3.81	1.03	4.39 [a]	1.01

*Scores range from 1(low) to 5 (high) on all items that make up the scales.
[a,b]*Matching symbols identify groups that differ significantly from each other, p≤ .05.*

Table 15: Institutional and Departmental Climate Ratings— Correlations with Overall Satisfaction with Position

	Overall Satisfaction with UM Position	
	tenure track (N=308)	women scientists/engineers (N=135)
Institutional Factors:		
Gender stereotyping	-.22***	-.29***
Ethnic/religious stereotyping	-.15*	-.17
Gender discrimination	-.28***	-.17*
Unwanted sexual attention	-.21***	-.21*
Departmental Factors:		
Positive climate	.59***	.57***
Tolerant climate	.36***	.44***
Gender egalitarian atmosphere	.38***	.39***
Scholarly isolation	-.14*	-.17*
Felt surveillance	-.46**	-.50***
Race/gender tokenism	-.38***	-.29***
Rating of department chair as fair	.52***	.51***
Rating of department chair as able to create positive environment	.53***	.52***

*p≤.05, **p≤.01, ***p≤.001

Note: Correlation coefficients indicate the magnitude and direction of the relationship. Thus, the correlation -.22 between gender stereotyping and overall satisfaction indicates that gender stereotyping is related to low satisfaction at a modest level. In contrast, the correlation .59 between positive climate and satisfaction indicates that positive climate is related to high satisfaction at a substantial level.

Table 16: Departmental Experiences Indicators— Correlations with Overall Satisfaction with Position

	Overall Satisfaction with UM Position	
	tenure track (N=308)	women scientists/engineers (N=135)
Significant Factors for Women Scientists/Engineers:		
Career satisfactions	.70 ***	.73 ***
Influence on decisions	.34 ***	.43 ***
Effort to obtain resources	-.29 ***	-.41 ***
Satisfaction with resources	.33 ***	.43 ***
N areas of non-mentoring	-.24 ***	-.34 ***
N mentors in same department	.11	.28 **
N male mentors at UM	.08	.22 **
Productivity—self view	.13 *	.16
Productivity—department view	.46 ***	.45 ***
Non-significant Factors for Women Scientists/Engineers:		
Committee service	.01	-.04
Committee chair	.05	-.03
Failure to nominate for award	.02	.10

*p≤.05, **p≤.01, ***p≤.001

Table 17: Personal and Position Indicators and Household Characteristics— Correlations with Overall Satisfaction with Position

	Overall Satisfaction with UM Position	
	tenure track (N=308)	women scientists/engineers (N=135)
Personal & Position Indicators:		
Age	.07	-.01
Ethnicity	-.03	-.09
Years at UM	.03	.06
Years since Ph.D.	.14 *	.08
Joint appointment	.05	-.05
Rank	.01	.07
Small college	-.05	-.07
Household Characteristics:		
Single, no children	-.12 *	-.24 **
Partner and children	.04	.03
Partner employed fulltime	-.15 *	.05
Partner employed as faculty	.08	-.07

*p≤.05, **p≤.01, ***p≤.001

Table 18: Harassment–Relationship with Satisfaction and Climate Ratings

	Tenure Track Faculty			Women Scientists/Engineers		
	experienced harassment (N=39)	experienced no harassment (N=264)		experienced harassment (N=26)	experienced no harassment (N=106)	
	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.
Satisfaction with position	2.92 (1.30)	3.62 (1.07)	***	2.83 (1.27)	3.45 (1.13)	*
Climate variables:						
Gender stereotyping	2.43 (.83)	1.63 (.66)	***	2.57 (.82)	1.74 (.67)	***
Positive climate	2.93 (1.08)	3.38 (.91)	**	2.81 (1.03)	3.22 (.93)	*
Tolerant climate	3.28 (1.04)	3.79 (.78)	***	3.21 (.81)	3.64 (.83)	*
Gender egalitarian atmosphere	2.85 (.95)	3.59 (.88)	***	2.60 (.70)	3.28 (.91)	**
Felt surveillance	3.09 (.95)	2.64 (1.02)	**	3.25 (.92)	2.85 (1.08)	ns
Tokenism	2.99 (1.29)	2.30 (1.26)	**	3.19 (1.08)	2.66 (1.29)	ns
Department chair as fair	3.09 (1.31)	3.57 (1.03)	**	2.90 (1.24)	3.35 (1.10)	ns
Department chair creates positive environment	2.95 (1.27)	3.48 (1.09)	**	2.69 (1.19)	3.26 (1.11)	*

*p≤.05, **p≤.01, ***p≤.001

Table 19: Discrimination –Relationship with Satisfaction and Climate Ratings

	Tenure Track Faculty			Women Scientists/Engineers		
	experienced discimination (N=86)	experienced no discrimination (N=222)		experienced discrimination (N=56)	experienced no discrimination (N=79)	
	mean (sd)	mean (sd)	sig	mean (sd)	mean (sd)	sig.
Satisfaction with position	3.04 (1.20)	3.73 (1.03)	***	3.11 (1.16)	3.51 (1.15)	*
Climate variables:						
Gender stereotyping	2.02 (.77)	1.62 (.68)	***	2.12 (.76)	1.76 (.75)	**
Positive climate	3.00 (.98)	3.45 (.89)	***	3.00 (1.00)	3.26 (.91)	ns
Tolerant climate	3.38 (.84)	3.85 (.81)	***	3.28 (.77)	3.74 (.85)	**
Gender egalitarian atmosphere	2.81 (.88)	3.75 (.79)	***	2.64 (.81)	3.52 (.81)	***
Felt surveillance	3.21 (1.01)	2.50 (.94)	***	3.25 (1.00)	2.69 (1.02)	**
Tokenism	3.01 (1.22)	2.13 (1.22)	***	3.03 (1.21)	2.56 (1.28)	*
Department chair as fair	3.23 (1.14)	3.60 (1.03)	**	3.16 (1.11)	3.30 (1.15)	ns
Department chair creates positive environment	3.16 (1.17)	3.50 (1.10)	*	3.07 (1.09)	3.19 (1.17)	ns

*p≤.05, **p≤.01, ***p≤.001

Table 20: Response Rates by Track and Gender (Percentages)

	women scientists/ engineers	men scientists/ engineers	women social scientists	total
Tenure	52	30	47	41
Research	48	22	--	32
Clinical	48	23	--	34
Total	50	26	47	

Table 21: Professional History by Track

	Tenure (N=235)		Research (N=95)		Clinical (N=116)	
	mean	sd	mean	sd	mean	sd
Age	47.65[ab]	9.73	45.49[a]	9.28	45.10[b]	7.88
Time since highest degree	3.83[a]	1.92	2.95[ab]	1.86	3.59[b]	1.71
Time since first UM appointment	2.83[ab]	1.80	2.26[a]	1.72	2.22[b]	1.38
	percentages		percentages		percentages	
Faculty of color	18.5[a]		20.4[b]		8.0[ab]	
Hired in last ten years	49.8[ab]		71.0[a]		64.1[b]	
Joint appointment	19.2		15.1		14.7	
Small college	24.4		28.4[a]		15.9[a]	
Full professor/ research scientist (includes sr. res. scientist)	40.4[ab]		16.8[ac]		7.7[bc]	
Assoc. professor/ assoc. res scientist (includes sr. assoc. res. scientist.)	28.1[a]		8.4[ab]		37.6[b]	
Asst. prof./ asst. research scientist (includes res. invest.)	31.5[ab]		74.7[ac]		54.7[bc]	

*1=1995-2001; 2=1990-1994, 3=1985-1989; 4=1980-1984; 5=1975-1979; 6=1970-1974; 7=1965-1969; 8=1960-1964.

[a,b,c]*Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 22: Household & Partner Employment Characteristics by Track (Percentages)

	Tenure	Research	Clinical
Household Composition:	(N=235)	(N=95)	(N=116)
Single (no partner nor children)	08	04	05
Children, no partner	04	05	07
Partner and children	74	76	75
Partner, no children	14	16	13
Partner Employment:	(N=204)	(N=84)	(N=101)
Partner works fulltime	65	73	63
Partner employed at UM	41	38	33
If partner employed at UM, employed as faculty	66	50	67
Considered leaving UM to improve partner's career	43	47	39

Table 23: Indicators of Productivity by Track (Percentages)

	Tenure (N=235)	Research (N=95)	Clinical (N=116)
Number of external grant proposals (PI or co-PI)	67[ab]	82[ac]	51[bc]
Total dollar amount of external grants (PI or co-PI)	71[ab]	82[ac]	52[bc]
Number of external fellowships	3	3	4
Number of articles published in refereed academic or professional journals	98[a]	98[b]	90[ab]
Number of monographs written	6	5	12
Number of books edited	5	4[a]	13[a]
Number of book chapters	12[a]	13[b]	27[ab]
Number of dissertations chaired	29[ab]	18[ac]	2[bc]
Number of presentations at national/international conferences	70	61	64
Number of patents	4	9	7

[a,b,c]*Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 24: Productivity by Track

by Track	Tenure (N=235)		Research (N=95)		Clinical (N=116)	
	mean	sd	mean	sd	mean	sd
Perception of own productivity	7.20[a]	1.81	7.04[b]	1.77	5.47[ab]	2.26
Perception of department's view of own productivity	6.24	2.15	6.27[a]	2.09	5.48[a]	2.35
by Rank	Assistant (N=235)		Associate (N=142)		Full (N=148)	
	mean	sd	mean	sd	mean	sd
Perception of own productivity	6.13[ab]	2.23	6.84[a c]	1.96	7.68[bc]	1.34
Perception of department's view of own productivity	5.69[a]	2.20	5.97[b]	2.18	6.73[ab]	2.10

*Scores on all items ranged from 1 to10 (1=much less productive; 10=much more productive, compared to researchers in your area and at your rank nationwide.).

[a,b,c]*Matching symbols identify groups that differ significantly from each other, p≤ .05.*

Table 25: Recognition by Track (Percentages)

	Tenure (N=235)	Research (N=95)	Clinical (N=116)
Nominated for teaching award	31 [a]	1 [ab]	25 [b]
Nominated for research award	30 [ab]	16 [ac]	5 [bc]
Nominated for clinical award	2 [a]	0 [b]	9 [ab]
Nominated for service award	13 [a]	1 [ab]	12 [b]
Nominated for at least one award	52 [ab]	17 [ac]	33 [bc]
Dept failed to nominate for appropriate award	17 [ab]	8 [a]	6 [b]

[a,b, c]*Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 26a: Career Satisfaction Ratings by Track

	Tenure (N=235)		Research (N=95)		Clinical (N=116)	
	mean	sd	mean	sd	mean	sd
Scale:						
Satisfaction with unit/department	3.61	.78	3.52	.63	3.47	.83
Individual items:						
Sense of being valued as a mentor or advisor by students	4.45	.92	4.44	.85	4.18	1.06
Sense of being valued as a teacher by students	4.14	1.06	4.49	.80	4.07	1.11
Sense of contributing to theoretical developments in my discipline	3.91 [a]	1.10	3.91 [b]	.94	3.32 [ab]	1.26
Opportunity to collaborate with other faculty	3.84	1.29	3.94	1.20	3.86	1.22
Ability to attract students to work with	3.64	1.30	3.40 [a]	1.34	3.86 [a]	1.00
Level of funding for research or creative efforts	3.63 [a]	1.26	3.35 [b]	1.22	2.95 [ab]	1.33
Sense of being valued for my teaching by members of unit/dept	3.48 [a]	1.32	2.90 [ab]	1.37	3.38 [b]	1.35
Level of intellectual stimulation in day-to-day contacts with faculty colleagues	3.49 [a]	1.36	3.68	1.23	3.94 [a]	1.22
Amount of social interaction with members of unit/department	3.44	1.40	3.40	1.21	3.74	1.28
Sense of being valued for research, scholarship, or creativity by members of unit/department	3.37	1.39	3.48 [a]	1.28	2.94 [a]	1.30
Current salary in comparison with the salaries of UM colleagues	3.13	1.27	3.03	1.35	3.14	1.25
Balance between professional and personal life	3.00	1.33	3.27	1.23	3.22	1.27

[a,b,]*Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 26b: Career Satisfaction Item Ratings, Ranked by Ratings

	science/engineering faculty across tracks (N=446)	
	mean	sd
Scale:		
Satisfaction with unit/department	3.56	.77
Highest Rated Items*		
Sense of being valued as a mentor or advisor by students	4.38	.95
Sense of being valued as a teacher by students	4.16	1.06
Opportunity to collaborate with other faculty	3.87	1.25
Sense of contributing to theoretical developments in my discipline	3.76	1.13
Middle Rated Items*		
Ability to attract students to work with	3.64	1.25
Level of intellectual stimulation in day-to-day contacts with faculty colleagues	3.64	1.31
Amount of social interaction with members of unit/department	3.51	1.33
Level of funding for research or creative efforts	3.42	1.29
Lowest Rated Items*		
Sense of being valued for my teaching by members of unit/dept	3.40	1.34
Sense of being valued for research, scholarship, or creativity by members of unit/department	3.29	1.36
Current salary in comparison with the salaries of UM colleagues	3.11	1.28
Balance between professional and personal life	3.11	1.30

*Scores on all items ranged from 1 to 5 (1=very dissatisfied; 5=very satisfied)

Table 27a: Influence over Educational Decisions and Unit Resources by Track

	Tenure (N=235)		Research (N=95)		Clinical (N=116)	
Scales:	mean	sd	mean	sd	mean	sd
Unit educational matters	2.69 [a]	.92	1.90 [ab]	.80	2.32 [b]	.89
Unit resources (salary, money for travel, facilities/equipment)	2.33	.91	2.48 [a]	.86	2.07 [a]	.82
Individual items:						
Unit curriculum decisions	2.83 [a]	1.20	1.60 [ab]	.94	2.63 [b]	1.16
Size of salary increases I receive	1.82	.95	1.90	1.03	1.78	.84
Obtaining money for travel to professional meetings	2.41	1.30	2.74 [a]	1.41	2.22 [a]	1.13
Securing the facilities or equipment I need for my research	2.93	1.11	2.89	1.07	2.46	.97
Selecting new graduate students or residents/fellows	3.36 [a]	1.33	2.74 [a]	1.29	3.05	1.25
Selecting new faculty members to be hired	2.92 [a]	1.17	2.06 [ab]	1.00	2.54 [b]	1.16
Determining who gets tenure	2.18 [ab]	1.25	1.20 [a]	.55	1.47 [b]	.90
Selecting the next unit head	2.06	1.12	1.64	.96	1.60	.90
Affecting the overall unit climate/culture	2.78	1.07	2.49	1.13	2.73	1.01

Scores for all items range from 1 to 5 (1=no influence; 5=tremendous influence).

Note: Statistically significant effects on *rank* (assistant, associate, full levels) were found for curriculum decisions, securing equipment, selecting new graduate students, selecting new unit head and tenure decisions. Statistically significant effects on *Hired in last 10 years* (yes/no) were found for influence over educational matters scale, selecting new unit head, and influence over curriculum decisions.

[a,b] *Matching symbols denote statistically significant difference, $p \leq .05$.*

Table 27b: Influence over Educational Decisions and Unit Resource by Rank

	Asst level (N=236)		Assoc level (N=142)		Full level (N=149)	
Scales:	mean	sd	mean	sd	mean	sd
Unit educational matters	2.09 [ab]	.83	2.67 [ac]	.93	2.93 [bc]	.91
Unit resources (salary, money for travel, facilities/equipment)	2.25 [a]	.88	2.34	.81	2.48 [a]	.97
Individual items:						
Unit curriculum decisions	2.17 [ab]	1.12	2.93 [a]	1.25	2.92 [b]	1.16
Size of salary increases I receive	1.74 [a]	.91	1.91	.88	1.97 [a]	1.04
Obtaining money for travel to professional meetings	2.51	1.27	2.46	1.21	2.63	1.34
Securing the facilities or equipment I need for my research	2.76 [a]	1.08	2.81 [b]	.99	3.11 [ab]	1.09
Selecting new graduate students or residents/fellows	3.00 [ab]	1.31	3.32 [a]	1.31	3.43 [b]	1.21
Selecting new faculty members to be hired	2.33 [ab]	1.09	2.91 [a]	1.14	3.12 [b]	1.17
Determining who gets tenure	1.20 [ab]	.62	2.08 [ac]	1.19	2.75 [bc]	1.28
Selecting the next unit head	1.61 [ab]	.96	2.02 [ac]	1.10	2.46 [bc]	1.18
Affecting the overall unit climate/culture	2.52 [ab]	1.03	2.76 [a]	1.10	2.91 [b]	1.07

Scores for all items range from 1 to 5 (1=no influence; 5=tremendous influence).

[a,b, c] *Matching symbols denote statistically significant difference, $p \leq .05$.*

Table 28: Effort and Satisfaction with Resources by Track

	Tenure (N=235)		Research (N=95)		Clinical (N=116)	
	mean	sd	mean	sd	mean	sd
Scales:						
Mean effort	2.83	.96	2.76	.92	2.71	1.07
Mean satisfaction	3.50[a]	1.05	3.72[a]	.96	3.58	1.06
Effort to secure the following resources:*						
office space	2.37	1.44	2.60	1.37	2.54	1.54
research space	3.41[a]	1.37	2.88[a]	1.40	3.13	1.54
computer equipment	2.64	1.19	2.72	1.14	2.66	1.36
lab equipment	3.31	1.26	2.76	1.16	2.92	1.38
service from vendors (repairs, supplies, upgrades)	2.83	1.03	2.68	.98	2.80	1.11
Satisfaction with the following resources:**						
office space	3.73	1.42	3.70	1.37	3.69	1.38
research space	3.23	1.47	3.45	1.42	3.18	1.47
computer equipment	3.62[a]	1.26	4.21[ab]	1.04	3.77[b]	1.29
lab equipment	3.61	1.29	3.79	1.14	3.62	1.20
service from vendors (repairs, supplies, upgrades)	3.34[a]	1.10	3.69[a]	1.04	3.48	1.15

* Scores on all items range from 1 to5 (1=no effort; 5=tremendous effort).
** Scores on all items range from 1 to 5 (1=very dissatisfied; 5=very satisfied).

[a,b]*Matching symbols denote statistically significant differences, p≤ .05.*

Table 29a: Number of Items in Contract Negotiation by Track

	Tenure (N=117)		Research (N=66)		Clinical (N=75)	
	mean	sd	mean	sd	mean	sd
Initial contract negotiation (if hired in last 10 yrs):						
Number of items offered by UM	2.99[ab]	2.44	.88[ac]	1.88	1.70[bc]	1.91
Number of items bargained for	2.64[ab]	2.66	.44[a]	1.19	.80[b]	1.31
Number of items promised in offer letter	2.64[ab]	2.69	.42[a]	1.30	.99[b]	1.87
Total number of items received	4.19[ab]	2.50	1.17[ac]	2.02	1.95[bc]	2.08
Contract renegotiation:	(N=205)		(N=57)		(N=76)	
Number of items offered by UM	1.49[a]	1.84	.95[a]	1.61	1.09	1.29
Number of items bargained for	1.80[ab]	1.95	.96[a]	1.32	1.23[b]	1.68
Number of items received by terms of award	1.08[a]	1.65	.75	1.57	.40[a]	1.14
Total number of items received	4.36[ab]	3.87	2.67[a]	2.61	2.72[b]	2.55

[a,b, c] *Matching symbols denote statistically significant differences, p≤ .05.*

Table 29b: Contract Negotiations by Track (Percentages)

	Initial Negotiation (for those hired within last 10 years):			Later Renegotiations:		
	Tenure (N=117)	Research (N=66)	Clinical (N=75)	Tenure (N=205)	Research (N=57)	Clinical (N=76)
Course release time						
Offered by UM	23.9[b]	3.6[a]	6.8[b]	12.8	4.7	10.0
Asked/bargained for	17.9[a]	0.0[ab]	8.2[b]	21.1[a]	2.3[a]	16.7
Lab equipment						
Offered by UM	25.6[b]	12.7[a]	6.8[b]	10.6	7.0	3.3
Asked/bargained for	37.6[a,b]	7.3[a]	8.2[b]	23.3[a]	14.0	10.0[a]
Lab space						
Offered by UM	38.5[b]	14.5[a]	6.8[b]	16.1[a]	9.3	5.0[a]
Asked/bargained for	38.5[ab]	7.3[a]	6.8[b]	27.8[a]	16.3	8.3[a]
Renovation of lab space						
Offered by UM	16.2[ab]	5.5[a]	2.7[b]	9.4	4.7	5.0
Asked/bargained for	15.4[ab]	3.6[a]	2.7[b]	17.8[ab]	4.7[a]	5.0[b]
Research assistant						
Offered by UM	7.7	7.3	5.5	3.3	9.3	1.7
Asked/bargained for	20.5[ab]	1.8[a]	2.7[b]	17.2[a]	2.3[a]	11.7
Clerical/administrative support						
Offered by UM	23.1[a]	9.1[ab]	27.4[b]	16.7	18.6	10.0
Asked/bargained for	7.7	3.6	12.3	15.0[a]	14.0[b]	26.7[ab]
Discretionary funds						
Offered by UM	43.6[a]	10.9[ab]	31.5[b]	25.6	23.3	25.0
Asked/bargained for	42.7[ab]	7.3[a]	17.8[b]	23.9	18.6	30.0
Travel funding						
Offered by UM	26.5[a]	12.7[ab]	38.4[b]	23.3	23.3	35.0
Asked/bargained for	17.9[a]	5.5[a]	8.2	18.9	30.2	23.3
Special bonus						
Offered by UM	1.7	1.8	1.4	15.0	4.7[a]	16.7[a]
Asked/bargained for	3.4	1.8	2.7	6.7	11.6	11.7
Summer salary						
Offered by UM	26.5[ab]	7.3[a]	2.7[b]	9.4	2.3	3.3
Asked/bargained for	17.9[ab]	5.5[ac]	0.0[bc]	8.9[a]	4.7	1.7[a]
Special timing of tenure clock						
Offered by UM	6.0	0.0	2.7	7.8	2.3	0.0
Asked/bargained for	9.4[ab]	0.0[a]	0.0[b]	11.7[ab]	0.0[a]	3.3[b]
Moving expenses						
Offered by UM	59.8[ab]	14.5[ac]	45.2[bc]	17.8	11.6	20.0
Asked/bargained for	26.5[ab]	9.1[a]	11.0[b]	7.8	7.0	6.7
Housing subsidy						
Offered by UM	1.7	1.8	0.0	0.6	2.3	0.0
Asked/bargained for	0.9	0.0	1.4	0.0	0.0	0.0
Child care						
Offered by UM	0.0	0.0	1.4	0.0	0.0	1.7
Asked/bargained for	0.9	0.0	0.0	0.0	0.0	0.0
Partner/Spouse position						
Offered by UM	3.4	3.6	1.4	1.1	2.3	0.0
Asked/bargained for	11.1[a]	3.6	1.4[a]	4.4	2.3	0.0

[a ,b, c] *Matching symbols denote statistically significant differences, p≤ .05.*

Table 30: Teaching by Track

	Tenure (N=199)		Research (N=16*)		Clinical (N=85)	
	mean	sd	mean	sd	mean	sd
Typical yearly teaching load in department						
Number of undergraduate courses	1.20	1.13	1.29	1.29	.95	1.19
Number of graduate courses	1.43	1.10	1.63	1.06	1.70	2.80
Number new courses developed in past 5 years	1.78[a]	2.09	1.73	2.09	1.12[a]	1.66
Number of courses released from teaching in past	1.65	2.70	.82	1.83	1.40	3.42
Teaching load winter and fall semesters 2001						
Number of undergraduate courses	.96[a]	1.75	.81[b]	1.38	.29[ab]	1.00
Number of graduate courses	.96 [a]	.31	1.13	1.67	.58 [a]	1.56
Number of non-lab courses	1.49	1.58	1.13	1.20	.77	1.61
Number of lab courses	.43[ab]	1.10	.81 [ac]	1.64	.11[bc]	.41
Number of undergraduate students	49.46[a]	84.79	14.38	30.19	25.69[a]	110.23
Number of graduate students	44.00	85.03	21.88	38.37	47.89	191.49
Official Advising	(N=209)		(N=19)		(N=89)	
Number of undergraduates	1.82[a]	4.48	1.32	2.67	.72[a]	2.99
Number of graduate students (masters, PhD, medical)	3.56[a]	4.09	3.00	4.04	1.51[a]	3.17
Number of postdocs or residents/fellows	1.44	2.30	.78	1.26	1.61	3.99
Number of junior faculty	.29	.74	.39	.85	.25	1.14

*Only 16 of 95 research faculty reported a formal teaching load.

[a,b,c] *Matching symbols denote statistically significant difference, p≤ .05.*

Table 31a: Mentoring of Junior Faculty by Track

	Tenure (N=74)		Research (N=71)		Clinical (N=64)	
	mean	sd	mean	sd	mean	sd
Number of areas of no mentoring by anyone	2.46	2.54	1.92	2.15	2.34	2.92
Number of mentors in same UM unit/department	3.88	3.96	4.22	3.68	3.14	3.98
Number of male mentors at UM	2.65	2.81	2.81	3.00	2.39	3.01

Table 31b : Percent With No Mentoring in Each Area, Junior Faculty by Track

Percent who received no mentoring in each of the following area:	Tenure (N=65)	Research (N=55)	Clinical (N=38)
role model	18.5	21.8	13.2
networking	33.8	25.5	18.4
advancement	21.5	30.9	21.1
publishing	27.7	20.0	26.3
department politics	38.5	43.6	34.2
resources	36.9	38.2	39.5
advocacy	33.8[a]	25.5	15.8[a]
balancing work/family	63.1	56.4	52.6

[a] *Matching symbols denote statistically significant difference, p≤ .05.*

Table 32: Service by Track

	Tenure (N=117)		Research (N=66)		Clinical (N=75)	
	mean	sd	mean	sd	mean	sd
Average number of committees served on per year	3.57[a]	2.46	1.00[ab]	1.34	2.89[b]	2.41
Average number of committees chaired per year	.78[a]	.88	.14[ab]	.36	.47[b]	.83
Importance of having dept/college leadership position *	3.08	1.37	2.61	1.33	2.86	1.33

*Scale 1-5, 1=not at all important, 5=very important
[a,b] *Matching symbols denote statistically significant differences, p≤ .05.*

Table 33: Stereotyping by Track

	Tenure (N=117)		Research (N=66)		Clinical (N=75)	
Scales:	mean	sd	mean	sd	mean	sd
Gender stereotyping	1.75[ab]	.73	1.57[ac]	.63	1.88[bc]	.76
Ethnic or religious stereotyping	1.46	.67	1.40[a]	.55	1.49[a]	.67
Items: *Heard insensitive or disparaging comment…*						
about women by faculty	1.91[a]	.95	1.64[ab]	.81	1.99[b]	.96
about women by students	1.56	.79	1.41[a]	.65	1.66[a]	.90
about men by faculty	1.87[a]	.96	1.63[ab]	.79	2.01[b]	1.01
about men by students	1.53	.79	1.49[a]	.80	1.68[a]	.96
about racial/ethnic minorities by faculty	1.59[a]	.85	1.47[a]	.68	1.57	.87
about racial/ethnic minorities by students	1.48	.84	1.36	.64	1.33	.65
about a religious group by faculty	1.41	.76	1.39[a]	.69	1.57[a]	.83
about a religious group by students	1.29	.66	1.26[a]	.59	1.40[a]	.78

*Scale 1-5, 1=never, 2=once or twice per year, 3=couple of times per year, 4= more than once per month, 5=weekly
[a,b] *Matching symbols denote statistically significant differences, p≤ .05.*

Table 34a: Discrimination by Track (Percentages)

	Tenure (N=235)	Research (N=95)	Clinical (N=116)
Discrimination at UM in past 5 years due to:			
Race/ethnicity	5.5	8.4	6.0
Gender	25.5	18.9	29.9
Sexual orientation	1.3	0.0	0.9
Physical disability	0.0[a]	2.1[a]	0.0
Religious affiliation	0.0[a]	0.0	1.7[a]

[a]*Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 34b : Gender Discrimination by Track (Percentages)

Experienced gender discrimination at UM within past 5 years in:	Tenure (N=235)	Research (N=95)	Clinical (N=116)
Hiring	4.6	7.3	5.2
Promotion	9.2	9.8	13.4
Salary	21.5	22.0	30.9
Space/equipment, other resources	11.7	11.0	8.2
Access to administrative staff	6.6	4.9	9.3
Graduate student or resident/fellow assignments	4.1	2.4	3.1

Table 35: Sexual Harassment* by Track (Percentages)

In past 5 years at UM:	Tenure (N=235)	Research (N=95)	Clinical (N=116)
Individuals reporting sexual harassment	13.4 [a]	3.2[ab]	15.2[b]
Individuals reporting others reported sexual harassment	30.6 [a]	18.5[a]	30.0

* Defined as unwanted and uninvited sexual attention (sexual teasing, jokes, remarks or questions; unwanted pressure for dates; unwanted letters, phone calls, email; unwanted touching, leaning over, cornering, pinching; unwanted pressure for sexual favors; stalking; rape or assault.)

[a,b]*Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 36: Department Climate Scales by Track

	Tenure (N=235)		Research (N=95)		Clinical (N=116)	
	mean	sd	mean	sd	mean	sd
Positive environment	3.30	.94	3.41	.80	3.48	.89
Tolerant environment	3.66	.82	3.75	.77	3.76	.87
Scholarly isolation	2.71[a]	.52	2.83	.45	2.93[a]	.64
Felt surveillance	2.73	1.02	2.65	.84	2.61	1.05
Egalitarian Atmosphere	3.43	.92	3.61	.84	3.41	1.00
Tokenism	2.44	1.33	2.10	1.07	2.40	1.37
Chair as fair	3.44	1.08	3.24	1.04	3.41	1.17
Chair as able to create a positive environment	3.31	1.12	3.26	1.02	3.52	1.14
Chair as committed to ethnic/racial diversity	3.65	1.15	3.59	1.01	3.85	.97

*Scale 1-5, 1=strongly disagree, 5=strongly agree

[a] *Matching symbols denote statistically significant differences, p≤ .05.*

Table 37: Institutional and Departmental Climate Ratings— Correlations with Overall Satisfaction with Position by Track

	Overall Satisfaction with UM Position					
	Tenure (N=235)		Research (N=95)		Clinical (N=116)	
Institutional Factors:						
Gender stereotyping	-.22	***	-.21	*	-.13	
Ethnic/religious stereotyping	-.12		-.01		-.004	
Gender discrimination	-.23	***	-.11		-.20	*
Unwanted sexual attention	-.22	***	-.22	*	-.13	
Departmental Factors:						
Positive climate	.58	***	.49	***	.61	***
Tolerant climate	.38	***	.25	*	.41	***
Gender egalitarian atmosphere	.36	***	.22	*	.34	***
Scholarly isolation	-.14	*	-.18		.19	*
Felt surveillance	-.45	***	-.47	***	-.49	***
Race/gender tokenism	-.36	***	-.36	***	-.38	***
Rating of dept. chair as fair	.49	***	.37	***	.50	***
Rating of depart. chair as able to create positive environment	.51	***	.32	**	.44	***

*p≤.05, **p≤.01, ***p≤.001

Table 38: Departmental Experiences Indicators—Correlations with Overall Satisfaction with Position by Track

	Overall Satisfaction with UM Position		
	Tenure (N=235)	Research (N=95)	Clinical (N=116)
Career satisfactions	.71 ***	.69 ***	.57 ***
Influence over educational decisions	.36 ***	.19	.27 **
Influence over unit resources	.34 ***	.45 ***	.38 ***
Effort to obtain resources	-.33 ***	-.14	-.39 ***
Satisfaction with resources	.38 ***	.32 **	.29 **
N areas of non-mentoring	-.27 ***	-.33 **	-.28 **
N mentors in same department	.18 **	.38 ***	.28 **
N male mentors at UM	.13 *	.39 ***	.26 **
Committee service	-.00	-.07	.08
Committee chair	.04	.05	.13
Failure to nominate for award	.05	-.12	-.10
Productivity—self view	.13 *	.06	.20
Productivity—department view	.47 ***	.37 ***	.36 ***

*p≤.05, **p≤.01, ***p≤.001

Table 39: Personal and Position Indicators and Household Characteristics—Correlations with Overall Satisfaction with Position by Track

	Overall Satisfaction with UM Position		
	Tenure (N=235)	Research (N=95)	Clinical (N=116)
Age	.06	-.20	.21 *
Ethnicity (white/non-white)	-.05	-.25 *	-.12
Years at UM	.06	-.09	-.00
Years since Ph.D.	.14 *	-.07	.14
Joint appointment	-.00	.08	.09
Rank	.09	.02	.10
Small college	-.08	-.11	.13
Single, no children	-.17 *	.04	.07
Partner and children	.03	-.08	.10

*p≤.05

Table 40: Harassment by Track–Relationship with Satisfaction and Climate Ratings

	Tenure Track Faculty			Research Track Faculty			Clinical Track Faculty		
	experienced harassment (N=31)	experienced no harassment (N=204)		experienced harassment (N=3)	experienced no harassment (N=92)		experienced harassment (N=17)	experienced no harassment (N=100)	
	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.
Satisfaction with position	2.90 (1.23)	3.62 (1.07)	***	2.00 (1.00)	3.40 (1.15)	*	3.13 (1.36)	3.55 (1.10)	ns
Climate Scales:									
Gender stereotyping	2.54 (.82)	1.64 (.66)	***	1.75 (.25)	1.61 (.69)	ns	2.22 (.98)	1.71 (.66)	**
Racial stereotyping	1.88 (1.00)	1.39 (.58)	***	1.33 (.58)	1.44 (.58)	ns	1.81 (.83)	1.43 (.63)	*
Positive climate	2.91 (.97)	3.35 (.92)	**	3.22 (.25)	3.33 (.81)	ns	3.16 (.91)	3.50 (.87)	ns
Tolerant climate	3.21 (.88)	3.75 (.79)	***	3.58 (.80)	3.69 (.78)	ns	3.50 (.82)	3.72 (.92)	ns
Gender egalitarian atmosphere	2.73 (.88)	3.57 (.88)	***	3.26 (.36)	3.56 (.87)	ns	2.95 (1.13)	3.45 (.97)	ns
Scholarly isolation	2.90 (.56)	2.67 (.49)	*	2.97 (.50)	2.85 (.49)	ns	3.06 (.82)	2.96 (.65)	ns
Felt surveillance	3.09 (.98)	2.66 (1.04)	*	3.17 (.52)	2.72 (.88)	ns	3.42 (1.22)	2.55 (1.02)	**
Tokenism	3.03 (1.22)	2.28 (1.30)	**	2.17 (.76)	2.10 (1.06)	ns	3.26 (1.45)	2.28 (1.33)	**
Dept chair as fair	3.10 (1.23)	3.48 (1.06)	ns	3.44 (.38)	3.20 (1.04)	ns	3.25 (1.22)	3.37 (1.15)	ns
Dept chair creates positive environment	2.86 (1.16)	3.38 (1.09)	*	3.56 (.19)	3.18 (1.05)	ns	3.47 (1.15)	3.32 (1.23)	ns

*p≤.05, **p≤.01, ***p≤.001

Table 41: Gender Discrimination by Track–Relationship with Satisfaction and Climate Ratings

	Tenure Track Faculty			Research Track Faculty			Clinical Track Faculty		
	experienced discrimination (N=60)	experienced no discrimination (N=175)		experienced discrimination (N=18)	experienced no discrimination (N=77)		experienced discrimination (N=35)	experienced no discrimination (N=82)	
	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.
Satisfaction with position	3.10 (1.15)	3.68 (1.06)	***	3.11 (1.18)	3.42 (1.16)	ns	3.15 (1.18)	3.63 (1.09)	*
Climate Scales:									
Gender stereotyping	2.10 (.76)	1.63 (.71)	***	1.97 (.66)	1.53 (.66)	*	1.88 (.78)	1.79 (.74)	ns
Racial stereotyping	1.51 (.59)	1.42 (.69)	ns	1.47 (.53)	1.42 (.59)	ns	1.54 (.72)	1.46 (.65)	ns
Positive climate	3.03 (.99)	3.39 (.89)	**	3.14 (.83)	3.37 (.79)	ns	3.12 (.79)	3.60 (.87)	**
Tolerant climate	3.34 (.77)	3.78 (.81)	***	3.56 (.88)	3.71 (.75)	ns	3.25 (.80)	3.86 (.90)	***
Gender egalitarian atmosphere	2.73 (.87)	3.71 (.81)	***	3.21 (1.03)	3.64 (.80)	*	2.51 (.78)	3.72 (.90)	***
Scholarly isolation	2.70 (.53)	2.70(.50)	ns	2.66 (.59)	2.90 (.45)	*	2.95 (.68)	3.00 (.66)	ns
Felt surveillance	3.26 (1.00)	2.52 (.97)	***	3.17 (.90)	2.63 (.84)	*	3.28 (1.15)	2.44 (1.01)	***
Tokenism	3.00 (1.21)	2.15 (1.27)	***	2.44 (1.07)	2.01 (1.02)	ns	2.17 (1.32)	3.23 (1.32)	***
Dept chair as fair	3.18 (1.12)	3.51 (1.06)	*	2.80 (1.23)	3.30 (.95)	ns	3.00 (1.17)	3.54 (1.10)	*
Dept chair creates positive environment	3.11 (1.09)	3.38 (1.11)	ns	3.02 (1.12)	3.23 (1.00)	ns	3.32 (1.18)	3.54 (1.13)	ns

*p≤.05, **p≤.01, ***p≤.001

Table 42: Professional Experience by Gender

	women scientists/engineers (N=259)		men scientists/engineers (N=187)	
	mean	sd	mean	sd
Age	45.39 [a]	8.30	48.11 [a]	10.23
Time since highest degree*	3.30 [a]	1.59	4.15 [a]	2.09
Time since first UM appointment*	2.37 [a]	1.47	2.80 [a]	1.96
	percentages		percentages	
Faculty of color	14		20	
Hired in last ten years	63 [a]		51 [a]	
Joint appointment	21 [a]		12 [a]	
Small college	29 [a]		15 [a]	
Full professor/ research scientist (includes sr. res. sci.)	20 [a]		36 [a]	
Assoc. professor/ assoc. res scientist (includes sr. assoc. res. sci.)	31[a]		21 [a]	
Asst. prof./ asst. research scientist (includes res. invest.)	49		43	

*1=2000-1; 2=1995-1999; 3=1990-1994, 4=1985-1989; 5=1980-1984; 6=1975-1979; 7=1970-1974; 8=1965-1969; 9=1960-1964.

[a]*Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 43: Household and Partner Employment Characteristics by Gender (Percentages)

	women scientists/ engineers	men scientists/ engineers
Household Composition:	(N=259)	(N=187)
Single (no partner nor children)	8	5
Children, no partner	8 [a]	1 [a]
Partner and children	69 [a]	84 [a]
Partner, no children	16	10
Partner Employment:	(N=216)	(N=172)
Partner works fulltime	87 [a]	41 [a]
Partner employed at UM	43 [a]	32 [a]
If partner employed at UM, employed as faculty	76 [a]	40 [a]
Considered leaving UM to improve partner's career	30 [a]	32 [a]

[a] *Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 44: Productivity* by Gender

	women scientists/ engineers (N=259)		men scientists/ engineers (N=187)	
	mean	sd	mean	sd
Perception of own productivity	6.73	2.09	6.88	1.94
Perception of department's view of own productivity	5.89	2.32	6.34	2.00

*Scores on all items ranged from 1 to10 (1=much less productive; 10=much more productive).

Table 45: Indicators of Productivity by Gender (Percentages)

	women scientists/ engineers (N=259)	men scientists/ engineers (N=187)
Number of external grant proposals (PI or co-PI)	74[a]	56[a]
Total dollar amount of external grants (PI or co-PI)	70	67
Number of external fellowships	4	3
Number of articles published in refereed academic or professional journals	97	94
Number of monographs written	5[a]	11[a]
Number of books edited	6	7
Number of book chapters	14	17
Number of dissertations chaired	19	22
Number of presentations at national/international conferences	71[a]	60[a]
Number of patents	4[a]	9[a]

[a] *Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 46: Recognition by Gender (Percentages)

	women scientists/ engineers (N=259)	men scientists/ engineers (N=187)
Nominated for teaching award*	19[a]	29[a]
Nominated for research award	20	23
Nominated for clinical award	3	5
Nominated for service award	10	11
Nominated for at least one award*	36[a]	46[a]
Failed to be nominated for award for which one is qualified	12	12

*Gender differences are not statistically significant when controlling for rank.
[a] *Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 47: Mean Scores of Career Satisfaction Item Ratings by Gender

	women scientists/engineers (N=259)		men scientists/engineers (N=187)	
	mean	sd	mean	sd
Scale:				
Satisfaction with unit/department	3.48	.75	3.67	.78
Individual items:*				
Sense of being valued as a mentor or advisor by students	4.43	.93	4.29	.98
Sense of being valued as a teacher by students	4.20	1.06	4.10	1.06
Sense of contributing to theoretical developments in my discipline	3.71	1.16	3.85	1.10
Opportunity to collaborate with other faculty	3.78	1.30	3.98	1.17
Ability to attract students to work with	3.72	1.24	3.54	1.27
Level of funding for research or creative efforts	3.26[a]	1.33	3.65[a]	1.22
Sense of being valued for my teaching by members of unit/dept	3.31	1.36	3.53	1.31
Level of intellectual stimulation in day-to-day contacts with faculty colleagues	3.61	1.38	3.68	1.21
Amount of social interaction with members of unit/department	3.49	1.38	3.54	1.26
Sense of being valued for research, scholarship, or creativity by members of unit/department	3.16	1.37	3.48	1.31
Current salary in comparison with the salaries of UM colleagues	3.93[a]	1.27	2.36[a]	1.26
Balance between professional and personal life	2.98	1.33	3.30	1.24

*Scores on all items ranged from 1 to 5 (1=very dissatisfied; 5=very satisfied).
[a] *Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 48: Influence over Educational decisions and Unit Resources by Gender

	women scientists/engineers (N=259)		men scientists/engineers (N=187)	
	mean	sd	mean	sd
Scales:				
Unit educational decisions	2.50[a]	.94	2.36[a]	.94
Unit resources (salary, money for travel, facilities/equipment)	2.27	.90	2.33	.88
Individual items:*				
Unit curriculum decisions	2.59	1.20	2.60	1.27
Size of salary increases I receive	1.86	.99	1.78	.87
Obtaining money for travel to professional meetings	2.30[a]	1.25	2.61[a]	1.33
Securing the facilities or equipment I need for my research	2.77	1.12	2.94	1.03
Selecting new graduate students or residents/fellows	3.18	1.34	3.15	1.30
Selecting new faculty members to be hired	2.71	1.15	2.59	1.22
Determining who gets tenure	1.81	1.13	1.87	1.19
Selecting the next unit head	1.95[a]	1.11	1.74[a]	.98
Affecting the overall unit climate/culture	2.68	1.04	2.75	1.11

*Scores for all items range from 1 to 5 (1=no influence; 5=tremendous influence).

Note: Statistically significant effects on *rank* (junior, middle, senior) were found for curriculum decisions, securing equipment, selecting new graduate students, selecting new unit head and tenure decisions. Statistically significant effects on *Hired in last 10 years* (yes/no) were found for influence over educational matters scale, selecting new unit head, and influence over curriculum decisions.

Table 49: Effort and Satisfaction with Resources by Gender

	women scientists/ engineers (N=259)		men scientists/ engineers (N=187)	
	mean	sd	mean	sd
Scales				
Mean effort	2.81	1.00	2.74	.99
Mean satisfaction	3.50	1.05	3.66	1.01
Effort to secure the following resources*:				
office space	2.47	1.44	2.44	1.48
research space	3.20	1.42	3.30	1.41
computer equipment	2.79	1.31	2.49	1.08
lab equipment	3.14	1.27	3.12	1.27
service from vendors (repairs, supplies, upgrades)	2.76	1.04	2.83	1.03
Satisfaction with the following resources:**				
office space	3.65	1.38	3.79	1.42
research space	3.32	1.46	3.21	1.45
computer equipment	3.64 [a]	1.32	3.96 [a]	1.12
lab equipment	3.54	1.31	3.82	1.13
service from vendors (repairs, supplies, upgrades)	3.39	1.10	3.53	1.10

* Scores on all items range from 1 to5 (1=no effort; 5=tremendous effort).
** Scores on all items range from 1 to 5 (1=very dissatisfied; 5=very satisfied).

[a]*Matching symbols denote statistically significant differences, p≤ .05.*

Table 50a: Number of Items in Contract Negotiation by Gender

	women scientists/ engineers (N=161)		men scientists/ engineers (N=96)	
	mean	sd	mean	sd
Initial Contract Negotiation (if hired in last 10 yrs)				
Number of items offered by UM	2.10	2.32	2.04	2.35
Number of items bargained for	1.62	2.27	1.42	2.24
Number of items promised in offer letter	1.54	2.25	1.69	2.59
Total number of items received	2.84	2.56	2.64	2.73
Contract Renegotiation	(N=197)		(N=140)	
Number of items offered by UM	1.18	1.55	1.49	1.89
Number of items bargained for	1.61	1.87	1.41	1.77
Number of items received by terms of award	.92	1.64	.81	1.45
Total number of items received	3.71	3.53	3.71	3.49

Table 50b: Contract Negotiations by Gender (Percentages)

	Initial Negotiation (those hired within last 10 yrs)		Later Renegotiations:	
	women scientists/ engineers (N=161)	men scientists/ engineers (N=196)	women scientists/ engineers (N=197)	men scientists/ engineers (N=140)
Course release time				
Offered by UM	21.1	13.3	14.5	14.8
Asked/bargained for	14.1	10.0	23.8 [a]	13.0 [a]
Lab equipment				
Offered by UM	16.0	20.0	6.4	12.2
Asked/bargained for	23.5	21.1	20.9	16.6
Lab space				
Offered by UM	23.0	17.8	8.9 [a]	16.5 [a]
Asked/bargained for	23.0	18.9	20.4	20.9
Renovation of lab space				
Offered by UM	7.5	8.9	4.3 [a]	10.4 [a]
Asked/bargained for	8.0	8.9	9.4	14.8
Research assistant				
Offered by UM	6.6	7.8	5.5	1.7
Asked/bargained for	12.2	10.0	16.2	13.0
Clerical/administrative support				
Offered by UM	21.1	18.9	12.8	20.0
Asked/bargained for	7.5	5.6	16.2	17.4
Discretionary funds				
Offered by UM	35.7	34.4	25.1	28.7
Asked/bargained for	27.7	27.8	28.5	20.0
Travel funding				
Offered by UM	27.7	23.3	24.3	33.0
Asked/bargained for	15.5	11.1	23.8	18.3
Special bonus				
Offered by UM	1.4	2.2	15.7	11.3
Asked/bargained for	1.9	3.3	7.2	7.8
Summer salary				
Offered by UM	24.4 [a]	14.4 [a]	11.5	7.0
Asked/bargained for	14.6 [a]	4.4 [a]	9.8	7.0
Special timing of tenure clock				
Offered by UM	5.2	3.3	7.2	2.6
Asked/bargained for	4.2	5.6	10.2	5.2
Moving expenses				
Offered by UM	49.3	52.2	17.9	20.9
Asked/bargained for	17.8	20.0	6.4	11.3
Housing subsidy				
Offered by UM	1.4	0.0	0.4	0.9
Asked/bargained for	0.9	0.0	0.0	0.0
Child care				
Offered by UM	0.0	1.1	0.0	0.9
Asked/bargained for	0.0	0.0	0.4	0.0
Partner/Spouse position				
Offered by UM	4.7	3.3	3.0	0.9
Asked/bargained for	13.1 [a]	5.6 [a]	5.5	2.6

[a] *Matching symbols denote statistically significant differences, $p \leq .05$.*

Table 51: Teaching by Gender

	women scientists/ engineers (N=183)		men scientists/ engineers (N=117)	
	mean	sd	mean	sd
Typical yearly teach load in department				
Number of undergraduate courses	1.17	1.17	1.12	1.12
Number of graduate courses	1.46	2.25	1.55	2.13
Number new courses developed in past 5 years	1.70	1.95	1.50	2.09
Number of courses released from teaching in past 5 years	1.78	3.14	1.24	2.28
Teaching load winter and fall semesters 2001				
Number of undergraduate courses	.80[a]	1.74	.71[a]	1.30
Number of graduate courses	.83	1.30	.91	1.44
Number of non-lab courses	1.20	1.56	1.36	1.67
Number of lab courses	.42	1.15	.25	.72
Number of undergraduate students	34.66	83.12	50.34	102.98
Number of graduate students	39.33	81.80	51.06	168.51
Official advising				
Number of undergraduates	1.62	3.97	1.29	4.15
Number of graduate students (masters, PhD, medical)	3.05	4.04	2.80	3.81
Number of postdocs or residents/fellows	1.35	2.33	1.61	3.50
Number of junior faculty	.31	.72	.26	1.08

[a] *Matching symbols denote statistically significant difference, $p \leq .05$.*

Table 52a: Mentoring of Junior Faculty by Gender

	women scientists/ engineers (N=128)		men scientists/ engineers (N=80)	
	mean	sd	mean	sd
Number of areas of no mentoring by anyone anywhere	2.50	2.66	1.80	2.30
Number of mentors in same UM unit/department	3.90	3.82	3.53	3.99
Number of male mentors at UM	2.58	2.87	2.68	3.03

Table 52b: Percent With No Mentoring in Each Area Junior Faculty by Gender

	women scientists/engineers (N=104)	men scientists/engineers (N=53)
Percent who received no mentoring in each of the following area:		
role model	21.6	13.2
networking	29.6	26.4
advancement	22.4	26.4
publishing	25.6	22.6
department politics	40.0	35.8
resources	42.4	30.2
advocacy	29.6	22.6
balancing work/family	57.6	60.4

Table 53: Service by Gender

	women scientists/engineers (N=259)		men scientists/engineers (N=187)	
	mean	sd	mean	sd
Average number of committees served on per year	3.19[a]	2.48	2.52[a]	2.40
Average number of committees chaired per year	.63[a]	.85	.49[a]	.78
Importance of having dept/college leadership position *	3.05	1.34	2.77	1.37

*Scale 1-5, 1=not at all important, 5=very important

[a] *Matching symbols denote statistically significant differences, p≤ .05.*

Table 54: Stereotyping by Gender

	women scientists/engineers (N=259)		men scientists/engineers (N=187)	
Scales*	mean	sd	mean	sd
Gender stereotyping	1.85	.75	1.60	.66
Racial or religious stereotyping	1.49	.63	1.41	.67
Items*				
about women by faculty	2.07[a]	1.01	1.60[a]	.73
about women by students	1.65	.84	1.43	.72
about men by faculty	1.92	.94	1.77	.96
about men by students	1.61	.83	1.49	.85
about racial/ethnic minorities by faculty	1.63	.84	1.46	.79
about racial/ethnic minorities by students	1.44	.77	1.38	.75
about a religious group by faculty	1.48	.78	1.41	.76
about a religious group by students	1.32	.66	1.30	.71

Table 55a: Discrimination by Gender (Percentages)

	women scientists/engineers (N=259)	men scientists/engineers (N=187)
Discrimination due to:		
Race/ethnicity	3.9[a]	9.6[a]
Gender	39.8[a]	4.8[a]
Sexual orientation	1.5	0.0
Physical disability	0.8	0.0
Religious affiliation	0.4	0.5

[a] *Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 55b: Gender Discrimination by Gender (Percentages)

	women scientists/engineers (N=259)	men scientists/engineers (N=187)
Experienced gender discrimination in:		
Hiring	6.8	3.3
Promotion	15.8[a]	2.0[a]
Salary	37.7[a]	3.9[a]
Space/equipment, other resources	17.6[a]	0.7[a]
Access to administrative staff	11.3[a]	0.7[a]
Graduate student or resident/fellow assignments	5.4[a]	0.7[a]

[a] *Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 56: Sexual Harassment* by Gender (Percentages)

	women scientists/engineers (N=259)	men scientists/engineers (N=187)
Experienced sexual harassment at UM in past five years	15.9[a]	5.4[a]
Knows someone who experienced sexual harassment at UM in past five years	32.7[a]	21.7[a]

* Defined as unwanted and uninvited sexual attention (sexual teasing, jokes, remarks or questions; unwanted pressure for dates; unwanted letters, phone calls, email; unwanted touching, leaning over, cornering, pinching; unwanted pressure for sexual favors; stalking; rape or assault.)

[a] *Matching symbols identify groups that differ significantly from each other, p≤ .05*

Table 57: Department Climate Scales* by Gender

	women scientists/engineers (N=259)		men scientists/engineers (N=187)	
	mean	sd	mean	sd
Positive environment	3.27	.93	3.50	.84
Tolerant environment	3.56[a]	.86	3.90[a]	.72
Scholarly isolation	2.79	.54	2.79	.56
Felt surveillance	2.83[a]	1.01	2.49[a]	.94
Egalitarian Atmosphere	3.14[a]	.92	3.89[a]	.73
Tokenism	2.68[a]	1.27	1.86[a]	1.18
Chair as fair	3.29	1.13	3.54	1.04
Chair as able to create a positive environment	3.28	1.13	3.45	1.07
Chair as committed to ethnic/racial diversity	3.65	1.12	3.74	1.02

*Scores range from 1(low) to 5 (high) on all items that make up the scales.

[a] *Matching symbols denote statistically significant differences, p≤ .05.*

Table 58: Institutional and Departmental Climate Ratings by Gender—Correlations with Overall Satisfaction with Position

	Overall satisfaction with UM position	
	women scientists/engineers (N=259)	men scientists/engineers (N=187)
Institutional Factors:		
Gender stereotyping	-.19**	-.14
Ethnic/religious stereotyping	-.06	-.06
Gender discrimination	-.17**	-.08
Unwanted sexual attention	-.16*	-.18*
Departmental Factors:		
Positive climate	.53***	.60***
Tolerant climate	.41***	.21**
Gender egalitarian atmosphere	.36***	.16*
Scholarly isolation	-.05	-.04
Felt surveillance	-.45***	-.45***
Race/gender tokenism	-.32***	-.36***
Rating of department chair as fair	.44***	.49***
Rating of department chair as able to create positive environment	.42***	.48***

*p≤.05, **p≤.01, ***p≤.001

Table 59: Departmental Experiences Indicators by Gender—Correlations with Overall Satisfaction with Position

	Overall satisfaction with UM position	
	women scientists/engineers (N=259)	men scientists/engineers (N=187)
Career satisfactions	.67***	.65***
Influence over educational decisions	.32***	.31***
Influence over resources	.41***	.29***
Effort to obtain resources	-.35***	-.23**
Satisfaction with resources	.38***	.25***
N areas of non-mentoring	-.34***	-.17*
N mentors in same department	.33***	.14
N male mentors in same dept	.28***	.14
Committee service	-.01	.14
Committee chair	-.01	.20**
Failure to nominate for award	-.00	-.06
Productivity—self view	.15*	.08
Productivity—department view	.46***	.33***

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

Table 60: Personal and Position Indicators by Gender—Correlations with Overall Satisfaction with Position

	Overall satisfaction with UM position	
	women scientists/engineers (N=259)	men scientists/engineers (N=187)
Age	-.07	.13
Ethnicity	-.11	-.14
Years at UM	-.03	.04
Years since Ph.D.	-.01	.17*
Joint Appointment	.03	.11
Rank	.00	.16*
Small college	-.04	.03
Single, no children	-.12	.04
Partner and children	.05	-.10

*p≤.05

Table 61: Harassment by Gender–Relationship with Satisfaction and Climate Ratings

	women scientists/engineers			men scientists/engineers		
	experienced harassment (N=40)	experienced no harassment (N=219)		experienced harassment (N=10)	experienced no harassment (N=177)	
	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.
Satisfaction with position	2.89 (1.29)	3.41 (1.13)	**	2.90 (1.29)	3.73 (1.03)	*
Climate Scales:						
Gender stereotyping	2.44 (.89)	1.71 (.67)	***	2.22 (.84)	1.57 (.65)	**
Racial stereotyping	1.81 (.85)	1.43 (.59)	***	1.96 (1.25)	1.38 (.60)	**
Positive climate	2.95 (.98)	3.30 (.90)	*	3.30 (.66)	3.48 (.86)	ns
Tolerant climate	3.33 (.84)	3.57 (.87)	ns	3.35 (.98)	3.91 (.71)	*
Gender egalitarian atmosphere	2.72 (.86)	3.22 (.94)	**	3.37 (1.13)	3.93 (.69)	*
Scholarly isolation	2.92 (.66)	3.22 (.94)	ns	3.02 (.60)	2.78 (.56)	ns
Felt surveillance	3.36 (.99)	2.79 (.54)	***	2.58 (1.14)	2.47 (.95)	ns
Tokenism	3.33 (1.18)	2.58 (1.25)	***	2.15 (1.27)	1.78 (1.10)	ns
Department chair as fair	2.99 (1.26)	3.28 (1.10)	ns	3.80 (.48)	3.52 (1.05)	ns
Department chair creates positive environment	2.93 (1.26)	3.29 (1.09)	ns	3.50 (.57)	3.44 (1.09)	ns

*p≤.05, **p≤.01, ***p≤.001

Table 62: Discrimination –Relationship with Satisfaction and Climate Ratings

	women scientists/engineers			men scientists/engineers		
	experienced discimination (N=103)	experienced no discrimination (N=156)		experienced discrimination (N=9)	experienced no discrimination (N=178)	
	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig
Satisfaction with position	3.09 (1.17)	3.50 (1.12)	**	3.33 (1.00)	3.70 (1.06)	ns
Climate Scales:						
Gender stereotyping	2.02 (.77)	1.72 (.73)	**	1.94 (.51)	1.59 (.69)	ns
Racial stereotyping	1.49 (.59)	1.48 (.68)	ns	1.79 (.88)	1.39 (.63)	ns
Positive climate	3.05 (.91)	3.38 (.88)	**	3.37 (.79)	3.49 (.86)	ns
Tolerant climate	3.29 (.79)	3.68 (.89)	***	4.02 (.63)	3.88 (.75)	ns
Gender egalitarian atmosphere	2.65 (.85)	3.45 (.87)	**	3.76 (.73)	3.91 (.73)	ns
Scholarly isolation	2.73 (.58)	2.87 (.54)	*	3.14 (.60)	2.79 (.55)	ns
Felt surveillance	3.26 (1.01)	2.64 (.96)	***	3.09 (1.31)	2.44 (.93)	*
Tokenism	3.02 (1.23)	2.49 (1.24)	***	2.63 (1.33)	1.77 (1.11)	*
Department chair as fair	3.02 (1.17)	3.37 (1.06)	*	3.52 (.93)	3.55 (1.03)	ns
Department chair creates positive environment	3.11 (1.15)	3.31 (1.10)	ns	3.67 (.75)	3.45 (1.09)	ns

*p≤.05, **p≤.01, ***p≤.001

Appendix A: UM Survey of Academic Climate and Activities

University of Michigan **Fall, 2001**

SURVEY OF ACADEMIC CLIMATE AND ACTIVITIES

Procedures for Completing the Survey

Thank you very much for taking the time to complete this survey. We know how busy you are and have tried to make the process as simple and efficient as possible. However, if you feel that there is any additional information about your experiences at the University of Michigan that was not asked in the survey, but that you think we should know, please feel free to add your written comments on an additional sheet of paper and return it with the survey. There are three options available to you for completing the survey: by hand; on the computer using a downloaded PDF file; or in an interview. In order to fully protect respondents' anonymity, we have decided against offering as alternatives either submission of the PDF version via the web, or a web survey.

1. **Completing the survey by hand**
   You can simply fill out the enclosed copy of the survey by hand and return it to us in the enclosed addressed and stamped envelope.

2. **Completing the survey on your computer**
   A PDF download is available on the Institute for Research on Women and Gender's website at http://www.umich.edu/~irwg/climatesurvey/ to permit you to complete the survey on a computer. Once you have completed the survey, please print it out and return it to us in the enclosed self-addressed stamped envelope. (Because of concerns about maintaining privacy, submission of the file via the web is not possible.) If you have trouble locating or downloading the PDF file, please contact Julie Stubbs (764-9537/ jstubbs@umich.edu).

3. **Completing the survey in an interview**
   If it would be easier for you to respond in an interview format, we will arrange for a project staff member to do the survey with you, either over the phone or face-to-face, and record your responses on a survey. If you prefer this option, please contact Julie Stubbs (764-9537/jstubbs@umich.edu).

To facilitate analyses and future planning, we hope to receive completed surveys no later than ***November 5, 2001****.*

Please note that the university's Behavioral Sciences Human Subjects Review Committee has approved this study. If you have any questions, please contact Kate M. Keever, Administrator, Human Subjects Protection Office (734/936-0933, IRB-Behavsci-Health@umich.edu).

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

PROFESSIONAL EMPLOYMENT

In the chart below, please check the appropriate boxes to indicate when you obtained your highest academic degree, your first UM appointment and started on a tenure track at UM (if applicable).

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-01
year of highest degree									
year of 1st UM appointment									
year began tenure track at UM									

How would you classify the primary field of your UM appointment? *(check only one)* ____Social Science
____Science or Engineering
(basic, natural, clinical & applied science)

Please indicate in the following chart your budgeted appointment *for July 2000-June 2001* at UM, including the School or College in which you held the appointment, as well as the rank and fraction of time associated with that appointment. If you had multiple budgeted appointments, please list information for second, third and fourth budgeted appointments, where applicable, as well; *fraction amounts should not equal more than 100%*. To list your rank, please use the following codes. *Note that all ranks include adjunct appointments.*

Instructional Track:
1 lecturer
2 instructor
3 asst. professor
4 assoc. professor
5 professor

Primary Research Track:
6 research investigator
7 asst. research scientist
8 assoc. research scientist
9 senior assoc. research scientist
10 research scientist
11 senior research scientist

Clinical Track:
12 instructor
13 asst. professor
14 assoc. professor
15 professor

Administrative:
16 any administrative appointment

	school/ college	rank code	appointment fraction (e.g., 100%, 50%)
1st (only) budgeted appointment			
2nd budgeted appointment			
3rd budgeted appointment			
4th budgeted appointment			

Including up through this academic year (2001-02), how many years (including 0) have you held each of the following ranks at UM and at other academic institutions (please distinguish between part-time and full-time employment)?

	U of M		other academic institution	
	part time	full time	part time	full time
post-doctoral fellow				
lecturer				
instructor				
assistant professor/assistant research scientist				
associate professor/associate research scientist				
senior associate research s cientist				
professor/research scientist				
senior research scientist				

How many years (including 0) were you *only* employed as a researcher in a non-academic setting? _____
Since receiving your final degree, for how many years (including 0) were you *not* employed at all? _____

Do you *currently* have one or more dry (unfunded) appointments? Yes No

Have you changed your fractional appointment *within the last five years*? Yes No
If yes, why and how did it change? _____
_____
_____

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

Were you hired at UM within the last 10 years? Yes No

If yes, please check which, if any, of the following were part of any aspect of your *initial contract negotiation,* and in what ways, according to the four categories listed below.

Please check all that apply.	offered by university	asked/bargained for by me	promised (in my offer letter)	received		offered by university	asked/bargained for by me	promised (in my offer letter)	received
course release time					signing bonus				
lab equipment					summer salary				
lab space					special timing of tenure clock				
renovation of lab space					moving expenses				
research assistant					housing subsidy				
clerical/admin. support					child care				
discretionary funds					partner/spouse position				
travel funding					other:				

TEACHING. If *not* teaching, please indicate N/A by checking here ; and then go to section labeled **SERVICE** (p. 3).

What is the *typical teaching load* each year in your primary unit? Number of undergraduate courses? _____
Number of graduate courses? _____

Number of student contact hours? _____
(Not covered by formal courses)

In the past 5 years, how many *new* courses (courses that you have not taught previously--do not include even major revisions of courses you have taught before) have you prepared for your primary unit? _____
Of these, how many did *you* propose? _____
How many were you *asked or required* to develop? _____

In the past 5 years, how many courses have you been released from teaching for the following reasons:
(Indicate how many next to each category.) _____with your own grant or fellowship funds?
_____by your department? for? *(check all that apply)*:
_____course development
_____administrative work
_____modified duties
_____routine leave (e.g., "nurturance leave"/leave after certain duties)
_____sabbatical
_____other: _____

For how many of each of the following types of individuals (including 0) do you currently serve as *official* advisor?

_____undergraduates _____medical students _____residents/fellows
_____MA students _____post-docs _____junior faculty
_____PhD students

On average, how many hours per month do you spend on *informal* mentoring activities
(e.g. advising, counseling, advocating for students or junior faculty who are not your advisees)? _____

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

Please answer the following questions about your teaching load, which may not include formal courses for medical faculty, for the *winter 2001* and *fall 2001* terms (calendar year 2001). If on sabbatical or leave either term, please indicate by checking on the appropriate line under the relevant term(s).

	winter 2001		fall 2001	
on sabbatical/leave of absence				
	undergrad	graduate	undergrad	graduate
non-lab courses*/number (N) and total credit hours (hrs)	N= hrs=	N= hrs=	N= hrs=	N= hrs=
lab courses*/number (N) and total credit hours (hrs)	N= hrs=	N= hrs=	N= hrs=	N= hrs=
total number of students taught/teaching				
total number of GSIs/graders across courses				
average number of contact hours/week with medical students				
average number of contact hours/week with residents/fellows				
average number of office hours/week				
average number of hours supervising student research/week				

*If appropriate, put in parentheses the number of these courses designated for non-majors.

SERVICE. We're interested in knowing your level of involvement in committee work at UM over the *past 5 years*. For *each* of the following levels, please choose 3-5 of the committees you consider important, *whether or not you have served on them* by checking the box to the left of the committee name. Then specify your level of participation on those selected by checking the appropriate boxes. (Please note: important committees are those which *you feel* address significant/ substantive issues and on which *you feel* you have/could play a meaningful role.)

	Please check all that apply for each committee you list.	no participation	volunteered	asked to serve	served	chaired
	Department level committees:					
	curriculum					
	department executive					
	faculty search					
	fellowship					
	graduate admissions					
	space					
	other (please list):					
	School/college level committees					
	college curriculum					
	college executive					
	department/unit head search					
	other (please list):					
	University level committees					
	Please list:					
	Please list:					
	Please list:					

In a typical year, how many committees do you serve on? _____ *In a typical year*, how many do you chair?_____

Please list any other committees you have served on *in the past 5 years*. _____ _____

Have you *ever* been asked to serve and/or served as department chair, department section/area/program chair or center/ lab/ institute/program director or administrator? asked to serve: Yes No
served: Yes No

How important to you is having a department or college leadership position? *Please circle the appropriate number.*
Not at all important 1 2 3 4 5 Very important

How willing are you to take on time-consuming service tasks (e.g., chairing an important committee)? *Please circle the appropriate number.* Not at all willing 1 2 3 4 5 Very willing

University of Michigan Survey of Academic Climate and Activities

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RESOURCES. In the chart below, please indicate how much effort (e.g., memos, meetings, phone calls, etc.) it takes for you to secure the following items, and your level of satisfaction with current allocations of these items. *Please indicate by checking one box for each item under "effort" and one box for each item under "satisfaction."*

	effort						**satisfaction**					
	no effort	some effort	moderate effort	substantial effort	tremendous effort	not applicable	very dissatisfied	somewhat dissatisfied	neutral	somewhat satisfied	very satisfied	not applicable
office space												
research space												
computer equipment												
lab equipment												
service from vendors-repairs, supplies, upgrades												

If helpful, please elaborate on any resource allocation issues that concern you: _____

_____

_____

Have you received any of the following resources as a result of your own negotiations, the terms of an award, or offer by the university, since your initial contract at UM? *If so,* please check all that apply. *If not applicable,* please check here:

	asked/ bargained for by me	terms of an award	offered by university		asked/ bargained for by me	terms of an award	offered by university
course release time				special bonus			
lab equipment				summer salary			
lab space				special timing of tenure clock			
renovation of lab space				moving expenses			
research assistant				housing subsidy			
clerical/admin. support				child care			
discretionary funds				partner/spouse position			
travel funding				other :			

Have you *ever* had an outside offer while at UM? Yes No

If yes, has an outside offer ever resulted in a salary increase? Yes No

If no, why not _____

Many of the questions on the following pages ask you to rate conditions in your unit(s) or department(s). If you have multiple appointments, we would like to give you the opportunity to rate two units. Normally this would be the two units in which you spend the most time (regardless of percentage of budgeted appointment). However, we are most interested in learning about instructional units, so if one of these is a unit in which you have an administrative position, and you have an additional instructional appointment in another unit, please select the instructional unit. Please identify the unit(s) you will be rating in terms of the school/college in which each is located as well as your appointment in each by checking the appropriate boxes in the rows labeled Unit 1 and Unit 2, if applicable.

	School/College					**Appointment**		
	Engin.	Med.	LSA/Sci.	LSA/Soc. Sci.	Other	Instructional	Research	Clinical
Unit 1								
Unit 2								

University of Michigan Survey of Academic Climate and Activities

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CAREER SATISFACTION. How satisfied are you with the following dimensions of your professional development?

Unit 1							Unit 2						
very dissatisfied	somewhat dissatisfied	neutral	somewhat satisfied	very satisfied	not applicable	*Check the box that best expresses your level of satisfaction.*	very dissatisfied	somewhat dissatisfied	neutral	somewhat satisfied	very satisfied	not applicable
						opportunity to collaborate with other faculty						
						amount of social interaction with members of my unit/department						
						level of funding for my research or creative efforts						
						current salary in comparison to the salaries of my UM colleagues						
						ability to attract students to work with me						
						sense of being valued as a teacher by my students						
						sense of being valued as a mentor or advisor by my students						
						sense of being valued for my teaching by members of my unit/department						
						sense of being valued for my research, scholarship, or creativity by members of my unit/department						
						level of intellectual stimulation in my day-to-day contacts with faculty colleagues						
						sense of contributing to theoretical developments in my discipline						
						balance between professional and personal life						
						other, please specify:						

All things considered, how satisfied are you with your current position at UM? *Please circle the number on the scale that is closest to how you feel.* Very dissatisfied 1 2 3 4 5 Very satisfied

RECOGNITION

Has your department ever nominated you for an award in the following areas?

teaching	Yes	No
research	Yes	No
clinical	Yes	No
service	Yes	No

Has your department failed to nominate you for an award for which you were qualified? Yes No I don't know

If yes, please elaborate: _____

_____

PRODUCTIVITY

What are the most reliable and informative indicators of productivity in your area of research? *Please check up to five items.*

- ❑ number of external grant proposals (PI or co-PI)
- ❑ total dollar amount of external grants (PI or co-PI)
- ❑ number of external fellowships
- ❑ number of articles published in refereed academic or professional journals
- ❑ number of monographs written
- ❑ number of books edited
- ❑ number of book chapters
- ❑ number of dissertations chaired
- ❑ number of presentations at national/international conferences
- ❑ number of patents
- ❑ other *(please specify):* _____

_____

Using the criteria you checked above, how would you rate your overall level productivity compared to researchers in your area and at your rank nationwide? *Please circle the number that best corresponds to your rating.*

Much less productive 1 2 3 4 5 6 7 8 9 10 Much more productive

Using the same criteria, how do you think your department views your productivity, compared to the departmental average? *Please circle the number that best corresponds to your rating.*

Much less productive 1 2 3 4 5 6 7 8 9 10 Much more productive

University of Michigan Survey of Academic Climate and Activities

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INSTITUTIONAL AND UNIT/DEPARTMENT CLIMATE

In the chart below, please indicate the areas in which you would benefit from mentoring at this stage of your career by checking the relevant boxes in the column on the left. *Please check all that apply.* In the columns on the right, please indicate the level of mentoring you currently receive in each area listed, regardless of whether or not it is beneficial.

	My mentor(s)…	none	some	a lot	too much
	serves as a role model				
	promotes my career through networking				
	advises about preparation for advancement (e.g., promotion, leadership positions)				
	advises about getting my work published				
	advises about department politics				
	advises about obtaining the resources I need				
	advocates for me				
	advises about balancing work and family				
	other *(please specify):*				

Is there anyone whom you currently regard as a mentor—someone who gives advice and counsel on career issues and/or sponsors or advocates for you? Yes No

In the chart below please indicate in the space provided *how many* male and female mentors you have and the *kinds of support/advice they provide,* according to their institutional affiliation category. *Please answer separately for male and female mentors, as appropriate, and check all that apply.* If you feel this is not applicable to you, please leave blank and check here:

My mentor(s)…	**male mentors (N=)**				**female mentors (N=)**			
	UM same unit (1 or more)	UM different unit (1 or more)	at other institution (1 or more)	outside academe (1 or more)	UM same unit (1 or more)	UM different unit (1 or more)	at other institution (1 or more)	outside academe (1 or more)
serves as a role model								
promotes my career through networking								
advises about preparation for advancement (e.g. promotion/tenure, leadership positions)								
advises about getting my work published								
advises about department politics								
advises about obtaining the resources I need								
advocates for me								
advises about balancing work and family								
other:								

Please rate the climate of your unit(s)/department(s) on the following continuum by *circling/underlining the appropriate number*.

Unit 1							**Unit 2**						
Friendly	1	2	3	4	5	Hostile	Friendly	1	2	3	4	5	Hostile
Racist	1	2	3	4	5	Non-racist	Racist	1	2	3	4	5	Non-racist
Homogeneous	1	2	3	4	5	Diverse	Homogeneous	1	2	3	4	5	Diverse
Disrespectful	1	2	3	4	5	Respectful	Disrespectful	1	2	3	4	5	Respectful
Collegial	1	2	3	4	5	Contentious	Collegial	1	2	3	4	5	Contentious
Non-sexist	1	2	3	4	5	Sexist	Non-sexist	1	2	3	4	5	Sexist
Collaborative	1	2	3	4	5	Individualistic	Collaborative	1	2	3	4	5	Individualistic
Cooperative	1	2	3	4	5	Competitive	Cooperative	1	2	3	4	5	Competitive
Homophobic	1	2	3	4	5	Non-homophobic	Homophobic	1	2	3	4	5	Non-homophobic
Not supportive	1	2	3	4	5	Supportive	Not supportive	1	2	3	4	5	Supportive

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

Please indicate your level of agreement with each of the following statements concerning conditions in your unit(s)/ department(s), and your relationships with your unit/department colleagues by *checking the appropriate box*.

Unit 1							Unit 2					
strongly disagree	tend to disagree	neutral	tend to agree	strongly agree	not applicable		strongly disagree	tend to disagree	neutral	tend to agree	strongly agree	not applicable
						My research interests are valued by my colleagues.						
						I feel pressured to change my research agenda in order to fit in.						
						I feel/felt pressured to change my research agenda to make tenure/be promoted .						
						I am comfortable asking questions about performance expectations.						
						I am/was reluctant to bring up issues that concern me for fear that it will/would affect my promotion/tenure.						
						My colleagues expect me to represent "the point of view" of my gender.						
						My colleagues expect me to represent "the point of view" of my race/ethnicity.						
						My colleagues solicit my opinions about their research ideas and problems.						
						My colleagues have lower expectations of me than of other faculty.						
						I constantly feel under scrutiny by my colleagues.						
						I have/had to work harder than I believe my colleagues do, in order to be/have been perceived as a legitimate scholar.						
						There are many unwritten rules concerning how one is expected to interact with unit colleagues.						
						Others seem to find it easier than I to "fit in."						

How would you rate your unit(s)/department(s)'s executive leader (chair or director) in each of the following areas*? Check the appropriate box for each item.*

Unit 1						**Unit 2**					
poor	below average	average	above average	superior	The chair/director of my unit/department…	poor	below average	average	above average	superior
					maintains high academic standards					
					is open to constructive criticism					
					is an effective administrator					
					shows interest in faculty					
					encourages and empowers faculty					
					treats faculty in an even-handed way					
					helps me obtain resources I need					
					gives me useful feedback about my performance					
					articulates a clear vision					
					articulates clear criteria for promotion/tenure					
					honors agreements					
					handles disputes/problems effectively					
					communicates consistently with faculty					
					creates a cooperative and supportive environment					
					shows commitment to racial-ethnic diversity					

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

For each item, please *check the box* that best corresponds to how much influence you feel you have over the following matters in your unit(s)/department(s):

Unit 1							Unit 2					
really no influence	minor influence	some influence	substantial influence	tremendous influence	not applicable		really no influence	minor influence	some influence	substantial influence	tremendous influence	not applicable
						unit curriculum decisions						
						size of salary increases I receive						
						obtaining money for travel to professional meetings						
						securing the facilities or equipment I need for my research						
						selecting new graduate students or residents/fellows						
						selecting new faculty members to be hired						
						determining who gets tenure						
						selecting the next unit head						
						affecting the overall unit climate/culture						

Please indicate in the chart below any job-related discrimination you have experienced *at UM within the last five years*, noting the basis for the discrimination (race/ethnicity, gender, sexual orientation, etc.) and the areas in which the discriminatory behavior has affected your career at UM. *Please check all that apply.*

	not applicable	race/ ethnicity	gender	sexual orientation	physical disability	religious affiliation	other:
hiring							
promotion							
salary							
space/equipment, other resources							
access to administrative staff							
graduate student or resident/fellow assignments							
other *(please specify)*:							

Please indicate your level of agreement with each of the following statements concerning the atmosphere in your unit(s)/department(s) by *checking the appropriate box*:

Unit 1						Unit 2					
strongly disagree	disagree	neutral	agree	strongly agree		strongly disagree	disagree	neutral	agree	strongly agree
					Some faculty have a condescending attitude toward women.					
					Sexist remarks are heard in the classroom.					
					There is equal access for both men and women to lab/research space.					
					The environment promotes adequate collegial opportunities for women.					
					Men receive preferential treatment in the areas of recruitment and promotions.					
					Men are more likely than women to receive helpful career advice from colleagues.					
					In meetings, people pay just as much attention when women speak as when men do.					
					Women are appropriately represented in senior positions.					
					Sex discrimination is a big problem in my department.					

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

How often within the last five years at UM have you overheard insensitive or disparaging comments about the following types of people in general, or about particular people as a member of that group, made by faculty or students? [*This does not refer to comments about an individual as an individual.] Please check once for each row. Check "never" if not applicable*.

		never	once or twice/ year	couple of times/ term	more than once/ month	weekly
about women in general, or about particular women as "typical" of women	faculty					
	students					
about men in general, or about particular men as "typical" of men	faculty					
	students					
about racial/ethnic minorities, or about particular persons of color as "typical" of a racial/ethnic group	faculty					
	students					
about a religious group or about particular persons as "typical" of a religious group	faculty					
	students					

Within the past 5 years, have you experienced any unwanted and uninvited sexual attention (defined as including unwanted sexual teasing, jokes, remarks or questions; unwanted pressure for dates; unwanted letters, phone calls, email; unwanted touching, leaning over, cornering, pinching; unwanted pressure for sexual favors; stalking; rape or assault)? Yes No

If yes, did you make an official report of it to anyone? Yes No

Why/why not? _____

_____

_____

If applicable, please indicate which of the following actions you took in response to the unwanted sexual attention by indicating the effect that this action had. *Please check all that apply. If you did not take the action please check N/A.*

	I felt better	I felt worse	behavior decreased	behavior increased	made no difference	N/A
ignored behavior						
avoided the person(s)						
curtailed time in that unit						
asked/told the person(s) to stop						
reported behavior to unit/department head						
reported behavior to other UM official						
made a joke of the behavior						
went along with the behavior						
other; please explain:						

In your unit(s)/department(s), how prevalent are instances of unwanted and uninvited sexual attention? *Please circle the appropriate number for each applicable unit.*

Unit 1: Not at all prevalent 1 2 3 4 5 Very prevalent

Unit 2: Not at all prevalent 1 2 3 4 5 Very prevalent

Within the past five years, how many individuals from UM have come to you concerned about behavior they experienced that either *you or they* would define as uninvited and unwanted sexual attention? _____

Are you now, or *in the past five years* have you ever been, the officially designated person to whom people report incidences of unwanted sexual attention? Yes No

University of Michigan Survey of Academic Climate and Activities

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PERSONAL LIFE

Do you have a spouse or partner? Yes No
(*If no,* please go to the section labeled **DEMOGRAPHICS**, below)

What, if any, is your spouse's/partner's employment or career field? _____

What is your spouse's/partner's employment status? Full time Part time Not employed

What is your spouse's/partner's *preferred* employment status at this time? Full time Part time Not employed

If your partner is employed at UM, what type of appointment does he or she have? *Check all that apply.*

faculty member	administrative/professional staff	office or support staff
primary research appointment	technical	health field
post-doctoral or fellowship	librarian/curator	other, specify_____

Have you ever sought help from UM in attempting to find appropriate employment for your spouse or partner?
Yes No

If yes, how satisfied were you with UM's help in locating appropriate opportunities for your spouse or partner? *Please circle the appropriate number.*

Very dissatisfied 1 2 3 4 5 Very satisfied

Have you ever considered leaving UM to improve career opportunities for your spouse/partner? Yes No

DEMOGRAPHICS

Age: _____ (years) Sex: Male Female US citizen?: Yes No

Racial/Ethnic Identification *(Check one):*
___African American
___Asian American
___Euro American
___Latina/o or Hispanic American
___Native American/American Indian
___Mixed (pleased describe):_____
___Other (please describe): _____

Number of children for whom you do, or have, provide(d) care: _____
Age of youngest: _____
Age of oldest: _____

If you are a tenured or tenure-track faculty member:

Is it possible to stop or extend the tenure clock in your unit(s)/department(s)? Yes No I don't know

If yes, and if you were ever an assistant professor at UM, did you stop or extend the tenure clock for any of the following reasons? *Check all that apply.*

Yes, as part of my start-up package.
Yes, because of a professional opportunity.
Yes, because of childbirth/other dependent care duties.
Yes, for health/medical reasons.
Yes, for other reasons; please specify _____

Did you choose *not* to stop the tenure clock even though you were entitled to? Yes No
If yes, why? _____

If you have chosen to stop the tenure clock for any reason, how supportive was/were your unit(s)/department(s) in facilitating this choice? *Please circle the appropriate number for each applicable unit.*

Unit 1:	Not at all supportive	1	2	3	4	5	Very supportive
Unit 2:	Not at all supportive	1	2	3	4	5	Very supportive

SURVEY FOLLOWUP

Because the survey responses are anonymous, we have no way of knowing who completed them. Therefore, we ask you to please fill out and return, under separate cover, the enclosed stamped and addressed postcard. The postcard asks you to provide the following information:

1. that you have completed and returned (or decline to complete) the survey. This information will be used to re-contact non-respondents in an effort to increase response rate. *If you return the postcard you will not be re-contacted about the survey;*

2. whether or not you would like a copy of the report of the findings;

3. whether or not you would be interested in participating in a follow-up interview. Sometimes respondents are willing to be interviewed in order to discuss further issues raised briefly in a survey. If you think you might be interested in an interview, please indicate this by checking the appropriate box on the reply postcard. Information provided in an interview, while not anonymous, will be confidential. Regrettably, we may not be able to interview all those who express interest.

Thank you very much for taking the time to complete and return the survey.

Appendix B: List of Colleges and Units/Departments Surveyed

UM Survey of Academic Climate and Activities: Included Colleges and Units/Departments

College Of Engineering
- Aerospace Engineering
- Atmospheric, Oceanic & Space Sciences
- Biomedical Engineering
- Chemical Engineering Department
- Civil & Environmental Engineering
- Electrical Engineering & Computer Science
- Industrial-Operations Engineering
- Macromolecular Science & Engineering Center
- Materials Science & Engineering
- Mechanical Engineering
- Naval Architecture & Marine Engineering
- Nuclear Engineering & Radiological Sciences
- Technical Communication

College Of Literature, Science & The Arts
- Anthropology
- Astronomy
- Biology
- Chemistry
- Communication Studies
- Economics
- Geological Sciences
- History
- Mathematics
- Physics
- Political Science
- Psychology
- Sociology
- Statistics
- Residential College
- Women's Studies Program

School Of Dentistry
- Biologic And Materials Sciences
- Cariology,Restorative Sciences & Endodontics
- Community Dentistry
- Dental Hygiene-Dentistry
- Oral Diagnosis-Dentistry
- Oral Medicine/Pathology/Oncology
- Oral Pathology-Dentistry
- Oral Surgery Dentistry
- Oral/Maxillofacial Surgery/HospitalDentistry
- Orthodontics & Pediatric Dentististry
- Orthodontics-Dentistry
- Pediatric Dentistry
- Periodontics/Prevention/Geriatics
- Periodontics-Dentistry
- Prosthodontics

Medical School
- Anesthesiology
- Biological Chemistry
- Cardiac Surgery Section
- Cell & Development Biology
- Dermatology
- Family Medicine
- Emergency Medicine
- General Surgery Section
- Human Genetics
- Internal Medicine-Hematology/Oncology
- Internal Medicine-Molecular Medicine & Genetics
- Internal Medecine-Nephrology
- Internal Medicine
- Kresge Hearing Research Institute
- Laboratory Animal Medicine Unit
- Microbiology And Immunology
- Neurology
- Neurosurgery Section
- Obstetrics and Gynecology
- Ophthalmology and Visual Sciences
- Oral Surgery Section
- Orthopaedic Surgery Section
- Otorhinolaryngology
- Pathology
- Pediatric Surgery Section
- Pediatrics & Communiable Diseases
- Pharmacology
- Physical Medicine & Rehabilitation
- Physiology
- Plastic Surgery Section
- Psychiatry
- Radiation Oncology
- Radiology
- Surgery
- Thoracic Surgery Section
- Urology Surgery Section
- Vascular Surgery Section
- Medical Education
- Medical School Administration

School Of Public Health
- Biostatistics
- Environmental Health Sciences
- Epidemiology
- Health Behavior & Health Education
- Health Management And Policy

College Of Pharmacy

Division Of Kinesiology

School Of Nursing

School Of Natural Resources & Environment

School Of Information

Research Centers and Institutes

Center for Human Growth & Development
Biological Station
Museum Of Anthropology
Herbarium
Museum of Paleontology
Institute for Environmental Sciences
Engineering and Technology
Space Physics Research Lab
Cooperative Institute for Limnology & Ecosystems Research
Substance Abuse (Medical School)
Mental Health Research Institute
Substance Abuse Research Center
Director Of Research-Dentistry
Institute of Gerontology
Collaboratory for Research on Electronic Work
Program Study of Complex Systems
Biophysics Research Division
Center for Great Lakes & Aquatic Sciences
UM Transportation Research Institute

Appendix C: ADVANCE Committee Membership

ADVANCE Committee Membership

Steering Committee
Abigail Stewart (PI, Psychology, Women's Studies)
Pamela Raymond (Co-PI, Senior Counselor to the Provost, Cell and Developmental Biology)
Stephen Director (Co-PI, Dean of Engineering)
Allen Lichter (Co-PI, Dean of Medicine)
Terrence McDonald (Interim Dean of LS&A)

Project Staff
Abigail Stewart, Implementation
Danielle LaVaque-Manty, Implementation
Janet Malley, Evaluation
Julie Stubbs, Evaluation

Evaluation Advisory Committee
Mark Chesler (Sociology)
Mary Corcoran (Political Science, Public Policy, Social Work, Women's Studies)
Paul Courant (Interim Provost, Economics)
Ann Lin (Public Policy, Political Science)
Richard Gonzalez (Psychology)
Sylvia Hurtado (Higher Education)
Janet Lawrence (Higher Education)
Valerie Lee (Education)
Yu Xie (Sociology)

Committee on Science and Technology Recruiting to Improve Diversity and Excellence (STRIDE)
Anthony England (Electrical Engineering and Computer Sciences)
Carol Fierke (Chemistry)
Melvin Hochster (Mathematics)
Samuel Mukasa (Geological Sciences)
Martha Pollack (Electrical Engineering and Computer Science)
Pamela Raymond (Cell and Developmental Biology)
Michael Savageau (Microbiology and Immunology)
John Vandermeer (Ecology and Evolutionary Biology)

Project Collaborators, Evaluation
Carol Hollenshead (CEW)
Jean Waltman (CEW)

Implementation Advisory Committee
Linda Abriola (Civil and Environmental Engineering)
James Bean (Associate Dean of Engineering, Industrial Operations)
David Bloom (Associate Dean of Medicine, Urology Surgery)
David Burke (Human Genetics)
Valerie Castle (Associate Provost, Pediatrics and Communicable Diseases)
Carol Fierke (Chemistry)
Katherine Freese (Physics)
Philip Hanlon (Associate Dean of LS&A, Mathematics)
John Laird (Electrical Engineering and Computer
Donald Lopez (Associate Dean of LS&A, Asian Languages and Culture)
Samuel Mukasa (Geological Sciences)
Matthew O'Donnell (Biomedical Engineering)
Marvin Parnes (Associate Vice President for Research)
Tresa Pollock (Materials Science and Engineering)
Pamela Raymond (Senior Counselor to the Provost, Cell and Developmental Biology)
Linda Samuelson (Physiology)
Michael Savageau (Microbiology and Immunology)
Lisa Tedesco (Vice President and Secretary of UM, Dentistry)
Kathryn Tosney (Biology)

Project Collaborators, Implementation
Constance Cook (CRLT)
Cinda-Sue G. Davis (WISE)
Jane Hassinger (Interdisciplinary Program in Feminist Practice)
Patricia Shure (Math Department)

Appendix D: Scale Construction

Scale Construction

University Climate

Gender Stereotyping, Alpha= .82
Insensitive or disparaging comments…
about women in general or about particular women as "typical" of women made by faculty
about women in general or about particular women as "typical" of women made by students
about men in general or about particular men as "typical" of men made by faculty
about men in general or about particular men as "typical" of men made by students

How often within the last five years at UM have you overheard insensitive or disparaging comments about the following types of people in general, or about particular people as a member of that group, made by faculty or students? (This does not refer to comments about an individual as an individual.)
Scale 1-5 (1=never, 2=once or twice per year, 3=couple times per term, 4=more than once a month, 5=weekly.)

Ethnic/Religious Stereotyping, Alpha= .87
Insensitive or disparaging comments…
about racial/ethnic minorities, or about particular persons of color as "typical" of a racial/ethnic group made by faculty
about racial/ethnic minorities, or about particular persons of color as "typical" of a racial/ethnic group made by students
about a religious group or about particular persons as "typical" of a religious group made by faculty
about a religious group or about particular persons as "typical" of a religious group made by students

How often within the last five years at UM have you overheard insensitive or disparaging comments about the following types of people in general, or about particular people as a member of that group, made by faculty or students? (This does not refer to comments about an individual as an individual.)
Scale 1-5 (1=never, 2=once or twice per year, 3=couple times per term, 4=more than once a month, 5=weekly.)

Departmental Climate

Tolerant Environment, Alpha= .72
Racist/ Non-racist
Homophobic/ Non-homophobic
Homogeneous/ Diverse
Sexist/ Non-sexist
Rate the climate of your unit/department on the following continuum by circling the appropriate number.
Scale1-5 (1=negative, 5=positive)

Positive Environment, Alpha=.88
Hostile/ Friendly
Disrespectful/ Respectful
Contentious/ Collegial
Individualistic/ Collaborative
Competitive/ Cooperative
Not supportive/ Supportive

Rate the climate of your unit/department on the following continuum.
Scale1-5 (1=negative, 5=positive)

Gender Egalitarian Atmosphere, Alpha=.86
Some faculty have a condescending attitude toward women. (R)
Sexist remarks are heard in the classroom. (R)
There is equal access for both men and women to lab/research space.
The environment promotes adequate collegial opportunities for women.
Men receive preferential treatment in the areas of recruitment and promotions. (R)
Men are more likely than women to receive helpful career advice from colleagues. (R)
In meetings, people pay just as much attention when women speak as when men do.
Women are appropriately represented in senior positions.
Sex discrimination is a big problem in my department. (R)

Please indicate your level of agreement with each of the following statements concerning the atmosphere in your unit/department.
Scale 1-5 (1=strongly disagree, 5=strongly agree)
(R) indicates items reversed for analysis.

Scholarly Isolation, Alpha= .75
I am comfortable asking questions about performance expectations. (R)
My colleagues solicit my opinions about their research ideas and problem. (R)
My research interests are valued by my colleagues. (R)
I feel pressured to change my research agenda in order to fit in.
I feel/felt pressured to change my research agenda to make tenure/be promoted.
My colleagues have lower expectations of me than of other faculty.

Please indicate your level of agreement with each of the following statements concerning conditions in your unit/department.
Scale 1-5 (1=strongly disagree, 5=strong agree)
(R) Indicates items reversed for analysis.

Felt Surveillance, Alpha= .74
I am/was reluctant to bring up issues that concern me for fear that it will/would affect my promotion/tenure.
I constantly feel under scrutiny by my colleagues.
I have/had to work harder than I believe my colleagues do, in order to be/have been perceived as a legitimate scholar.
There are many unwritten rules concerning how one is expected to interact with unit colleagues.

Please indicate your level of agreement with each of the following statements concerning conditions in your unit/department.
Scale 1-5 (1=strongly disagree, 5=strong agree)

Felt Tokenism, Alpha= .87
My colleagues expect me to represent "the point of view" of my gender.
My colleagues expect me to represent "the point of view" of my race/ethnicity.

Please indicate your level of agreement with each of the following statements concerning conditions in your unit/department.
Scale 1-5 (1=strongly disagree, 5=strong agree)

Chair as Fair, Alpha= .88
treats faculty in an even-handed way
honors agreements
handles disputes/problems effectively

How would you rate your unit/department's executive leader (chair or director) in each of the following areas? The chair/director of my unit department…
Scale 1-5 (1=poor, 5=superior)

Chair as Able to Create a Positive Environment, Alpha= .89
is an effective administrator
encourages and empowers faculty
creates a cooperative and supportive environment

How would you rate your unit/department's executive leader (chair or director) in each of the following areas? The chair/director of my unit department…
Scale1-5 (1=poor, 5=superior)

Other Department and Campus Experiences

Influence over Educational Matters, Alpha= .80
unit curriculum decisions
selecting new graduate students or residents/fellows
selecting new faculty members to be hired
determining who gets tenure
selecting the next unit head

For each item, please check the box that best corresponds to how much influence you feel you have over the following matters in your unit/department.
Scale 1-5 (1=really no influence, 5 tremendous influence)

Influence over Unit Resources, Alpha= .64
size of salary increases I receive
obtaining money for travel to professional meetings (beyond standard unit allocations)
securing the facilities or equipment I need for my research

For each item, please check the box that best corresponds to how much influence you feel you have over the following matters in your unit/department.
Scale 1-5 (1=really no influence, 5 tremendous influence)

Career Satisfactions, Alpha= .84
opportunity to collaborate with other faculty
amount of social interaction with members of my unit/department
level of funding for my research or creative efforts
current salary in comparison to the salaries of my UM colleagues
ability to attract students to work with me
sense of being valued as a teacher by my students
sense of being valued as a mentor or advisor by my students
sense of being valued for my teaching by members of my unit/department
sense of being valued for my research, scholarship, or creativity by members of my unit/department
level of intellectual stimulation in my day-to-day contacts with faculty colleagues
sense of contributing to theoretical developments in my discipline
balance between professional and personal life

How satisfied are you with the following dimensions of your professional development?
Scale 1-5 (1=very dissatisfied, 5=very satisfied)