ASSESSING THE ACADEMIC WORK ENVIRONMENT FOR TENURE-TRACK FACULTY AT THE UNIVERSITY OF MICHIGAN IN 2012: PREDICTORS OF JOB SATISFACTION

UM ADVANCE Program

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INTRODUCTION

Universities strive to attract creative and productive scholars to their faculties, and the University of Michigan (UM) has been recognized for its success in this area. However, a concern for all universities is retaining productive faculty members once they have been recruited and hired. A recent study of faculty retention rates in science and engineering, for example, found that the likelihood of the faculty in their sample being retained over time was less than 50% (with the median departure time being roughly 11 years)[1]. One factor that influences faculty members' intent to stay with a current position is job satisfaction[2]. Thus, understanding the various factors that predict faculty job satisfaction is of great importance. Exploring the predictors of job satisfaction among tenure-track UM faculty is the focus of the present report.

This report is part of a series of reports derived from the fall 2012 study of the academic climate on the University of Michigan campus for tenure track faculty. The first report assessed data from UM science and engineering faculty in 2001, 2006, and 2012 about their experiences of their work environment. The second report assessed the same variables for science and engineering, as well as social science faculty, for 2006 and 2012. The third report examined gender and race/ethnicity differences in career experiences thought to be related to faculty career satisfaction and retention (e.g., opportunities for leadership and influence, service experiences, the allocation of resources, recognition for work, and family responsibilities). This report focused on these variables for three groups: science and engineering faculty, social science faculty, and faculty in the arts and humanities.

The present report draws on the 2012 data that were used for the first three reports. For detailed information about the study and data collection procedures, please refer to the first two reports[3].

The main focus of this report is an examination of the predictors of job satisfaction at UM in 2012. Predictors of job satisfaction were explored via the use of multiple regression. Multiple regression analysis allows for the simultaneous examination of multiple potential predictors of an outcome variable of interest (in this case, job satisfaction). Those predictors that emerge as significant in such an analysis (e.g., having a mentor) are those that predict important variance in job satisfaction above and beyond any variance predicted by the other variables in the model (e.g., satisfaction with funding).

SAMPLE SURVEYED

In 2012[4] the tenure-track faculty in the natural sciences, engineering, the social sciences and the arts and humanities were surveyed. An overview of the initial sample -- as a function of gender, race-ethnicity, and

[1] Kaminski, D., & Geisler, C. (2012). Survival analysis of faculty retention in science and engineering by gender. *Science, 335*(6070), 864-866.
[2] Derby-Davis, M. J. (2014). Predictors of nursing faculty's job satisfaction and intent to stay in academe. *Journal of Professional Nursing, 30*(1), 19-25.
[3] http://advance.umich.edu/climatestudies.php

broad disciplinary area -- is presented in the table below. This sample (*n*=1085) includes only those respondents for whom race-ethnicity and gender information was available.

Initial 2012 sample size (by disciplinary area, gender, and race-ethnicity)

	Natural Sciences & Engineering	Social Sciences	Arts & Humanities
Female Faculty	174	117	88
Male Faculty	452	148	106
Faculty of Color	125	54	35

A more detailed description of the total number of faculty surveyed (and the response rates for 2012) is provided in Appendix A.

Because there were respondents who did not answer some of the survey questions that were included in the present analyses, a subset of 766 respondents (out of the 1085 initial respondents) were included in the regression models presented below. This group of 766 provided all of the data necessary for the regression model. Demographic information for the final sample of 766 responses is presented below:

Sample used in the regression analysis reported below (by disciplinary area, gender, and race-ethnicity)

	Natural Sciences & Engineering	Social Sciences	Arts & Humanities
Female Faculty	122	89	70
Male Faculty	316	102	67
Faculty of Color	96	48	28

As noted in the reports that preceded the current one (see footnote 1 for link to reports), the sample reported on here was not fully representative of the larger pool of tenure-track faculty who were invited to participate in the survey. To address this issue, analyses were conducted using appropriate weights. Weighted analyses adjust the raw survey data to reflect the population from which the sample is drawn. In this case the data were weighted on the basis of race, gender, and school (Engineering, LSA, and all others).

DATA ANALYSIS STRATEGY

In the multiple regression analysis below, gender and race-ethnicity were entered as predictor variables. These variables allowed us to compare female faculty to male faculty, and faculty of color[5] to white faculty. The interaction between gender and race-ethnicity was also tested for significance. This test had the

[4] Although data collection in 2012 included all tenure-, research-, and clinical-track faculty with paid appointments at UM-Ann Arbor, this report focuses only on tenure-track faculty (those who were at or above the rank of assistant professor as of October, 2012).

[5] Preliminary analyses were conducted comparing Asian/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/Asian American faculty with underrepresented minority faculty in these analyses to increase the power of the analyses.

potential to reveal patterns of job satisfaction that may vary within a particular gender group (e.g., women) as a function of race, or within a particular race-ethnicity group (e.g., faculty of color) as a function of gender. (The gender × race-ethnicity interaction was not significant.)

Compared to female respondents, the male respondents in 2012 were older, had been at UM longer, had received their highest degrees longer ago, and were more likely to be at the rank of full professor. We found the same differences when comparing the white tenure-track faculty with tenure-track faculty of color. Given these career timeline differences related to gender and race-ethnicity, we constructed a summary variable to capture level of experience in academia by combining age, years at UM, year of degree, and rank. This summary measure of experience in academia was used as a predictor variable the analysis. This approach means that any significant findings reported below cannot easily be explained by differences in age, years at UM, year of degree, or rank.

In the results reported below, references to significant findings refer to effects found to be statistically significant (i.e., $p \leq .05$)[6]. These references point to effects that would have emerged simply by chance - when there really was no effect - at or less than 5 percent of the time. This is a generally accepted standard of statistical significance in social science research.

ABOUT REGRESSION AND CORRELATIONAL ANALYSES

As noted above, the use of multiple regression allows for the simultaneous examination of multiple predictors of job satisfaction. Predictors that emerge as significant are those that predict unique variance in job satisfaction above and beyond any variance predicted by the other variables in the model.

When a significant, positive relationship emerges between two variables in a regression or correlation analysis, it means that an increase in the predictor variable (e.g., satisfaction with funding) is associated with an increase in the outcome variable (e.g., job satisfaction), on average[7]. Conversely, when a significant, negative relationship between two variables emerges in a regression or correlation analysis, it means that an increase in the predictor variable (e.g., faculty teaching load) is associated with a *decrease* in the outcome variable (e.g., job satisfaction), on average.[8] We note that significant associations in this type of study cannot and should not be interpreted in causal terms, but are nonetheless quite informative in describing important relationships between variables.

Because only a fraction of the faculty sample had sought UM help with finding employment for a partner/spouse, this variable was not explored as a predictor of job satisfaction in the regression analyses.[9]

[6] Any effects noted in this report should be assumed to be statistically significant – even if the word 'significant' is not used - unless they are explicitly described as trends. Trends are mentioned sparingly, and involve *p*-values greater than .054 but less than .105.

[7] Further, in a positive association, decreases in the predictor variable are associated with decreases in the outcome variable, on average.

[8] Further, in a negative association, decreases in the predictor variable are associated with increases in the outcome variable, on average.

[9] Including this variable in the regression models, in which cases with missing values were delated listwise, would have decreased the numbers of respondents included in these analyses, thereby reducing statistical power.

Instead, satisfaction with UM help in securing employment for partners was assessed in relation to job satisfaction in stand-alone correlation analyses for each gender/race-ethnicity group. Correlation statistics describe the associations between two variables, in terms of magnitude and direction, but do not allow for the statistical control of a large number of other predictor variables.

Further, although having (or not having) a mentor was included in the larger regression model as a predictor of job satisfaction, it was also analyzed separately for assistant professors only, because having a mentor may be of special importance for junior faculty. We examined the association between satisfaction with mentoring and overall job satisfaction for assistant professors using a correlation analysis.

VARIABLES IN THE ANALYSES

The outcome variable of interest - overall job satisfaction - was measured with a summary variable that was constructed as the mean (or average) of three items[10] that were each assessed on a 5-point scale: (1) *How satisfied are you with your current position at UM?*; (2) *How much you would like to stay at UM for your entire career?*; and (3) *How often do you think about leaving UM?* Prior to computing the job satisfaction variable, responses to the third item used in the scale were reverse-scored so that more positive values indicated fewer thoughts about leaving.

Summary scales were created to measure a number of predictors of job satisfaction that had originally been measured using multiple items. We note in the list of predictor variables below any variables that were constructed as summary variables of multiple items. For some predictor variables of interest, the creation of summary scales was not possible; these variables were included in the regression analysis as single items (e.g., satisfaction with teaching load).

When creating summary scales and choosing variables for the regression analysis, attention was paid to retaining adequate numbers of respondents in each of the four gender/race-ethnicity groups. A key aspect of this step involved attending to missing data for certain groups of faculty when computing summary scales. For example, a summary *Satisfaction with Office Space and Location* variable was computed as the mean of up to ten individual items measuring this general construct. However, for some faculty, some of those ten items were not relevant to their work at UM; e.g., many faculty in the arts and humanities did not supply a response when asked about their satisfaction with lab equipment. In order to ensure that a summary scale like *Satisfaction with Office Space and Location* was still computed for a faculty member who did not answer some of the individual questions linked to the scale, summary scales were computed for faculty who answered at least some of the questions related to the scale. For example, for the *Satisfaction with Office Space and Location* scale, faculty who answered 5 or more of the ten individual questions linked to the scale received a score on the scale (scores on this and other scales were computed for each faculty member as the mean of all items to which they responded).

[10] Cronbach's alpha - a measure of internal consistency, or how closely related a set of items are, was .79. Alphas above .70 indicate that items are highly related and can justifiably be combined to create composite variables. The alpha was high enough (i.e., > .70) to justify combining the three items into a summary scale measuring job satisfaction. All other summary scales were also checked for adequate internal consistency (i.e., alphas > .70) prior to use in the analyses reported below.

We also note that, while most respondents answered a question about satisfaction with university funding, many did not answer a question about satisfaction with external funding; thus the latter variable was not included in the analyses we report on below.

PREDICTOR VARIABLES INCLUDED IN REGRESSION MODEL

All of the variables in the tables below were analyzed as potential predictors of job satisfaction.[11] We also tested interactions between gender and the variables below, and between race-ethnicity and the variables below. These tests had the potential to reveal patterns of job satisfaction that differed for men versus women, or for faculty of color versus white faculty. Unless noted below, these interactions were not found to be significant. (And, as noted above, we also tested a gender × race-ethnicity interaction term.)

One group of predictor variables in the model was characterized by a focus on demographic factors (e.g., gender, race). Level of experience in academia was also included here because respondent age was a part of this variable.

Demographic Variables	Description
Experience in Academia	Composite (of age, years at UM, year of highest degree, and rank)
Gender	Single item (coded as: 0 = male, 1 = female)
Race-ethnicity	Single item (coded as: 0 = white, 1 = faculty of color)

Another group of variables was characterized by a focus on climate-related issues, such as the experience of discrimination, the perceived level of tolerance in one's department or unit, etc.

Climate-Related Variables	Description
Summary Climate Scale	Mean of items assessing positivity of environment, level of scholarly isolation, felt surveillance, and ratings of unit leader
Tolerant Climate Scale	Mean of 4 items assessing prejudice/discrimination in department/unit for vulnerable groups
Gender Egalitarian Atmosphere	Mean of 9 items assessing gender egalitarianism
Disparaging Comments about Women	Mean of 2 items assessing presence of disparaging comments about women in unit
Disparaging Comments about Racial-Ethnic and/or Religious Minorities	Mean of 4 items assessing presence of disparaging comments about racial-ethnic and/or religious minorities
Experienced Gender Discrimination (in past 5 years)	Presence of observed discrimination in any of 6 areas; e.g., hiring, salary (coded as 0 = absent, 1 = present)
Experienced Racial-Ethnic Discrimination (in past 5 years)	Presence of observed discrimination in any of 6 areas; e.g., hiring, salary (coded as 0 = absent, 1 = present)

[11] Division (social sciences, arts and humanities, and natural sciences/engineering) was entered into the model (via dummy coding) in preliminary analyses but was not a significant predictor of job satisfaction.

The third set of predictor variables was characterized by a focus on career-related experiences, such as having a mentor, feeling a sense of impact and self-determination at work, etc.

Career-Related Variables	Description
Satisfaction with Office Space and Location	Mean of satisfaction with amount of space, computer and lab equipment, vendor service, location and contiguity, maintenance, and safety
Number of Committees Served on in Typical Year	Single item
Quality of Feedback from Department/Unit Chair/Director	Mean of 2 items measuring quality of feedback from superior on job performance and quality of information offered about promotion/tenure
Have Mentor or Career Advisor	Single item (coded as: 1 = no, 2 = yes)
Failure to be Nominated for Award by Department/Unit	Single item (coded as: 1 = no, 2 = yes)
Self Determination/Impact	Mean of 6 items measuring the extent to which respondent can make autonomous decisions about work activities and has influence over work activities
Boundary Management	Mean of 4 items measuring the extent to which work spills into vacation time, family time, and time at home
Learning/Growth on the Job	Mean of 3 items measuring growth and learning on the job; e.g., "I find myself learning often"
Number of Areas of Work Life Affected by Caring for Children	Computed as sum of 6 areas of work like potentially affected by caring for children (e.g., professional travel curtailed)
Number of Areas of Work Life Affected by Caring for Adult	Computed as sum of 6 areas of work like potentially affected by caring for an adult (e.g., opportunities not taken)
Number of Areas of Work Life Affected by Own Health	Computed as sum of 6 areas of work like potentially affected by own health issues (e.g., time away from work)
Satisfaction with Teaching Load	Single item
Satisfaction with University Funding	Single item from rating scale

FINDINGS

The regression analysis was conducted in multiple steps, with each set of predictor variables entered at a different step (and with tests of several potential 2-way interaction effects conducted in preliminary analyses). The results reported here are from the final, most parsimonious model that included one significant 2-way interaction involving faculty race-ethnicity (see Appendix B for more detailed statistics). The final multiple regression model had an R^2 of .51, meaning that 51% of the variance in job satisfaction was accounted for by the variables in the model[12].

[12] In other words, the R^2 statistic indicates the proportion of the variance in job satisfaction that is predictable via the independent variables in the regression model. Because human behavior and attitudes are relatively difficult to predict, being able to account for half of the variation in a psychological phenomenon such as job satisfaction is good in the social sciences.

Below, we provide standardized regression coefficients (β) and indicators of significance (*p*) to describe the relationship between the predictor variables and job satisfaction. If the regression coefficient is positive, the relationship between the predictor and outcome is positive (i.e., increases in one variable are associated with increases in the other). If the beta coefficient is negative, the relationship between the predictor variable and job satisfaction is negative (i.e., increases in one variable are associated with decreases in the other).

RELATIONSHIPS OF DEMOGRAPHIC VARIABLES TO JOB SATISFACTION

At the final step of the regression model, in which all of the variables in the tables above were included, gender was not a significant predictor of job satisfaction (β = .02, *p* = .45)[13]. Moreover, none of the tested 2-way interaction effects involving gender (e.g., gender × experiences with gender discrimination) were significant when tested in preliminary analyses. I.e., none of the predictor variables in the model predicted job satisfaction in ways that were different for women versus men.

Faculty members' level of experience in academia was a significant, positive predictor of job satisfaction (β = .11, *p* < .001). Greater experience in academia was associated with greater job satisfaction, on average. (We include discussion of this variable in the demographic section of the findings because participant age, a demographic factor, was one of the factors that was used to compute the level-of-experience variable.)

Race-ethnicity was involved in a significant interaction with a career-related variable: whether one felt deserving of a departmental/unit award nomination but did not receive such a nomination (β = -.20, *p* = .03). In this interaction, the white faculty had similar mean levels of job satisfaction regardless of whether they did or did not receive a deserved award nomination. Faculty of color, on the other hand, had significantly lower mean levels of job satisfaction when they did not receive an award nomination for which they felt deserving, compared to when they did receive such recognition for their work. Thus, the presence vs. absence of this type of department/unit-based recognition was associated with job satisfaction for faculty of color, but not for white faculty.

RELATIONSHIPS OF CLIMATE-RELATED VARIABLES TO JOB SATISFACTION

Two of the climate-related variables emerged as significant predictors of job satisfaction in 2012 (controlling for all of the other variables in the model, including the career-related variables). First, the summary climate scale was a significant, positive, and relatively strong predictor of job satisfaction (β = .30, *p* < .001). More positive ratings of the work climate – e.g., lower levels of scholarly isolation, lower levels of felt surveillance, higher ratings of the unit leader, etc. – were associated with greater job satisfaction, on average.

Second, the experience of gender discrimination in the past five years (scored as present or absent) was negatively associated with job satisfaction (gender discrimination was assessed in areas such as hiring,

[13] All regression coefficients provided in the body of this report are standardized. This practice allows for a comparison of the magnitudes of the associations between various independent variables and the dependent variable, even when the independent variables are measured using different scales or units.

promotion, salary, access to resources, and access to administrative staff). Those who had experienced some form of gender discrimination had lower levels of job satisfaction, on average, compared to those who did not report experiences with gender discrimination (β = -.08, p = .02). We note that female faculty respondents (80%) were more likely than their male peers (20%) to indicate that they had experienced from some form of gender discrimination, χ^2 = 140.35, p < .001. Thus, while there was no significant interaction between gender and the experience of gender discrimination (i.e., there were no differential effects of this experience as a function of gender), the data suggest that women are more likely than men to be faced with the negative association between gender discrimination and job satisfaction.

Experiences with discrimination based on race-ethnicity did not significantly predict job satisfaction (nor was it involved in a significant interaction with respondents' self-reported race or ethnicity). It is important to note, however, that such a finding does not suggest that being treated poorly as a function of one's race or ethnicity does not have any connection to how a person feels about their job. Instead, the way that the variables were constructed for the regression analysis had the potential to overshadow certain very specific associations. For example, among the faculty of color in the sample, those who felt racially discriminated against in the specific area of promotion were less satisfied with their jobs (mean satisfaction = 3.26) compared to those who did not feel discriminated against in this manner (mean = 3.72), t = 1.97, p = .05. As another example, faculty of color who felt racially discriminated against with regard to salary were less satisfied with their jobs (mean = 3.20) compared to those who did not feel discriminated against with regard to compensation (mean = 3.74), t = 2.48, p = .01.

Relationships of Career-Related Variables to Job Satisfaction

After controlling for demographic and climate-related variables, a large number of career-related variables emerged as significant predictors of job satisfaction in 2012. These are listed below:

- Level of satisfaction with office space/location was a significant, positive predictor of job satisfaction (β = .08, p < .01). Higher levels of satisfaction with one's office space/location were, on average, associated with higher levels of job satisfaction.
- There was a trend (β = .06, p = .06) for faculty who reported having at least one mentor to report higher mean levels of job satisfaction compared to faculty who did not report having a mentor.
- A relatively strong and positive predictor of job satisfaction was the extent to which faculty felt a sense of self-determination and impact (β = .22, p < .001). Greater levels of self-determination and impact were, on average, associated with higher levels of job satisfaction.
- There was a significant association between boundary management and job satisfaction. Firmer boundaries between work life and personal life were, on average, associated with greater levels of job satisfaction (β = .06, p = .02).
- There was a significant and positive association between job satisfaction and the experience of learning and growing on the job (β = .09, p < .01). Those who reported higher levels of job-related learning and growth were, on average, more satisfied with their jobs compared to faculty reporting lower levels of learning and growth.
- Satisfaction with teaching load was significantly and positively associated with job satisfaction (β = .11, p < .001). Faculty who reported higher levels of satisfaction with teaching load were, on

average, more satisfied with their jobs compared to faculty reporting lower levels of satisfaction with their teaching loads.

- Lastly, there was a significant and positive link between job satisfaction and satisfaction with university funding for research (β = .17, $p < .001$). Faculty who reported being more satisfied with UM research funding tended to be more satisfied with their jobs compared to faculty who were less satisfied with UM research funding, on average.

CORRELATIONS BETWEEN JOB SATISFACTION AND UM PARTNER EMPLOYMENT ASSISTANCE

As noted above, separate correlation analyses between job satisfaction and satisfaction with UM partner/spouse employment assistance were conducted; to have included this variable in the regression analyses would have substantially decreased the number of faculty in those analyses.

In 2012, the association between satisfaction with UM partner/spouse employment assistance and overall job satisfaction was positive and significant for both white male faculty ($r = .23$, $p < .01$) and white female faculty ($r = .34$, $p < .001$); the associations between the two variables for male and female faculty of color were not significant. When male and female faculty of color were assessed as a single group in order to increase statistical power, there was still no significant association between satisfaction with UM partner/spouse employment assistance and overall job satisfaction for faculty of color ($r = .17$, $p = .14$). That is, for faculty of color only, satisfaction with UM partner/spouse employment assistance was not related to their overall job satisfaction.

RELATIONSHIP BETWEEN JOB SATISFACTION AND RECEIVED MENTORING - ASSISTANT PROFESSORS ONLY

In the regression analysis reported above, having a mentor was positively associated with job satisfaction, but this relationship was only marginally significant when tested with all ranks of tenure-track faculty were pooled. Although faculty at each rank reported having a mentor (76% of assistant professors; 43% of associate professors; 24% of full professors), the assistant professors were significantly more likely than the other two groups to have a mentor (p-values < .001). Having a mentor as an assistant professor is of special importance, as navigating new faculty responsibilities and the tenure process is stressful and confusing at times. Thus, here we examined the association between job satisfaction and having a mentor for assistant professors only.

Assistant professors with and without mentors did not differ, on average, on the measure of job satisfaction ($p = .13$). We also examined the relationship between job satisfaction and assistant professors' responses to this question: *Overall, how effective is your primary department/unit at mentoring its junior faculty?* Respondents answered this question using a scale ranging from 1 (very ineffective) to 5 (very effective). There was a significant, positive correlation between ratings of effectiveness and job satisfaction, $r = .52$, $p < .001$. For assistant professors, more positive views of how junior faculty are mentored are associated with more positive feelings about work in general.

SUMMARY

The regression model presented in this report allowed for the simultaneous exploration of many potential predictors of job satisfaction for UM tenure-track faculty in 2012. Several variables predicted significant variance in job satisfaction, and the final regression model accounted for 51% of the variance in satisfaction.

The variables that were **significant positive predictors of job satisfaction in 2012** are listed here in summary fashion (along with two stand-alone correlation analyses):

- Level of experience in academia (a composite predictor accounting for age, years at UM, year of highest degree, and rank)
- Ratings of positivity of overall department/unit climate (e.g., lower levels of scholarly isolation, lower levels of felt surveillance, higher ratings of the unit leader, etc.)
- Level of satisfaction with office space/location
- Having at least one mentor (this finding trended toward significance)
- Level of experienced self-determination and impact
- The extent to which boundaries between work and non-work life were firm
- Level of experience learning and growth on the job
- Level of satisfaction with teaching load
- Level of satisfaction with university funding for research
- For white faculty only: level of satisfaction with UM assistance with partner employment was positively correlated with job satisfaction (this predictor variable was not included in the regression model)
- For junior faculty, views of one's department/unit as effective at mentoring junior faculty were positively correlated with job satisfaction (this predictor variable was not included in the regression model)

The variables that were **significant negative predictors of job satisfaction in 2012** are listed here in summary fashion (along with two stand-alone *t*-tests):

- The experience of gender discrimination in the past five years (assessed in areas such as hiring, promotion, salary, access to resources, and access to administrative staff, etc.)
- For faculty of color only: the experience of not receiving a deserved department/unit-level award nomination was associated with lower levels of job satisfaction (compared to receiving such an award nomination)
- For faculty of color, experiences of race-related discrimination in the areas of salary and promotion were negatively associated with job satisfaction (these links were tested via *t*-tests, not in the larger regression model).

CONCLUSION

Understanding the factors that are associated with faculty members' job satisfaction is important for taking concrete steps toward improving job satisfaction for all faculty, for reducing faculty member stress, and for effectively retaining the excellent faculty who call the University of Michigan home.

The above results suggest a number of steps that could be taken to increase job satisfaction for UM faculty. First, ensuring that faculty members are working in departments and units characterized by a positive environment – i.e., respectful interactions, positive connections among scholars, lack of unpleasant scrutiny, etc. – is a critical step. For departments and units that do not yet have a sense of how their faculty view the climate, or what steps they need to take to make improvements, participating in a formal departmental climate assessment is recommended.

Ensuring that faculty members have certain types of practical support is another step that departments and other units should consider. Three types of practical support that emerged as especially important are the presence of mentors/careers advisors in faculty members' lives, the availability of university funding for scholarly work, and the provision of work spaces that meet faculty members' needs. Departments and units looking to take steps in this direction are advised to assess whether there are faculty members who have needs in these areas that are currently unaddressed or unresolved.

A large body of psychological research[14] indicates that a sense of autonomy – even in the context of working closely with others or under the supervision of others – is a fundamental predictor of human thriving. Consistent with this, we found that faculty members' sense of self-determination and efficacy was one of the strongest predictors of job satisfaction. Faculty who had a greater sense of independence and freedom in their work, and a sense that their work had a real impact, tended to be happier with their jobs than those who felt less self-determination and impact. These findings suggest that department and unit leaders might increase faculty job satisfaction by exploring ways to give individual faculty members reasonable opportunities to determine how their jobs are done. Within the larger context of the existing research on self-determination, the findings also suggest that when new departmental policies are adopted, ensuring that faculty members are invested in such changes and view them as consistent with their own goals is ideal. In the spirit of self-determination, faculty members themselves may benefit from being more assertive about their work goals, and pursuing new plans and ideas to the extent that is reasonable and possible.

Another psychological variable that was a positive predictor of job satisfaction was the experience of learning and growing while at work. Faculty members who experienced more of this were typically happier with their jobs compared to faculty members who reported less of this experience. This suggests that departmental and unit leaders should consider ways to maintain an optimal level of challenge for faculty

[14] E.g., Ryan, R. M., & Deci, E. L. (2006). Self-Regulation and the Problem of Human Autonomy: Does Psychology Need Choice, Self-Determination, and Will?. *Journal of Personality, 74*(6), 1557-1585.

members. Faculty job satisfaction may suffer as one's workload becomes too heavy, as is seen in the association between satisfaction with teaching load and overall job satisfaction. However, faculty who are given opportunities to try new things (e.g., serving on a committee, coordinating a program, teaching a new course) without being overloaded may benefit in terms of overall satisfaction with work.

The results of the present analyses suggest that having work demands spill into one's personal life can have negative consequences for job satisfaction. By the same token, faculty members who reported firmer boundaries between work life and personal life tended to happier with their jobs, on average. This finding indicates that faculty members should reflect carefully about the extent to which their work and personal lives feel appropriately balanced, and to take steps to address any problems that exist in this area, perhaps with the help of a supervisor or unit leader.

Finally, the present findings indicate that experiences with negative treatment at work can undermine faculty members' job satisfaction. Experiences with discrimination based on gender were associated with lower job satisfaction for faculty members, and women were significantly more likely than men to report encountering experiences with gender-based discrimination. Likewise, faculty of color who perceived salary and promotion decisions as discriminatory, based on race, had lower levels of job satisfaction compared to faculty of color who did not have such experiences. It can even be the case that the negative impact of frustrating events on job satisfaction can be amplified for members of vulnerable groups, perhaps because of the extra obstacles and stereotypes already faced by such groups. For example, in the present analyses, the experience of being passed over for an award had a negative link to job satisfaction for faculty of color, but not for white faculty. It may be that for faculty of color, who face certain cultural and institutional barriers that white faculty do not, the experience of not being fairly recognized can feel loaded with broader implications. In light of the findings reported here, university leadership at multiple levels should make efforts to ensure faculty are treated fairly in areas such as compensation (e.g., by conducting departmental analyses of salary as a function of race and gender) and recognition. Further, it may be necessary to investigate how comfortable faculty members are seeking help with concerns about discrimination, and to assess what additional types of support are needed in this area. Raising the awareness of all faculty members regarding various forms of bias and discrimination may also help to create a more comfortable work setting for faculty who are members of traditionally underrepresented groups.

APPENDIX A: OVERVIEW OF SAMPLE

By area and gender, the following met the criteria for receiving a survey in 2012. (Response rates are included in parentheses. Reponses rates encompass only those faculty for whom gender and race-ethnicity was available.)

- 432 female tenure-track faculty members in science and engineering[15]; 40% responded (n=174)
- 1,307 male tenure-track faculty members in science and engineering; 35% responded (n=452)
- 316 female tenure-track faculty members in social sciences; 37% responded (n=117)
- 455 male tenure-track faculty members in social sciences; 33% responded (n=148)
- 157 female tenure-track faculty members in arts and humanities; 56% responded (n=88)
- 251 male tenure-track faculty members in arts and humanities; 42% responded (n=106)

By area and race-ethnicity, the following met the criteria for receiving a survey in 2012. (Response rates are included in parentheses. Reponses rates encompass only those faculty for whom gender and race-ethnicity was available.)

- 440 tenure-track faculty members of color (African Americans, Latinos, Native Americans, and Asians and Asian Americans) in science and engineering; 28% responded (n=125)
- 1299 white tenure-track faculty in science and engineering; 39% responded (n=501)
- 207 tenure-track faculty members of color in social sciences; 26% responded (n=54)
- 564 white tenure-track faculty members in social sciences; 37% responded (n=211)
- 80 tenure-track faculty members of color in arts and humanities; 44% responded (n=35)
- 328 white tenure-track faculty members in arts and humanities; 48% responded (n=159)

In sum, the total number of respondents for the 2012 survey for who gender and race-ethnicity information was available was 1,085 (626 science and engineering faculty; 265 social sciences faculty; 194 arts and humanities faculty).

[15] This included faculty 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, Pharmacy, and Public Health).

APPENDIX B: REGRESSION TABLE

Final Step of Regression Model: Regression of Demographic, Climate-Related, and Career-Related Variables on 2012 Job Satisfaction for UM Tenure-Track Faculty

Predictors	Unstandardized Regression Coefficient (and Standard Error)	Standardized Regression Coefficient (β)
Experience in Academia	.028 (.008)	.11***
Gender	.045 (.058)	.02
Race-ethnicity	.451 (.206)	.21
Summary Climate Scale	.350 (.061)	.30***
Tolerant Climate Scale	.056 (.047)	.05
Gender Egalitarian Atmosphere	-.005 (.045)	-.004
Disparaging Comments about Women	.018 (.047)	.01
Disparaging Comments about Racial-Ethnic and/or Religious Minorities	.049 (.055)	.03
Experienced Gender Discrimination (in past 5 years)	-.187 (.079)	-.08*
Experienced Racial-Ethnic Discrimination (in past 5 years)	.028 (.106)	.01
Satisfaction with Office Space and Location	.072 (.026)	.08**
Number of Committees Served on in Typical Year	-.020 (.011)	-.05
Quality of Feedback from Department/Unit Chair/Director	-.053 (.037)	-.06
Have Mentor or Career Advisor	.105 (.056)	.06†
Failure to be Nominated for Award by Department/Unit	-.073 (.072)	-.03
Self Determination/Impact	.249 (.043)	.22***
Boundary Management	.091 (.039)	.06*
Learning/Growth on the Job	.138 (.043)	.09**
Number of Areas of Work Life Affected by Caring for Children	-.008 (.012)	-.02
Number of Areas of Work Life Affected by Caring for Adult	-.005 (.018)	-.01
Number of Areas of Work Life Affected by Own Health	-.033 (.021)	-.04
Satisfaction with University Funding	.126 (.023)	.17***
Satisfaction with Teaching Load	.093 (.023)	.11***
Race-Ethnicity × Failure to Receive Award Nomination	-.372 (.176)	-.20*

Note. †$p < .07$. *$p < .05$. **$p < .01$. ***$p < .001$. R^2 for final model was .51, meaning that 51% of the variance in job satisfaction was accounted for by the variables in the model. The coefficients for the main effects of race-ethnicity and failure to receive an award nomination do not allow for straightforward interpretation due to the fact that these two variables were involved in a significant interaction.