Assessing the Academic Work Environment for Science and Engineering and Social Science Faculty at the University of Michigan in 2006: Gender, Race, and Discipline in Retention-Relevant Career Experiences

UM ADVANCE Program

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INTRODUCTION

This is the fourth in a series of reports derived from the fall 2006 study of the academic climate on the University of Michigan campus. The first report assessed data from UM science and engineering faculty in 2001 and 2006 about their experiences of their work environment; the second report assessed the same climate factors for both science and engineering and social science faculty in 2006[1]. This report draws on the same 2006 data used in the second report; that is, responses from science and engineering faculty as well as social science faculty to the 2006 climate survey. For detailed information about the full study and data collection procedures, please refer to the initial report.

The purpose of this report is comparison of the gender and race differences by broad disciplinary groups (science/engineering and social science) in work experiences generally thought to be related to faculty career satisfaction and retention. These include opportunities for leadership and influence, service, allocation of resources, recognition and family responsibilities[2]. Analyses across the two disciplinary areas are not possible using the 2001 data, since we did not collect data from male social science faculty at that time. This report, then, examines gender and race differences in both groups of faculty for 2006 only.

Sample

The target sample of tenure track faculty surveyed for this study and reported on here includes the following groups of faculty with paid appointments at the University of Michigan-Ann Arbor as of August, 2006:

- All female tenure track science and engineering faculty at or above the rank of assistant professor (N=352).
- Random subsample of male tenure track science and engineering faculty at or above the rank of assistant professor, stratified by race and rank (N=620).
- All female tenure track social science faculty at or above the rank of assistant professor (N=148).
- All male tenure track social science faculty at or above the rank of assistant professor (N=244).

Due to the small number of faculty of color in academic science and engineering, as well as the social sciences, at the University of Michigan, the ADVANCE Evaluation Advisory Committee[3] 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 from underrepresented groups (African Americans, Latinos and Native Americans) in the target sample and a substantial random sample of Asians and Asian Americans. A total of 300 faculty of color (of whom 134 were underrepresented minorities) were surveyed.

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[1] All four reports are available on the ADVANCE Program website: http://sitemaker.umich.edu/advance/faculty-climate.

[2] These variables were also addressed in the third report, comparing Time 1 to Time 2 for science and engineering faculty.

[3] Members of the Evaluation Advisory Committee are Deborah Carter (Education), Mark Chesler (Sociology), Mary Corcoran (Political Science, Public Policy, Social Work, Women's Studies), Paul Courant (University Librarian and Dean of Libraries, Public Policy, Economics), Ann Lin (Public Policy, Political Science), Richard Gonzalez (Psychology), Janet Lawrence (Higher Education), Valerie Lee (Education), and Yu Xie (Sociology).

The target sample for science and engineering faculty was drawn from the three largest schools with science and engineering faculty (Engineering, LSA, and Medicine) as well as seven smaller schools (Dentistry, Information, Kinesiology, Natural Resources and Environment, Nursing[4], Pharmacy and Public Health). All social science faculty in these schools were included in the target sample.

The total sample of science and engineering faculty respondents in 2006 included 276 tenure track faculty. Of these, 128 were female, 148 were male, 207 were white, and 55 were faculty of color[5]. The comparable sample of social science faculty respondents was 147, including 73 women and 74 men; 32 of them were faculty of color. For both disciplinary subsamples, male faculty were older and had been at UM longer than female faculty; they also received their highest degree longer ago, and were less likely to have been hired within the past 10 years. Similarly, men were more likely to be full professors than women faculty.

We found similar differences when comparing the white tenure track faculty with tenure track faculty of color. White faculty were older than the faculty of color; they had also been at UM longer and had received their degrees earlier. Faculty of color were also more likely to have been hired in the last 10 years. White faculty were more likely to be at the rank of full professor. Given these differences, a composite variable assessing experience was constructed as a mean of age, years at UM, year of degree, and rank. This measure of experience was used as a control in all analyses and means that any statistical finding reported here cannot be explained by simple differences in age, years at UM, year of degree or rank.

Data Analysis Strategy

In this study we assessed gender differences in experiences of scientists and engineers on the tenure track compared to gender differences among social scientists on the tenure track; in addition, we assessed race-ethnicity by comparing faculty of color with white faculty within discipline groups. Preliminary analyses were conducted comparing Asians and Asian American faculty to underrepresented minority faculty that revealed few significant differences. Given this, and the small total number of faculty of color in the sample, we combined Asian and Asian American faculty with underrepresented minority faculty in these analyses. Analyses were completed using analyses of variance (ANOVAs) on scales and items from the survey to assess differences by gender and race-ethnicity, comparing mean scores of white and minority women and men scientists and engineers, and white and minority women and men 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 eight faculty groups--white women, minority women, white men, and minority men for each of the two disciplines. This design allows for a three-way ANOVA (gender X race X discipline). When the ANOVA indicated an overall significant difference in one of those individual or combined factors, we pursued relevant planned comparisons

[4] The demographic makeup of the Nursing school is quite different from the other schools. However, because preliminary analyses excluding Nursing school respondents were comparable to analyses in which they were included, we decided to keep respondents from all schools in the analysis sample.

[5] Four groups were treated as minority or "faculty of color": Asians and Asian Americans, African Americans, Native Americans and Latinos. Preliminary analyses were conducted comparing Asians and Asian American faculty to underrepresented minority faculty that revealed few significant differences. Given this, and the small total number of faculty of color in the sample, we decided to combine Asian and Asian American faculty with underrepresented minority faculty in these analyses.

between appropriate groups. This is a relatively conservative way to minimize error when conducting multiple tests.

When assessing frequency data (numbers of people, rather than scores), we used logistic regression, which is appropriate when the dependent variable is dichotomous but there are continuous control variables.

In the results discussed below, any references to significant differences or group differences refer exclusively to differences found to be statistically significant ($p \leq .05$—that is, differences or effects that would have occurred by chance if there really was no difference or effect at or less than 5 percent of the time, which is a generally accepted standard of statistical significance in social science research). Data tables follow the report. Four comparable tables are produced for each set of analyses to allow us to show differences among the groups (i.e., comparing male faculty by race-ethnicity, female faculty by race-ethnicity, white faculty by gender, and faculty of color by gender) within the two broad disciplines. Each table reports means or frequencies by group for both disciplines and identifies significant group differences within disciplines.[6]

Overview of Results

Our approach in this report is to examine qualities and characteristics of faculty work life, beyond ratings of the climate (which were addressed in the first two reports), that are thought to be important to faculty members' ability to be productive and have satisfying careers. For example, access to adequate resources to conduct research, recognition for academic work, and opportunities for leadership and influence are considered factors contributing to successful academic careers and conditions that are likely to keep faculty at the university[7]. Similarly, family responsibilities (e.g., the need to care for young children and/or a partner with full-time employment) or demands for university service may, if too time-consuming, divert faculty from their own scholarship and teaching and be obstacles to their success. We consider whether or not these work conditions vary systematically by race-ethnicity and/or gender within each of the disciplinary domains. We follow with an assessment of how these experiences and conditions may be related to faculty members' job satisfaction as well as their intentions to leave the university.

FINDINGS

Resources and Service: No Differences by Gender or Race-Ethnicity

There were very few statistically significant differences between gender and racial-ethnic groups, and no pattern of differences in two areas of faculty work-life considered in this report: **resources** (amount of office and research space faculty reported were allocated to them, their post docs and graduate students, adequacy of that space, and satisfaction with quality of office and research space) and **service** (number of committees faculty reported that they served on over the past five years, number of committees they reported they chaired over the past five years, and how willing respondents were to take on time-consuming service tasks). The results of these analyses are not described in detail here; however, they are included in the full set of tables posted on the ADVANCE website.

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[6] A more complete set of tables, including standard deviations, is available on the ADVANCE website: http://sitemaker.umich.edu/advance/faculty-climate.

[7] Mentoring is also considered important for faculty success, especially for junior faculty. However, this report focuses on those aspects of faculty work life potentially relevant for all faculty. The mentoring experience of junior faculty will be addressed in a separate report.

Family Responsibility, Influence and Recognition: Differences by Gender or Race-Ethnicity
Other factors (family responsibility, experiences of influence, and recognition) did produce important differences by race-ethnicity and/or gender. These findings are described below.

Family Responsibilities
Respondents were asked if they had a partner and children and age of youngest child. Those with partners were also asked whether or not the partner had full-time employment. Those with children were asked the extent of their responsibility for child care. Based on responses, a **composite family responsibility variable** was created as a mean of these family and partner demographics such that a higher score represented more family responsibility (e.g., younger children, more child care responsibility, being a single parent, having a partner who is employed full-time).

This variable produced a main effect for sex; men reported less family responsibility overall than women. This difference was principally accounted for by white men in both science and engineering and the social sciences, whose mean scores on family responsibility were significantly lower than those for their female counterparts (see Table 1). There were no differences comparing men and women of color in either disciplinary area, nor comparing women or men by racial-ethnic group.

Influence
Felt Influence: The survey identified nine areas of influence in department activities and respondents were asked to rate their level of felt influence in each of the areas. Two areas addressed felt influence in education and the curriculum (curriculum decisions, selecting new graduate students and residents/ fellows), and were combined to create a mean **felt influence over educational matters** scale. Three items addressed more general faculty matters (selecting new faculty members, determining who gets tenure, and selecting the next unit head), and were combined to created a mean **felt influence over faculty matters** scale. Three other items addressed influence concerning departmental resources (size of salary increase, obtaining money for travel, and securing facilities or equipment for research); these items were combined to create a mean **felt influence over resource allocations** scale. The ninth area, influence over the **overall unit's climate/culture**, remained a separate item.

There was a main effect for sex for both the felt influence over resources as well as the individual item assessing influence over the department's climate: women in both disciplinary domains reported less felt influence than men in both areas.

Comparisons between groups defined by race/ethnicity, gender withiin discipline revealed that women of color in the sciences and engineering reported less felt influence over educational matters and the department's climate than men of color (see Table 2d) and less felt influence over faculty matters than white women. In the social sciences, white women reported less felt influence over the department's climate than white men (see Table 2c).

Felt Exclusion: A separate question queried respondents' **experiences of being excluded** from participating in important decision-making college and/or department level committees. There were no statistically significant differences among the groups on this item (see Tables 2a-d).

Recognition
To assess experiences of recognition, faculty were asked whether or not their departments had ever nominated them for an **award in teaching, research** and **service**. A fourth survey item asked faculty to

indicate whether or not their departments had **failed to nominate them for an award** for which they were qualified.

There were very few differences among the faculty groups on this dimension and they were principally related to women of color in the social sciences. These faculty were less likely to report being nominated for a research award than white women or men of color in the social sciences (see Tables 3b and d).

Summary of Factors that May Support Faculty Work

In both disciplinary areas, men (especially white men) reported a lower level of family responsibility than women. Although there were no differences in feeling excluded from important decision-making committees, women across disciplinary areas felt they had less influence over educational and faculty matters, as well as the department's climate and culture, than men. Moreover, in the sciences and engineering, women of color reported lower levels of felt influence over department educational matters and the department's climate than men of color and less influence over faculty matters than white women. In the social sciences, white women reported less felt influence over the department's climate than white men, and women of color reported fewer instances of recognition through research award nominations.

Relationship of these Experiences to Job Satisfaction

We next examined the relationships of the factors considered here that contribute to faculty members' success to their job satisfaction (assessed by the item, how satisfied are you with your current position at UM) and intentions to leave (assessed with a mean of a two item scale combined so that a higher score indicates stronger intention to leave: how much you would like to stay at UM for your entire career, and how often do you think about leaving UM). To assess these relationships, all reported variables (number of committees served on, satisfaction with resources, family responsibilities, felt influence in the four areas, and department's failure to nominate them for an award) were correlated with the two outcome measures for the entire sample and then separately by race and gender groups within disciplines (see Tables 4a and b).

Results of analyses with the full sample revealed that all factors but one (family responsibility) were associated with job satisfaction in the expected directions (all were positive with the exception of reported failure to nominate for an award). In addition, all but family responsibility, committee service, and failure to nominate for an award were associated with intention to leave (all correlations were negative). These results suggest that all the variables assessed here, with the exception of family responsibility, play a role in faculty members' level of satisfaction with their jobs and whether or not they contemplate leaving the University. We next examined the same relationships individually for the four groups of faculty within each discipline.

Science and Engineering

White men: job satisfaction was positively related to reported committee service, satisfaction with resources, felt influence in each of the four areas assessed and negatively related to reporting that the department failed to nominate them for an award. Similarly, intention to leave was correlated negatively with all four influence variables and satisfaction with space.

White women: For white women, results were identical to those for white men, with one exception; reported committee service was not correlated with job satisfaction.

Men of color: Reported number of committees served on and satisfaction with the quality of space were positively correlated with job satisfaction. In addition satisfaction with space and felt influence over the department's climate were negatively correlated with intention to leave.

Women of color: For women of color, satisfaction with the quality of space and felt influence over the department climate were positively associated with job satisfaction; and felt influence over the department's climate, educational matters, and resource allocations were negatively associated with intention to leave.

Social Sciences

White men: Felt influence over the department's climate, educational matters and resource allocations were positively correlated with job satisfaction; no variables were correlated with intention to leave for these faculty.

White women: Influence over the department's climate and resource allocations were associated with job satisfaction and intention to leave in the expected directions. In addition, felt influence over faculty matters was positively associated with job satisfaction and felt influence over educational matters was negatively associated with intention to leave.

Men of color: Only felt influence over faculty matters produced a significant correlation and that was positive with job satisfaction.

Women of color: Felt influence over resource allocations was positively associated with job satisfaction for women of color; felt influence over faculty matters was negatively correlated with intention to leave and reported failure to be nominated for an award was positively correlated with intention to leave.

PREDICTING JOB SATISFACTION AND INTENTION TO LEAVE

Career-Related Factors that Predict Job Satisfaction and Intention to Leave UM

Given the relationship of these factors to job satisfaction and intention to leave, we conducted a series of regressions that would allow us to understand the relative importance of each of the factors considered in this report in predicting both job satisfaction and intention to leave. The overall regression model included a variable for each of the factors (reports of family responsibility, satisfaction with resources, reported committee service, felt influence over the department's climate and culture,[8] and reported failure to be nominated for an award) as well as the control (composite experience) and demographic (gender, race-ethnicity, and discipline) variables. Because job satisfaction is highly

[8] Four variables assessed felt influence in different areas and preliminary analyses revealed high inter-correlation among them. Because of a need to limit the number of variables in the regression model, and concern about multicollinearity, only one felt influence variable was selected for these analyses.

correlated with intention to leave, it was also included in the regression model predicting intention to leave.

The model was first run on the entire sample and results are shown in Tables 5a and b. The regression predicting job satisfaction produced four significant predictors. Three of those predictors (satisfaction with resources, reported committee service, felt influence over the department's climate) were positive—that is a higher score was associated with higher job satisfaction—and one was negative (failure to be nominated for an award). The regression predicting intention to leave produced only one significant predictor: job satisfaction was negatively predictive of intention to leave.

A series of similar regressions were run separately for men and women as well as white faculty and faculty of color (sample sizes were too small to conduct regressions by race and gender groups within disciplines). Gender was not included in the model run separately for men and women; similarly, race-ethnicity was not included in the model run separately for white faculty and faculty of color.

<u>Differences by Gender</u>

The results of the regressions for men and women produced some similarities. Both satisfaction with resources and felt influence over the department's climate were positive predictors of job satisfaction for both groups. For men, reported committee service was also a positive predictor; for women, reported failure to be nominated for an award was a negative predictor. And, like the results for the total sample, for both men and women job satisfaction was a negative predictor of intention to leave.

Even though women reported more family responsibility than men, this variable did not predict either job satisfaction or intention to leave for women faculty.

<u>Differences by Race-Ethnicity</u>

The results of the regressions for white faculty were very similar to those for the entire sample: satisfaction with resources, reported committee service, and felt influence over the department's climate were significant predictors of job satisfaction (failure to be nominated for an award was not). Similarly, overall job satisfaction was the, negative, predictor of intention to leave.

In contrast, fewer variables were significant predictors of job satisfaction for the faculty of color than for the total sample. For this group of faculty, satisfaction with resources positively predicted, and reported failure to be nominated for an award negatively predicted, job satisfaction. Like the other faculty groups, job satisfaction negatively predicted intention to leave for the faculty of color; but unlike other faculty groups, felt influence over the department's climate was also a negative predictor.

University Climate Factors that Predict Job Satisfaction and Intention to Leave

These findings encouraged us to consider the variables assessing climate discussed in the first two reports and their relationships with job satisfaction and intention to leave as well. Those reports focused on two broad areas of the climate: experiences related to the University generally and experiences specific to faculty members' departments. Thus, two additional sets of regressions were run; one assessed the University-level climate factors and the other assessed the department-level climate factors.

The regression focusing on the University climate included five variables discussed in the earlier reports: overhearing disparaging comments about women, about men, and about racial minorities; experiences

of sexual harassment; and experiences of gender and/or racial discrimination.[9] In addition, the same demographic and control variables (gender, race-ethnicity, discipline and experience) were included in the models.

In the analyses of the entire sample only one variable, experience, predicted (positively) job satisfaction (see Tables 6a and b). However, three variables (overhearing disparaging comments about racial minorities, experiences of sexual harassment, and reported gender-racial discrimination) positively predicted intention to leave; job satisfaction negatively predicted intention to leave.

Gender Differences

As we found for the total sample, experience positively predicted job satisfaction for women. Overhearing disparaging comments about women also negatively predicted job satisfaction for them. For men, only overhearing disparaging comments about racial-ethnic minorities negatively predicted job satisfaction. Overhearing disparaging comments about racial-ethnic minorities also positively predicted intention to leave for men, as did job satisfaction in the opposite direction. For women, job satisfaction negatively predicted intention to leave and reported racial-gender discrimination positively predicted intention to leave.

Race-Ethnicity Differences

None of the University-level climate variables predicted job satisfaction for white faculty or faculty of color. However, job satisfaction negatively predicted intention to leave for both groups of faculty. Moreover, reported experiences of sexual harassment positively predicted intention to leave for white faculty and overhearing disparaging comments about racial-ethnic minorities positively predicted intention to leave for faculty of color.

Department Climate Factors that Predict Job Satisfaction and Intention to Leave

Factors examined in the first two reports that assessed department-level climate included faculty rating of the department chair's role in creating a positive and welcoming climate (a mean of two scales: chair as fair and chair as able to create a positive environment), a single item that assessed chair's commitment to racial-ethnic diversity, and several scales about faculty experiences of the department climate (positive climate, gender egalitarian atmosphere, felt surveillance, scholarly isolation[10]). These, as well as the demographic and control variables were included in the regression model to predict job satisfaction and intention to leave; as before, the model predicting intention to leave included job satisfaction as well.

Results from analyses on the entire sample revealed several department climate factors that were predictors of faculty members' job satisfaction (see Tables 7a and b). Experience, the chair rating, positive climate and gender egalitarian atmosphere all positively predicted job satisfaction; in addition, scholarly isolation was associated with lower satisfaction. Both job satisfaction (in a negative direction) and felt surveillance (in a positive direction) were associated with the intention to leave UM.

Gender Differences

As we found for the entire sample, for both men and women, experience, the chair rating, and scholarly isolation were predictors of job satisfaction in the expected directions. For men, gender egalitarian

[9] This variable was created as a mean score of experiences of gender discrimination and racial-ethnic discrimination described in the first two reports.

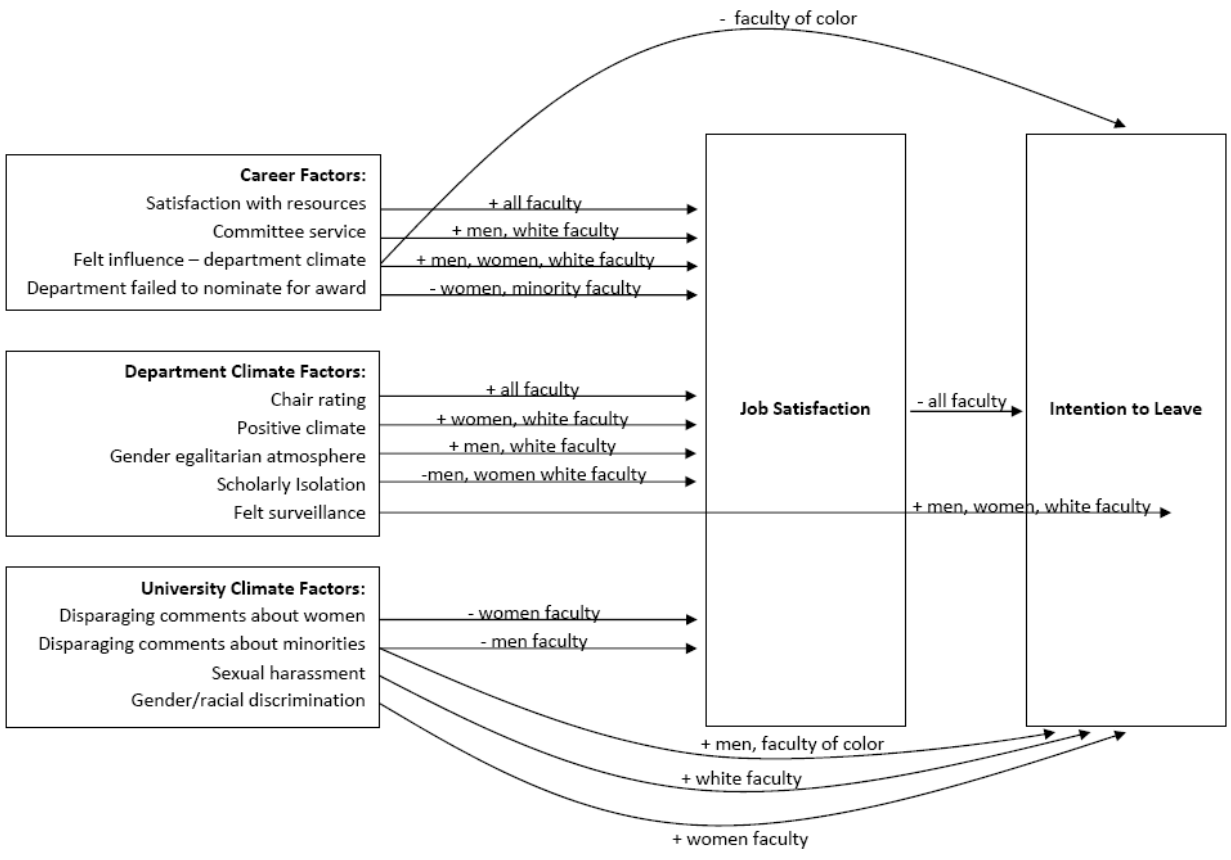
[10] See the first two reports for details about these variables.

atmosphere, and for women, positive climate, were also positive predictors. The results for men and women in predicting intention to leave were the same as for the entire sample: overall satisfaction negatively predicted and felt surveillance positively predicted.

Racial-Ethnic Differences

Similar to analyses with the total sample, experience, chair rating, reported positive climate and gender egalitarian atmosphere were positive predictors and scholarly isolation was a negative predictor of job satisfaction for white faculty. In addition, discipline was also a significant factor, such that science and engineering was a positive predictor of job satisfaction. In contrast, for faculty of color, only the chair rating was a (positive) predictor of job satisfaction. For both white and minority faculty, job satisfaction was a negative predictor of intention to leave; in addition, for white faculty only, felt surveillance was a positive predictor.

Figure 1: Relation of Career, Department and University Climate Factors to Faculty Job Satisfaction and Intention to Leave*



*Please see Appendix A for a more complete description of the Career, Department Climate and University Climate Factors reported on here.

Summary of Regression Analyses

Predicting Job Satisfaction

Many of the career-related and department climate factors were significant predictors of job satisfaction, which, in turn, was a significant predictor of intention to leave (see Figure 1 for a diagram summarizing the findings). Satisfaction with resources, felt influence over the department's climate,

chair ratings, and experiences of scholarly isolation were important predictors for all, or almost all faculty groups. In addition, reported committee service and gender egalitarian atmosphere were important for men and white faculty, positive climate mattered for women and white faculty, and reported failure to be nominated for an award was important for women and faculty of color.

In contrast to the findings related to career and department climate factors, University climate appeared less directly related to faculty members' level of job satisfaction. Overhearing disparaging comments—about women for women faculty, and about racial-ethnic minorities for men faculty—were the only University-level climate variables predictive of job satisfaction. However, University climate factors figured much more prominently in faculty members' intentions to leave than career-related and department-level climate factors.

Generally, fewer factors predicted job satisfaction for faculty of color than white faculty. It is, however, important to note that the sample of minority faculty is much smaller than that for white faculty. Since, in many instances, the coefficients for white faculty and faculty of color are comparable in magnitude and size, it is likely that, with a larger sample, more significant findings would emerge for faculty of color, as we observed for the white faculty sample.

Predicting Intention to Leave

One career-related variable, felt influence over the department's climate, negatively predicted intention to leave for faculty of color and one department climate factor, felt surveillance, positively predicted intention to leave for all faculty except faculty of color. However, three University climate factors were significant predictors of intention to leave: overhearing disparaging comments about racial-ethnic minorities for men and faculty of color, reported experiences of sexual harassment for white faculty, and reported gender-racial discrimination for women.

Beyond these domain-specific variables, job satisfaction was clearly a strong negative predictor of intention to leave for all faculty groups.

CONCLUSIONS

These results demonstrate that job satisfaction is a key element to faculty retention, and that there are several things that can be done at the University and department levels to promote job satisfaction for all faculty and encourage them to remain at the University.

Several career-related factors addressed in this report are significant predictors of faculty members' job satisfaction and should be considered essential aspects of all faculty members' work lives. **Adequate resources** for scholarship, **opportunities for influence and leadership,** through, for example, important committee memberships, and ensuring that **faculty are nominated for awards** for which they are qualified are all things the University, at all levels, can provide its faculty members. Opportunities for influence may be particularly important for women, especially women of color, who reported fewer experiences of felt influence than men.

In addition, the findings suggest that there are other, specifically department-level, aspects of faculty work experiences and conditions that are important to their job satisfaction. In particular, departments need to ensure that their **climates are positive and promote gender egalitarianism,** that **disparaging comments about women and racial-ethnic minorities among faculty and students** are **not tolerated**, and that **faculty members' work is not marginalized**. Moreover, the findings point to the significant

role department chairs play in promoting faculty members' job satisfaction, through ensuring a **positive department environment** and creating **department policies and practices that are fair** for all faculty.

These department-level work conditions are particularly important for women (especially women of color) who reported overhearing more disparaging comments about women, and rated their department's climate and their chairs as less positive than men, and for faculty of color who reported overhearing more disparaging comments about racial-ethnic minorities than white faculty[11]. We observed, in assessing change in these department climate factors over time, that mean scores for scholarly isolation were lower for all faculty (except women of color) at Time 2 compared to Time 1.

Beyond affecting job satisfaction, the analyses revealed several other factors that are directly related to faculty members' intentions to leave the University. University-level climate factors (including overhearing disparaging comments about racial-ethnic minorities, reported experiences of sexual harassment, and reported gender and/or racial discrimination) were important predictors of intention to leave. Here, again, the findings suggest a focus on women and faculty of color who reported more gender discrimination (reported by women), and more racial discrimination (reported by faculty of color, especially women of color). It is, however, encouraging to note that the campus may be improving on some of these dimensions: reports of sexual harassment by white women were significantly lower at Time 2 than at Time 1, and significantly fewer male faculty of color reported overhearing disparaging comments about racial-ethnic minorities at Time 2 compared to Time 1.

Looking particularly at departmental factors, experience of felt surveillance (e.g., feeling under scrutiny by colleagues, feeling that they have to work harder than colleagues to be perceived as legitimate scholars) also predicted faculty members' intention to leave directly for all but faculty of color; for faculty of color, felt influence over their departments' climates was a predictor of intention to leave. Again, these issues may be especially important for women, and particularly women of color, who reported more felt surveillance, and fewer experiences of felt influence over the department's climate than men.

Finally, it is useful to note that many of the same factors influence different groups of faculty members' job satisfaction and intention to leave. This pattern—of the same features benefiting different groups of faculty (groups differing in race, gender and discipline)—suggests that improvements in faculty experiences and the campus climate are likely to benefit all faculty, rather than benefiting some at the expense of others.

[11]These findings and others related to department and University climate for faculty are reported in the second report, **Assessing the Academic Work Environment for Science and Engineering and Social Science Faculty at the University of Michigan: 2006**.

Table 1: Family Responsibility

	scientists & engineers			social scientists		
	mean faculty of color	mean white	sig	mean faculty of color	mean white	sig
	n=28	n=103		n=12	n=53	
Male faculty	4.24	3.40		4.08	3.14	

	scientists & engineers			social scientists		
	mean faculty of color	mean white	sig	mean faculty of color	mean white	sig
	n=25	n=91		n=18	n=47	
Female faculty	4.90	4.54		5.12	4.47	

	scientists & engineers			social scientists		
	mean men	mean women	sig	mean men	mean women	sig
	n=103	n=91		n=53	n=47	
White faculty	3.40	4.54	*	3.14	4.47	*

	scientists & engineers			social scientists		
	mean men	mean women	sig	mean men	mean women	sig
	n=28	n=25		n=12	n=18	
Faculty of color	4.24	4.90		4.08	5.12	

Note: Ns vary slightly by item; Ns reported represent the maximum number of responses by group for the items in the table

*Symbol represents significant differences at the p≤.05 level of significance

Table 2a: Felt Influence - Male Faculty

	scientists & engineers			social scientists		
	mean faculty of color men n=28	mean white men n=98	sig	mean faculty of color men n=12	mean white men n=53	sig
Felt influence over educational matters	3.26	3.13		3.01	3.02	
Felt influence over faculty matters	2.34	2.55		2.69	2.77	
Felt influence over resource allocations	2.24	2.38		2.55	2.49	
Felt influence over unit's climate/culture	2.70	2.93		2.62	3.01	
	% faculty of color men	% white men	sig	% faculty of color men	% white men	sig
Do you feel you have been excluded from participating in important decision-making committees	40%	28%		8%	18%	

Table 2b: Felt Influence - Female Faculty

	scientists & engineers			social scientists		
	mean faculty of color women n=23	mean white women n=89	sig	mean faculty of color women n=18	mean white women n=47	sig
Felt influence over educational matters	2.50	3.11		2.64	3.07	
Felt influence over faculty matters	1.89	2.55	*	2.42	2.53	
Felt influence over resource allocations	1.69	2.25		2.03	2.05	
Felt influence over unit's climate/culture	2.05	2.60		2.18	2.36	
	% faculty of color women	% white women	sig	% faculty of color women	% white women	sig
Do you feel you have been excluded from participating in important decision-making committees	45%	31%		27%	23%	

Note: Ns vary slightly by item; Ns reported represent the maximum number of responses by group for the items in the table

*Symbol represents significant differences at the p≤.05 level of significance

Table 2c: Felt Influence - White Faculty

	scientists & engineers			social scientists		
	mean white men n=98	mean white women n=89	sig	mean white men n=53	mean white women n=47	sig
Felt influence over educational matters	3.13	3.11		3.02	3.07	
Felt influence over faculty matters	2.55	2.55		2.77	2.53	
Felt influence over resource allocations	2.38	2.25		2.49	2.05	
Felt influence over unit's climate/culture	2.93	2.60		3.01	2.36	*
	% white men	% white women	sig	% white men	% white women	sig
Do you feel you have been excluded from participating in important decision-making committees	28%	31%		18%	23%	

Table 2d: Felt Influence - Faculty of Color

	scientists & engineers			social scientists		
	mean faculty of color men n=28	mean faculty of color women n=23	sig	mean faculty of color men n=12	mean faculty of color women n=18	sig
Felt influence over educational matters	3.26	2.50	*	3.01	2.64	
Felt influence over faculty matters	2.34	1.89		2.69	2.42	
Felt influence over resource allocations	2.24	1.69		2.55	2.03	
Felt influence over unit's climate/culture	2.70	2.05	*	2.62	2.18	
	% faculty of color men	% faculty of color women	sig	% faculty of color men	% faculty of color women	sig
Do you feel you have been excluded from participating in important decision-making committees	40%	45%		8%	27%	

Note: Ns vary slightly by item; Ns reported represent the maximum number of responses by group for the items in the table

*Symbol represents significant differences at the p≤.05 level of significance

Table 3a: Recognition - Male Faculty

	scientists & engineers			social scientists		
	% faculty of color men n=28	% white men n=107	sig	% faculty of color men n=12	% white men n=54	sig
Nominated for teaching award	27%	36%		25%	31%	
Nominated for research award	32%	37%		18%	26%	
Nominated for service award	12%	16%		18%	9%	
Dept failed to nominate for appropriate award	18%	21%		0%	9%	

Table 3b: Recognition - Female Faculty

	scientists & engineers			social scientists		
	% faculty of color women n=26	% white women n=88	sig	% faculty of color women n=18	% white women n=46	sig
Nominated for teaching award	12%	25%		18%	31%	
Nominated for research award	25%	30%		0%	26%	*
Nominated for service award	10%	14%		33%	11%	
Dept failed to nominate for appropriate award	28%	13%		14%	17%	

Note: Ns vary slightly by item; Ns reported represent the maximum number of responses by group for the items in the table

*Symbol represents significant differences at the p≤.05 level of significance

Table 3c: Recognition - White Faculty						
	scientists & engineers			social scientists		
	% white men n=107	% white women n=88	sig	% white men n=54	% white women n=46	sig
Nominated for teaching award	36%	25%		31%	31%	
Nominated for research award	37%	30%		26%	26%	
Nominated for service award	16%	14%		9%	11%	
Dept failed to nominate for appropriate award	21%	13%		9%	17%	

Table 3d: Recognition - Faculty of Color						
	scientists & engineers			social scientists		
	% faculty of color men n=28	% faculty of color women n=26	sig	% faculty of color men n=12	% faculty of color women n=18	sig
Nominated for teaching award	27%	12%		25%	18%	
Nominated for research award	32%	25%		18%	0%	*
Nominated for service award	12%	10%		18%	33%	
Dept failed to nominate for appropriate award	18%	28%		0%	14%	

Note: Ns vary slightly by item; Ns reported represent the maximum number of responses by group for the items in the table

*Symbol represents significant differences at the p≤.05 level of significance

Table 4a: Correlations with Job Satisfaction

	total sample	scientists & engineers				social scientists			
		white men	white women	faculty of color men	faculty of color women	white men	white women	faculty of color men	faculty of color women
	n=402	n=112	n=95	n=29	n=26	n=58	n=50	n=12	n=20
Number of committees served on in a typical year	0.21 ***	0.27 **	0.04	0.52 **	0.18	0.16	-0.14	0.16	-0.33
Family responsibility	0.02	0.11	0.05	-0.22	0.03	0.04	0.08	-0.47	0.23
Overall satisfaction with resources	0.38 ***	0.38 ***	0.44 ***	0.54 **	0.63 ***	0.24	0.27	0.23	0.31
Felt influence over unit's climate/culture	0.46 ***	0.52 ***	0.47 ***	0.32	0.58 **	0.40 **	0.32 *	0.00	-0.07
Felt influence over educational matters	0.30 ***	0.51 ***	0.37 ***	0.15	0.34	0.35 **	0.23	0.61	0.08
Felt influence over faculty matters	0.35 ***	0.45 ***	0.34 ***	0.09	0.32	0.24	0.29 *	0.63 *	0.42
Felt influence over resource allocations	0.36 ***	0.45 ***	0.27 **	-0.19	0.35	0.29 *	0.45 **	0.14	0.47 *
Department failed to nominated for qualified award	-0.19 ***	-0.19 *	-0.25 *	-0.10	-0.17	-0.10	-0.08	-0.16	-0.37

Table 4b: Correlations with Intention to Leave

	total sample	scientists & engineers				social scientists			
		white men	white women	faculty of color men	faculty of color women	white men	white women	faculty of color men	faculty of color women
	n=402	n=112	n=95	n=29	n=26	n=58	n=50	n=12	n=20
Number of committees served on in a typical year	-0.09	-0.17	0.08	-0.33	-0.32	0.04	0.15	-0.52	0.29
Family responsibility	-0.02	0.00	-0.11	-0.13	-0.03	-0.04	-0.09	-0.02	0.21
Overall satisfaction with resources	-0.30 ***	-0.34 ***	-0.37 ***	-0.43 *	-0.31	-0.05	-0.13	-0.25	0.09
Felt influence over unit's climate/culture	-0.36 ***	-0.40 ***	-0.31 **	-0.53 **	-0.52 **	-0.12	-0.48 ***	-0.21	-0.11
Felt influence over educational matters	-0.32 ***	-0.41 ***	-0.30 **	-0.30	-0.43 *	-0.17	-0.39 **	-0.61	-0.33
Felt influence over faculty matters	-0.25 ***	-0.33 ***	-0.33 ***	-0.20	-0.32	-0.14	-0.27	-0.51	-0.59 **
Felt influence over resource allocations	-0.22 ***	-0.24 *	-0.28 **	0.04	-0.44 *	-0.12	-0.31 *	-0.17	-0.13
Department failed to nominated for qualified award	0.09	0.02	0.14	0.15	0.17	0.24	0.12	0.27	0.47 *

Note: Ns vary slightly by item; Ns reported represent the maximum number of responses by group for the items in the table

*** p-value≤0.001

**0.001<p-value≤0.01

*0.01<p-value≤0.05

Table 5a: Regression Model: Career Experiences Predicting Job Satisfaction					
	unstandardized coefficient				
Overall Job Satisfaction	**total sample**	**men**	**women**	**white**	**minority**
Sex	-0.206			-0.211	0.036
Race	-0.058	-0.091	-0.034		
Discipline	-0.109	-0.055	-0.277	-0.223	0.446
Experience	0.057	0.005	0.304	0.080	-0.067
Family responsibility	0.018	0.005	0.042	0.045	-0.098
Satisfaction with resources	0.351 ***	0.330 ***	0.392 ***	0.299 ***	0.488 ***
Committee service	0.334 *	0.082 **	-0.001	0.057 *	0.069
Influence-department climate	0.203 ***	0.271 ***	0.300 ***	0.329 ***	0.111
Not nominated for an award	-0.205 *	-0.147	-0.406 **	-0.190	-0.412 *

Table 5b: Regression Model: Career Experiences Predicting Intention to Leave					
	unstandardized coefficient				
Intention to Leave	**total sample**	**men**	**women**	**white**	**minority**
Sex	0.159			0.143	0.157
Race	-0.192	-0.240	-0.067		
Discipline	-0.069	-0.060	-0.083	-0.096	0.089
Experience	-0.092	-0.111	-0.023	-0.094	-0.301
Family responsibility	-0.035	0.038	-0.027	-0.032	-0.022
Satisfaction with resources	.-.033	-0.049	0.032	-0.028	-0.138
Committee service	0.009	-0.003	0.047	0.011	0.043
Influence-department climate	-0.104	-0.088	-0.147	-0.039	-0.368 *
Not nominated for an award	0.104	0.162	0.200	0.168	0.268
Job satisfaction	-0.598 ***	-0.597 ***	-0.602 ***	-0.624 ***	-0.536 ***

Note: Ns vary slightly by item; Ns reported represent the maximum number of responses by group for the items in the table

*** p-value≤0.001

**0.001<p-value≤0.01

*0.01<p-value≤0.05

Table 6a: Regression Model: University Climate Factors Predicting Job Satisfaction					
	unstandardized coefficient				
Overall Job Satisfaction	**total sample**	**men**	**women**	**white**	**minority**
Sex	-0.175			-0.154	-0.138
Race	-0.104	-0.095	-0.326		
Discipline	-0.195	-0.269	0.015	-0.289	0.303
Experience	0.151 *	0.121	0.251 *	0.182	-0.124
Disparaging comments about women	-0.037	0.180	-0.437 ***	-0.053	-0.012
Disparaging comments about men	-0.012	-0.076	0.253	0.001	-0.033
Disparaging comments about racial minorities	-0.234	-0.488 *	0.198	-0.244	-0.171
Sexual harassment	0.158	0.378	0.027	0.223	-0.079
Gender/racial discrimination	-0.601	-0.835	-0.257	-0.551	-0.488

Table 6b: Regression Model: University Climate Factors Predicting Intention to Leave					
	unstandardized coefficient				
Intention to Leave	**total sample**	**men**	**women**	**white**	**minority**
Sex	0.016			0.040	0.025
Race	-0.183	-0.177	-0.149		
Discipline	-0.042	0.012	-0.151	-0.119	0.357
Experience	-0.076	-0.097	-0.042	-0.055	-0.220
Disparaging comments about women	-0.072	-0.204	0.050	-0.105	0.151
Disparaging comments about men	0.047	0.032	0.112	0.072	-0.020
Disparaging comments about racial minorities	0.277 **	0.427 *	0.068	0.204	0.465 *
Sexual harassment	0.442 *	0.405	0.306	0.524 **	0.187
Gender/racial discrimination	0.523 *	0.320	0.733 **	0.478	0.548
Job satisfaction	-0.625 ***	-0.601 ***	-0.663 ***	-0.641 ***	-0.609 ***

Note: Ns vary slightly by item; Ns reported represent the maximum number of responses by group for the items in the table

*** p-value≤0.001

**0.001<p-value≤0.01

*0.01<p-value≤0.05

Table 7a: Regression Model: .Department Climate Factors Predicting Job Satisfaction					
	unstandardized coefficient				
Overall Job Satisfaction	**total sample**	**men**	**women**	**white**	**minority**
Sex	0.175			0.239	0.034
Race	-0.042	0.005	-0.078		
Discipline	-0.138	-0.177	-0.039	-0.251 *	0.390
Experience	0.166 **	0.146 *	0.295 ***	0.170 **	0.095
Chair rating	0.282 ***	0.313 **	0.224 *	0.266 **	0.290 *
Chair encourages diversity	-0.119	-0.163	-0.020	-0.092	-0.209
Positive climate	0.208 **	0.198	0.274 **	0.197 *	0.337
Gender egalitarian atmosphere	0.188 **	0.224 *	0.213	0.203 *	0.112
Felt surveillance	-0.047	-0.050	-0.013	-0.021	-0.118
Felt scholarly isolation	-0.425 ***	-0.478 ***	-0.240 *	-0.495 ***	-0.123

Table 7b: Regression Model: Department Climate Factors Predicting Intention to Leave					
	unstandardized coefficient				
Intention to Leave	**total sample**	**men**	**women**	**white**	**minority**
Sex	-0.052			-0.060	-0.014
Race	-0.229	-0.207	-0.147		
Discipline	-0.089	-0.040	-0.196	-0.146	0.008
Experience	-0.074	-0.079	0.023	-0.062	-0.197
Chair rating	0.055	0.123	-0.054	0.072	-0.050
Chair encourages diversity	-0.134	-0.225	0.056	-0.140	-0.056
Positive climate	-0.069	-0.068	0.001	-0.004	-0.292
Gender egalitarian atmosphere	-0.036	0.026	-0.151	-0.070	0.095
Felt surveillance	0.304 ***	0.337 ***	0.202 *	0.315 ***	0.273
Felt scholarly isolation	-0.043	-0.078	0.069	-0.002	-0.135
Job satisfaction	-0.504 ***	-0.512 ***	-0.525 ***	-0.512 ***	-0.466 ***

Note: Ns vary slightly by item; Ns reported represent the maximum number of responses by group for the items in the table

*** p-value≤0.001

**0.001<p-value≤0.01

*0.01<p-value≤0.05

Appendix A
Career, Department and University Climate Factors

CAREER FACTORS:

Satisfaction with resources

Mean satisfaction rating of 12 items related to office/research space (5-point scale from very dissatisfied to very satisfied):
Office space (amount of space, location, computer equipment);
Research space (amount of space, location appropriate to research needs, contiguity of space, computer equipment, lab equipment, service from vendors, safety, ability to control temperature, maintenance)

Committee service

Number of committees served on in past five years

Felt Influence over department climate and culture

Rating (five-point scale from really no influence to tremendous influence):

How much influence do you feel you have affecting the unit's overall climate/culture?

Failure to nominate faculty for an award

Has your department/unit failed to nominate you for an award for which you were qualified?

UNIVERSITY CLIMATE FACTORS:

Disparaging comments about women

How often heard insensitive or disparaging about… (5-point scale from never to weekly)
women in general or about particular women as "typical" of women made by faculty
women in general or about particular women as "typical" of women made by students

Disparaging comments about men

How often heard insensitive or disparaging about… (5-point scale from never to weekly)
women in general or about particular men as "typical" of men made by faculty
women in general or about particular men as "typical" of men made by students

Disparaging comments about men

How often heard insensitive or disparaging about… (5-point scale from never to weekly)
racial/ethnic minorities, or about particular persons of color as "typical" of a racial/ethnic group made by faculty
racial/ethnic minorities, or about particular persons of color as "typical" of a racial/ethnic group made by students
religious group, or about particular persons as "typical" of a religious group made by faculty
religious group, or about particular persons as "typical" of a religious group made by students

Sexual harassment

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, or e-mails; unwanted touching, leaning over, cornering, or pinching; unwanted pressure for sexual favors; stalking; rape or assault)?

Gender/racial discrimination

Count of any job-related gender and race/ethnicity discrimination at U-M in 6 areas:
hiring
promotion
salary
space/equipment, other resources
access to administrative staff
graduate student or resident/fellow assignments

DEPARTMENT CLIMATE FACTORS:

Chair rating

Comprised of 2 scales:

Chair as fair (3 items; 5-point scale from poor to superior)

- treats faculty in an even-handed way
- honors agreements
- handles disputes/problems effectively

Chair as able to create a positive environment (3 items; 5-point scale from poor to superior)

- is an effective administrator
- encourages and empowers faculty
- creates a cooperative and supportive environment

Positive climate

Mean rating of 6 semantic differentials:

- hostile/friendly
- disrespectful/respectful
- contentious/collegial
- individualistic/collaborative
- competitive/cooperative
- not supportive/supportive

Gender egalitarian atmosphere

Mean rating of 9 (5-point scale from strongly disagree to strongly agree) items:

- Some faculty have a condescending attitude toward women. (reverse-scored)
- Sexist remarks are heard in the classroom. (reserve-scored)
- 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. (reverse-scored)
- Men are more likely than women to receive helpful career advice from colleagues. (reverse-scored)
- 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. (reverse-scored)

Scholarly Isolation

Mean rating (5-point scale from strongly disagree to strongly agree) of 6 items:

- I am comfortable asking questions about performance expectations. (reverse-scored)
- My colleagues solicit my opinions about their research ideas and problems. (reverse-scored)
- My research interests are valued by my colleagues. (reverse-scored)
- 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.

Felt surveillance

Mean rating (5-point scale from strongly disagree to strongly agree) of 4 items:

- I am/was reluctant to bring up issues that concern me for that 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.