

# LEADER CONSORTIUM



Launching  
Equity in the  
Academy  
across the  
Dayton  
Entrepreneurial  
Region

**NSF ADVANCE PROGRAM**

LEADER Consortium (Air Force Institute of  
Technology, Central State University, University of  
Dayton, Wright State University)

Faculty Work Climate Survey:  
Baseline Comparison of STEM vs. SBS

December 2010



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## **Acknowledgments**

### **Final Report Authors**

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### **Survey Development, Data Entry, and Analysis**

Sarah M. Jackson	Graduate Research Assistant, Department of Psychology, WSU
Sarah M. Moore	Graduate Research Assistant, Department of Psychology, UD
Emily Polander	Graduate Research Assistant, Department of Psychology, WSU
Rebecca Riffle	Graduate Research Assistant, Department of Psychology, WSU
Peggy DesAutels, PhD	Associate Professor, Department of Philosophy, UD
Tamera Schneider, PhD	Associate Professor, Department of Psychology, WSU

There were 3 non-structured individual interviews with tenured faculty at each institution to aid in the surfacing of unforeseen issues concerning organizational climate, to include in the climate survey. As such, the climate survey we created was based on formative evaluation. In addition, we perused various climate surveys from prior ADVANCE projects and adapted some of their items to be included in our climate survey.

### **Faculty Participation Information (e.g., name, discipline)**

Deanna Vinson	Research Program Assistant, AFIT
Pamela Jackson	Human Resources, CSU
Susan Wachtel	Office of Sponsored Programs, CSU
Candace Lowell	Equity Advisor, CSU
Kimberly Kendricks, PhD	Co-Principal Investigator, CSU
Linda Nianouris	Human Resources, UD
Joyce Carter	Human Resources, UD
Tony Whack	Human Resources, WSU
Susan McGovern	Program Director, LEADER, WSU
Emily Polander	Graduate Research Assistant, Department of Psychology, WSU
Tamera Schneider, PhD	Associate Professor, Department of Psychology, WSU

Human-subjects approval was sought from each participating institution and obtained for both the qualitative research and the quantitative survey research.

## **Introduction**

### **Women in STEM Fields**

The underrepresentation of women in STEM academic positions is a nationwide concern (National Academy of Sciences, National Academy of Engineering, & Institute of Medicine of the National Academies (NAS, NAE, & IMNA), 2007). This underrepresentation is evident in gender disparities both in the training required for academic careers (e.g., graduate school and postdoctoral fellowships) and in hiring, promotion, retention, and advancement in academic organizations. For women scientists and engineers in the academy, these problems persist partly because of features of the institutional climate that are rooted in unconscious (i.e., implicit) and conscious (i.e., explicit) biases, attitudes, and behaviors of individuals within these organizations. These biases, which disproportionately disadvantage women, are held by both men and women. The disadvantages associated with biases of this type accumulate over time and can significantly hinder the success of women who choose to enter STEM fields.

Stereotypes can prevent women from entering STEM fields in the first place. NAS et al. (2007) has identified commonly held stereotypes about women in STEM fields: (1) women are not as good in mathematics as men, (2) women are not as competitive as men and do not want jobs in academia, (3) women faculty are less productive than men, and (4) women are more interested in family than in careers. The belief that men are more inclined to participate in and excel in math and science is widely held, even among women (NAS et al., 2007; Nosek, Banaji, & Greenwald, 2002). Stereotypes are beliefs that are involuntary, and they can influence attitudes and behaviors. The transformation of climate is thus fundamental to achieving ADVANCE objectives. With three rounds of ADVANCE sites now funded by the National Science Foundation, “best practices” are becoming available to the STEM community. That is what the LEADER consortium hopes to do – to borrow best practices from past ADVANCE sites and from each of the four institutions within the LEADER consortium to enhance the recruitment, advancement, and success of STEM women faculty.

### **Regional Climate Study**

The cultural norms and institutional policies across the partner institutions are as diverse as their histories and demographics. Our goal is to develop a regional climate and culture that enhances the recruitment, advancement, and success of STEM women. A collaborative approach to understanding and enhancing the environment for STEM women in the academy provides fruitful grounds both for evaluating best practices and for creating a sustainable, progressive regional environment. The LEADER specific aims are:

1. To conduct a comparative analysis of climate for STEM women across the institutions and thereby identify best practices related to recruitment, retention, and advancement.
2. To initiate gender schema education and a campaign based on persuasion theory that will promote new norms of expectation and thereby facilitate implementation of those best practices.
3. To implement social contracts across the consortium to promote transparency and accountability for the transformation of the climate leading to recruitment, promotion, and success of STEM women regionally.

With the first report summarizing the STEM climate, a comparative investigation of STEM versus Social and Behavioral Sciences (SBS) climate across the consortium institutions is presented in this second report.

## Method

### Respondents

STEM and Social and Behavioral Sciences (SBS) tenure-track faculty ( $N = 573$ ) from four institutions (AFIT, CSU, UD, WSU) were invited to participate in an online survey. An IRB-approved email was crafted for Deans of Colleges of respective institutions to adapt and send to their faculty to request participation. The email included a link to the online survey (programmed in and responded to using SNAP software). Those affiliated with LEADER (i.e., leadership) were not included in the email list sent to deans, and were not invited to participate in the online survey. The overall response rate was 49% ( $N = 282$ ). Respondents who provided survey data about their workplace climate were retained for the present summary, which yielded a response rate of 44% ( $N = 252$ ). Of these, 60% ( $n = 152$ ) were men and 25% ( $n = 62$ ) were women.

### Procedure

This first consortium climate survey was conducted by offering participation to each tenure-track STEM or SBS faculty member at each institution. Faculty contact information was obtained from human resources departments, institutional representatives, deans, and equity advisors. The dean for each college sent an email invitation with a link to the online survey to their tenure-track faculty. To facilitate the deans' emails, we provided them with a list of emails for the tenure-track faculty in their college and wording for the invitation email. The invitation email informed faculty that the confidential and anonymous survey would take approximately 15-20 minutes, and that participants would be entered into a raffle for a \$100 gift card (AFIT faculty were excluded from the raffle due to restrictions against incentive-driven research participation during duty hours). (The three lottery winners were notified and confirmed receipt of their gift cards).

Two weeks after the initial invitation, we sent reminders both via email and the postal service to all participants to query participation. Response options included that faculty a) participated in the online survey, b) did not participate but planned to, or c) did not plan to participate. Six follow-up email invitations (including the query and survey link) were sent to faculty who either did not respond to the reminder or responded that they had not yet participated in the survey but planned to. We recorded all reminder responses in a database with faculty names, contact information, and their response to the follow-up. Modeled somewhat after past ADVANCE grantees, we aimed to have similar participation success (University of Michigan, Stewart, Stubbs, & Malley, 2002), expecting a response rate of 38%. However, subsequent to setting this goal, it was learned at an ADVANCE PI meeting that a 50% response rate is preferable, resulting in the six follow-up invitations, the last sent in February, 2010. Table 1 presents the response rate for each institution, showing that the larger institutions appeared to have lower response rates. Table 2a presents response rates for STEM faculty and table 2b

presents response rates for SBS faculty. These tables revealed generally the same pattern as the overall response rates – larger institutions appeared to have lower response rates. AFIT does not employ SBS faculty, as indicated by the lack of SBS responses at this institution. Consequently, AFIT was dropped from subsequent analyses, so as not to skew comparisons by including an institution without an SBS climate.

**Table 1.** Overall Response Rates, by Institution

College	Total per institution	Number of responses	Response rate	Percent of total responses
AFIT	80	40	50.6%	15.9%
CSU	39	23	59.0%	9.1%
UD	200	77	38.5%	30.6%
WSU	254	112	44.1%	44.4%
TOTAL	573	252	44.0%	100.0%

**Table 2a.** Response Rates for STEM Faculty, by Institution

College	Total per institution	Number of responses	Response rate	Percent of total responses
AFIT	80	38	48.1%	21.0%
CSU	21	15	71.4%	8.3%
UD	139	55	39.6%	30.4%
WSU	176	73	41.5%	40.3%
TOTAL	416	181	43.5%	100.0%

**Table 2b.** Response Rates for SBS Faculty, by Institution

College	Total per institution	Number of responses	Response rate	Percent of total responses
AFIT	0	0	0.0%	0.0%
CSU	11	3	27.3%	5.6%
UD	38	20	52.6%	37.0%
WSU	51	31	60.8%	57.4%
TOTAL	100	54	54.0%	100.0%

Table 3a presents a summary of STEM respondents by institution, discipline, and sex, while table 3b presents a summary of SBS respondents by institution, discipline, and sex<sup>1</sup>. These tables reveal that there are numerous STEM and SBS disciplines with fewer than three tenure-track faculty respondents represented (e.g., Physical Science). To ensure anonymity of responders, an a priori requirement for cell size of three or more individuals to disaggregate data was made. Consequently, we collapsed across field to create two groupings: STEM and SBS.

<sup>1</sup> To ensure adequate cell population, data were summarized by field (STEM, SBS), rank (assistant, associate, full), and sex (women, men). Some data may not be made public.

**Table 3a.** Number (%) of Tenure-track Faculty Respondents at each Consortium Institution, by NSF STEM Field and Sex

	Institution			
	AFIT	CSU	UD	WSU
<b>Engineering (n =75)</b>	<b>24 ( 32.0)</b>	<b>5 ( 6.7)</b>	<b>28 ( 37.3)</b>	<b>18 ( 24.0)</b>
Men (n = 53)	19 ( 95.0)	5 (100.0)	16 ( 72.7)	13 ( 81.3)
Women (n = 10)	1 ( 5.0)	0	6 ( 27.3)	3 ( 18.8)
<b>Physical Science (n = 22)</b>	<b>5 ( 22.7)</b>	<b>4 ( 18.2)</b>	<b>6 ( 27.3)</b>	<b>7 ( 31.8)</b>
Men (n = 15)	3 ( 75.0)	2 ( 66.7)	6 (100.0)	4 ( 66.7)
Women (n = 4)	1 ( 25.0)	1 ( 33.3)	0	2 ( 33.3)
<b>Earth, Atmosphere, &amp; Ocean Sciences (n = 7)</b>	<b>0*</b>	<b>1 ( 14.3)</b>	<b>2 ( 28.6)</b>	<b>4 ( 57.1)</b>
Men (n = 3)	0	0	0	3 ( 75.0)
Women (n = 4)	0	1 (100.0)	2 (100.0)	1 ( 25.0)
<b>Mathematics (n = 28)</b>	<b>4 ( 14.3)</b>	<b>2 ( 7.1)</b>	<b>12 ( 42.9)</b>	<b>10 ( 35.7)</b>
Men (n = 12)	2 ( 50.0)	2 (100.0)	6 ( 60.0)	3 ( 60.0)
Women (n = 7)	1 ( 50.0)	0	4 ( 40.0)	2 ( 40.0)
<b>Comp Science (n = 14)</b>	<b>4 ( 28.6)</b>	<b>1 ( 7.1)</b>	<b>1 ( 7.1)</b>	<b>8 ( 57.1)</b>
Men (n = 12)	2 (100.0)	1 (100.0)	1 (100.0)	8 (100.0)
Women (n = 0)	0	0	0	0
<b>Bio/Agricultural Science (n = 35)</b>	<b>1 ( 4.0)</b>	<b>2 ( 5.7)</b>	<b>6 ( 17.1)</b>	<b>26 ( 74.3)</b>
Men (n = 23)	1 (100.0)	0	3 ( 75.0)	19 ( 76.0)
Women (n = 8)	0	1 (100.0)	1 ( 25.0)	6 ( 24.0)
<b>Total (N = 181)</b>	<b>38 ( 21.0)</b>	<b>15 ( 8.3)</b>	<b>55 ( 30.4)</b>	<b>73 ( 40.3)</b>

Note. \*department does not exist at the institution

**Table 3b.** Number (%) of Tenure-Track Faculty Respondents at CSU, UD, and WSU by SBS Field and Rank (AFIT excluded).

	Institution					
	CSU		UD		WSU	
<b>Psychology (n = 8)</b>	<b>1</b>	<b>( 12.5)</b>	<b>5</b>	<b>( 62.5)</b>	<b>2</b>	<b>( 25.0)</b>
Men (n = 4)	0		3	( 60.0)	1	( 50.0)
Women (n = 4)	1	(100.0)	2	( 40.0)	1	( 50.0)
<b>Economics (n = 3)</b>	<b>0</b>		<b>0</b>		<b>3</b>	<b>(100.0)</b>
Men (n = 1)	0		0		1	( 50.0)
Women (n = 1)	0		0		1	( 50.0)
<b>Political Science (n = 3)</b>	<b>0</b>		<b>2</b>	<b>( 66.7)</b>	<b>1</b>	<b>( 33.3)</b>
Men (n = 2)	0		1	( 50.0)	1	(100.0)
Women (n = 1)	0		1	( 50.0)	0	
<b>Sociology (n = 8)</b>	<b>0</b>		<b>6</b>	<b>( 75.0)</b>	<b>2</b>	<b>( 25.0)</b>
Men (n = 1)	0		1	( 20.0)	0	
Women (n = 6)	0		4	( 80.0)	2	(100.0)
<b>Other* (n = 13)</b>	<b>2</b>	<b>( 15.4)</b>	<b>5</b>	<b>( 38.5)</b>	<b>6</b>	<b>( 46.2)</b>
Men (n = 7)	0		3	( 75.0)	4	( 80.0)
Women (n = 4)	2	(100.0)	1	( 25.0)	1	( 20.0)
<b>Total (N = 25)</b>	<b>3</b>	<b>( 8.6)</b>	<b>8</b>	<b>( 51.4)</b>	<b>14</b>	<b>( 40.0)</b>

Note. \*Other Social Sciences (e.g. Accounting, Anthropology, Finance, Communications, Social Work, Urban Affairs)

Table 4a presents a summary of the frequency distribution of the 192 faculty respondents for whom we have field, rank, and sex data, revealing that cells are populated by at least three individuals and analyses can proceed. Table 4b presents a summary of the frequency distribution of the 162 faculty respondents at CSU, UD, and WSU, AFIT excluded, for comparison with Table 4a. Data analysis was facilitated using Excel and SPSS software packages. Psychometric analysis was used to reduce the data and is described below.

**Table 4a.** Number (%) of Men and Women Tenure-Track Faculty Respondents by Field (STEM or SBS) and Rank across Institutions.

	Men		Women		Total	
<b>STEM</b>	<b>116</b>	<b>( 60.4)</b>	<b>32</b>	<b>( 16.7)</b>	<b>148</b>	<b>( 77.1)</b>
Assistant Professor	25	( 13.0)	15	( 7.8)	40	( 20.8)
Associate Professor	41	( 21.4)	11	( 5.7)	52	( 27.1)
Full Professor	50	( 26.0)	6	( 3.1)	56	( 29.2)
<b>SBS</b>	<b>22</b>	<b>( 11.5)</b>	<b>22</b>	<b>( 11.5)</b>	<b>44</b>	<b>( 22.9)</b>
Assistant Professor	4	( 2.1)	5	( 2.6)	9	( 4.7)
Associate Professor	11	( 5.7)	14	( 7.3)	25	( 13.0)
Full Professor	7	( 3.6)	3	( 1.6)	10	( 5.2)
<b>Total</b>	<b>138</b>	<b>( 71.9)</b>	<b>54</b>	<b>( 28.1)</b>	<b>192</b>	<b>(100.0)</b>

**Table 4b.** Number (%) of Men and Women Tenure-Track Faculty Respondents by Field (STEM or SBS) and Rank at CSU, UD, and WSU (AFIT excluded).

	Men		Women		Total	
<b>STEM</b>	<b>89</b>	<b>( 54.9)</b>	<b>29</b>	<b>( 17.9)</b>	<b>118</b>	<b>( 72.8)</b>
Assistant Professor	21	( 13.0)	15	( 9.3)	36	( 22.2)
Associate Professor	34	( 21.0)	10	( 6.2)	44	( 27.2)
Full Professor	34	( 21.0)	4	( 2.5)	38	( 23.5)
<b>SBS</b>	<b>22</b>	<b>( 13.6)</b>	<b>22</b>	<b>( 13.6)</b>	<b>44</b>	<b>( 27.2)</b>
Assistant Professor	4	( 2.5)	5	( 3.1)	9	( 5.6)
Associate Professor	11	( 6.8)	14	( 8.6)	25	( 15.4)
Full Professor	7	( 4.3)	3	( 1.9)	10	( 6.2)
<b>Total</b>	<b>111</b>	<b>( 68.5)</b>	<b>51</b>	<b>( 31.5)</b>	<b>162</b>	<b>(100.0)</b>

**Exploratory Factor Analysis.** A brief summary of psychometric data reduction follows. For a full discussion, see Technical Report No. 1. First, items where high ratings denoted a negative workplace climate were reverse-scored so that higher values denote a positive climate. Second, exploratory factor analyses were computed to investigate whether items covaried enough to create a factor. All items representing a factor were averaged to create a subscale score for that factor. Reliability was determined by calculating Cronbach's alpha with subscales containing three or more items, or by calculating Pearson's Product Moment Correlations for subscales with two items. All subscales reported below had acceptable reliability (Cronbach's alpha > .70, or Pearson's  $r > .40$ ).

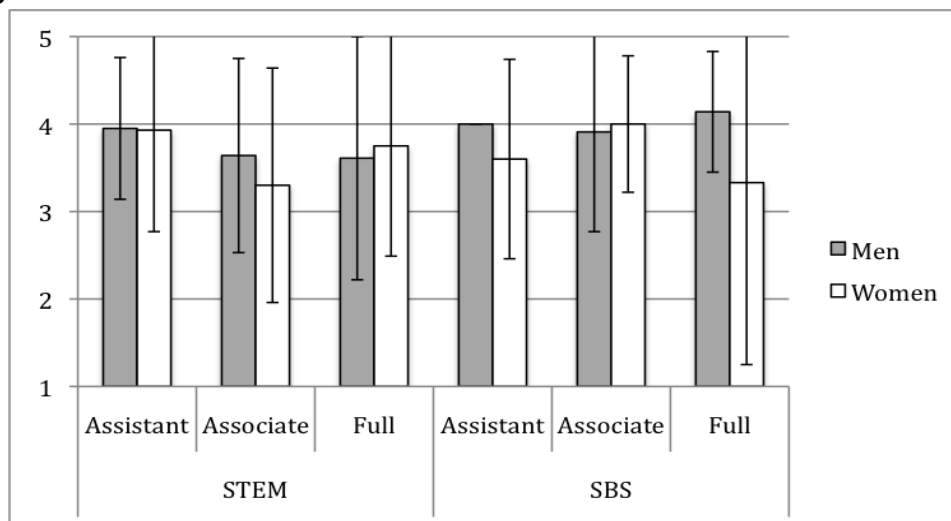
**Analysis of Variance.** After preliminary (descriptive) analyses were conducted, Analysis of Variance (ANOVA) was used to examine group differences in workplace climate. A 2 x 3 x 2 design was implemented; the independent variables in the analyses were field (STEM, SBS), rank (assistant, associate, full), and sex (women, men). We examined the influence of these independent variables on numerous dependent variables including climate-related subscales or individual items.

## Results

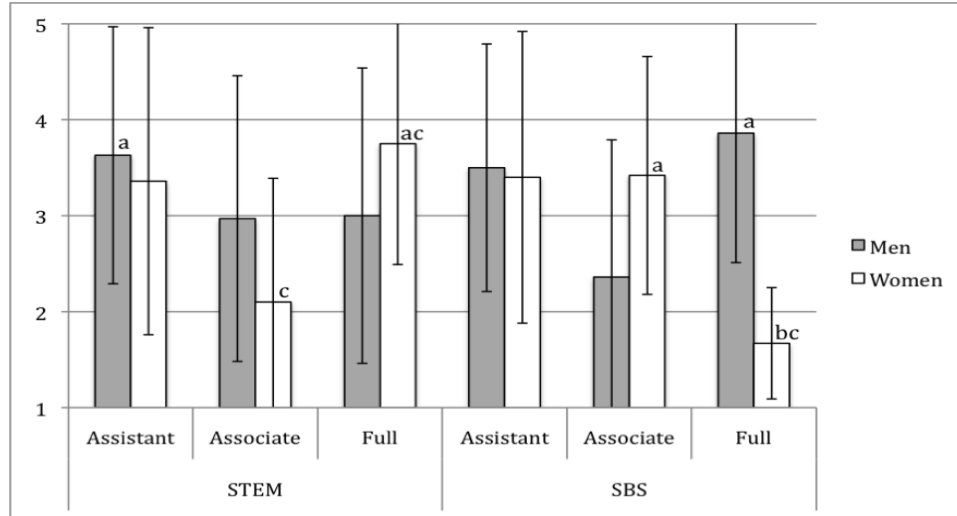
Note: For figures presented below, the y-axis represents the range of scale responses, whereas error bars represent standard deviations. Error bars extending beyond the response range are not capped, and absence of an error bar denotes zero variability.

### a) Job Satisfaction

We used a one-item measure to assess job satisfaction: "All things considered, I am satisfied with my current position." This item was obtained from University of Michigan's ADVANCE climate survey. Past research has suggested a one-item measure of job satisfaction is valid (Dolbier, Webster, McCalister, Mallon, & Steinhardt, 2005). Respondents rated this item on a 5-point agreement scale ranging from 1 (strongly disagree) to 5 (strongly agree). There were no significant differences in job satisfaction between field, rank, or sex (see Figure 1). Overall, given the possible values, the ratings denote greater job satisfaction (scores are above the midpoint of the scale, 3) and are comparable to other climate survey data from other institutions (e.g., University of Michigan).

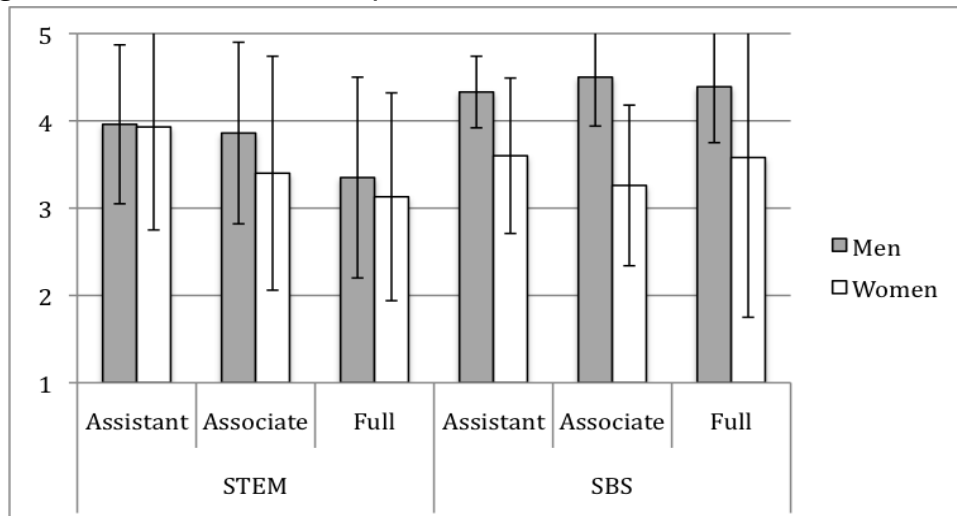
**Figure 1. Job Satisfaction****b) Intentions to Quit**

We used a one-item measure to assess intentions to quit: “I have seriously considered leaving this institution”. This item was from University of Michigan’s ADVANCE climate survey. Past research has suggested a one-item measure of turnover intent is valid (Beehr & Gupta, 1978). Respondents rated this item on a 5-point agreement scale ranging from 1 (strongly disagree) to 5 (strongly agree). This item was reverse-scored so that higher scores denote a better climate and lower intentions to quit. The ANOVA revealed a significant field by rank by sex interaction,  $F(2, 143) = 5.43, p = .01$ . Figure 2 shows that women SBS full faculty ( $M = 1.67, SD = 0.58$ ) had the highest quit intentions generally, and higher quit intentions specifically compared to men SBS full professors ( $M = 3.86, SD = 1.35$ ), women STEM full professors ( $M = 3.75, SD = 1.26$ ), men STEM assistants ( $M = 3.63, SD = 1.34$ ), and women SBS associates ( $M = 3.42, SD = 1.24$ ), as denoted by different letters above the means. Women STEM associates also had higher turnover intent in general, with significantly higher turnover intent than men STEM assistants ( $M = 3.63, SD = 1.34$ ), men SBS full professors ( $M = 3.86, SD = 1.35$ ), and women SBS associates ( $M = 3.42, SD = 1.24$ ). Within STEM, men assistants ( $M = 3.63, SD = 1.34$ ) reported significantly lower intentions to quit than women associates ( $M = 2.10, SD = 1.29$ ). (Note: Means with different letters are significantly different,  $p < .05$ ).

**Figure 2. Intentions to Quit**

### c) General Leadership

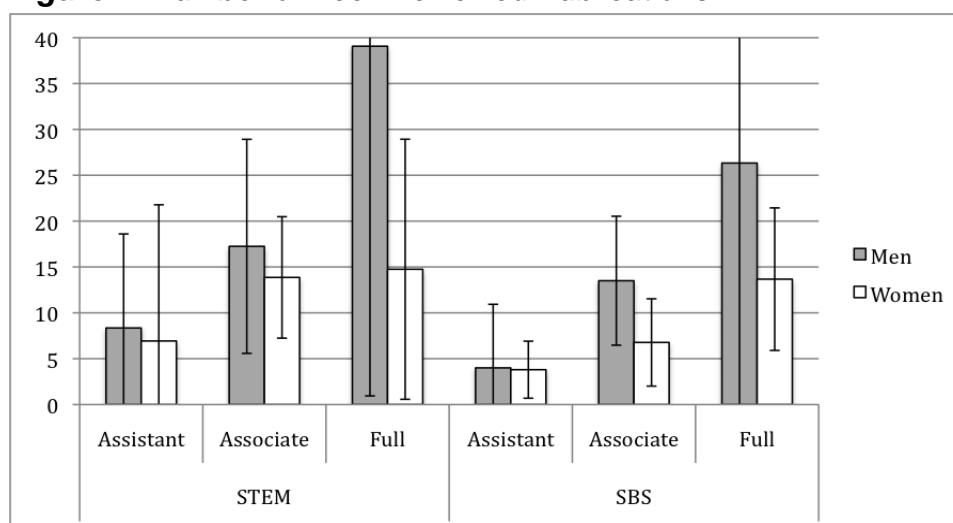
General leadership was assessed using a 13-item subscale adapted from the theory and measurement of leadership (Trepper & Percy, 1994) and prior ADVANCE climate surveys (e.g., University of Michigan, University of Illinois at Chicago (UIC; Khare & Owens, 2006)). Scale items, determined with exploratory factor analysis, included: “Is an effective administrator”, “Shows interest in Faculty”, “Encourages and empowers faculty”, “Treats faculty in an even-handed way”, “Gives me useful feedback about my performance”, “Communicates consistently with faculty”, and “Creates a cooperative and supportive environment”. This was a reliable subscale ( $\alpha = .96$ ). Respondents rated items on a 5-point agreement scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores denote better perceptions about departmental leadership. The ANOVA revealed a significant main effect for sex,  $F(1, 142) = 6.63, p = .01$ . Figure 3 shows that men faculty ( $M = 3.83, SD = 1.04$ ) rated leaders more positively than women faculty ( $M = 3.51, SD = 1.14$ ).

**Figure 3. General Leadership**

#### d) Number of Peer-Reviewed Publications

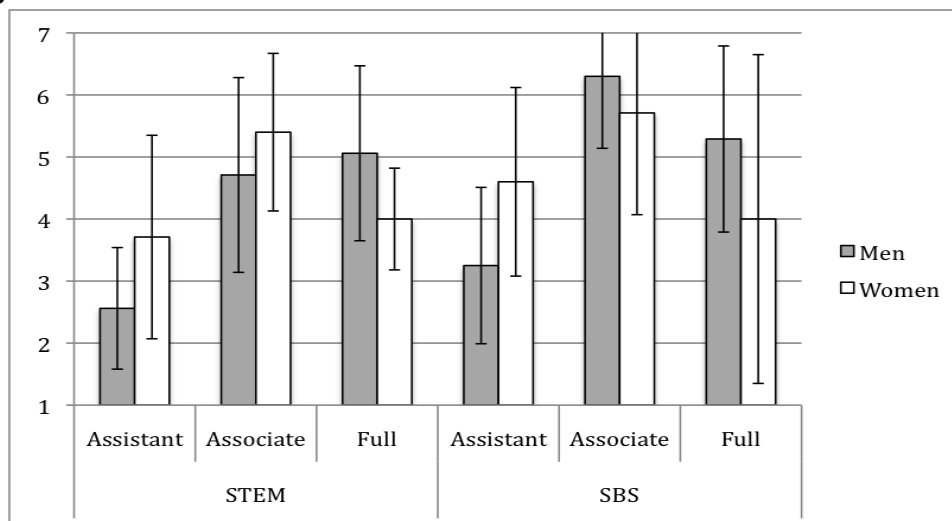
We used a one-item measure, adapted from the University of Michigan's ADVANCE climate survey, to assess the number of peer-reviewed publications as a proxy for respondents' productivity in their research area. The ANOVA revealed a significant main effect of rank,  $F(2, 127) = 4.00, p = .02$ , but no other significant mean differences were found. Figure 4 shows that full faculty ( $M = 32.98, SD = 25.17$ ) reported significantly more peer-reviewed publications than associate faculty ( $M = 13.84, SD = 9.94$ ) and assistant faculty ( $M = 6.92, SD = 11.34$ ). There was no significant difference in number of peer-reviewed publications between assistants and associates.

**Figure 4.** Number of Peer-Reviewed Publications

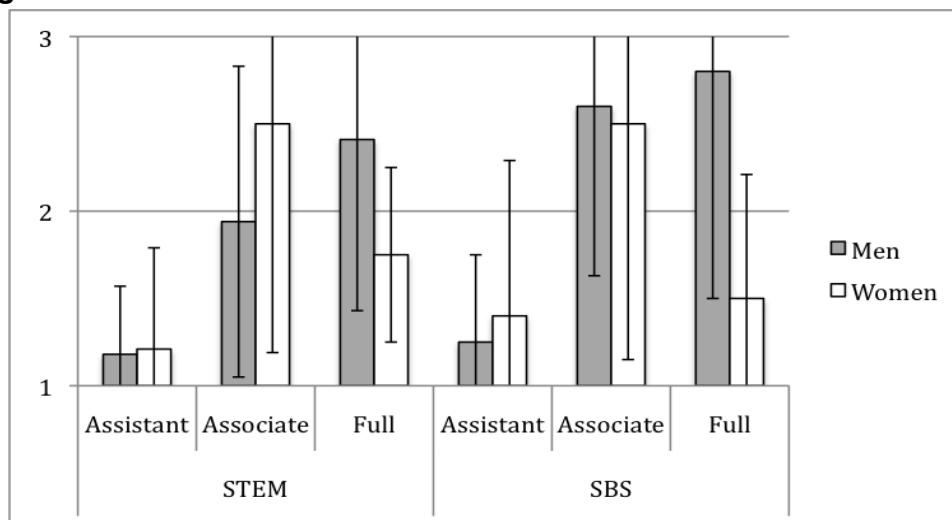


#### e) Number of Committees Served

We used a one-item measure, adapted from the University of Michigan's ADVANCE climate survey, to measure the number of committees respondents served on, as a proxy for service participation. The ANOVA revealed significant main effects for field,  $F(1, 145) = 4.05, p = .05$ , and rank,  $F(2, 145) = 17.72, p = .00$ . Figure 5 shows that faculty in SBS ( $M = 5.30, SD = 1.73$ ) served on more committees than those in STEM ( $M = 4.39, SD = 1.66$ ). Also, associate faculty ( $M = 5.25, SD = 1.58$ ) and full faculty ( $M = 4.94, SD = 1.48$ ) served on more committees than assistants ( $M = 3.27, SD = 1.47$ ). There was no significant difference between associate and full professors. However, this main effect of rank was qualified by a significant rank by sex interaction,  $F(2, 145) = 4.26, p = .02$ . Associate women ( $M = 5.58, SD = 1.47$ ) served on more committees than assistant men ( $M = 2.68, SD = 1.04$ ), assistant women ( $M = 3.95, SD = 1.62$ ), and full women ( $M = 4.00, SD = 1.63$ ). Full ( $M = 5.10, SD = 1.41$ ) and associate men ( $M = 5.07, SD = 1.62$ ) served on more committees than assistant women ( $M = 3.95, SD = 1.62$ ). In contrast, assistant men ( $M = 2.68, SD = 1.04$ ) served on fewer committees than every other group: assistant women ( $M = 3.95, SD = 1.62$ ), associate women ( $M = 5.58, SD = 1.47$ ), full women ( $M = 4.00, SD = 1.63$ ), associate men ( $M = 5.07, SD = 1.62$ ), and full men ( $M = 5.10, SD = 1.41$ ).

**Figure 5. Number of Committees Served****f) Number of Committees Chaired**

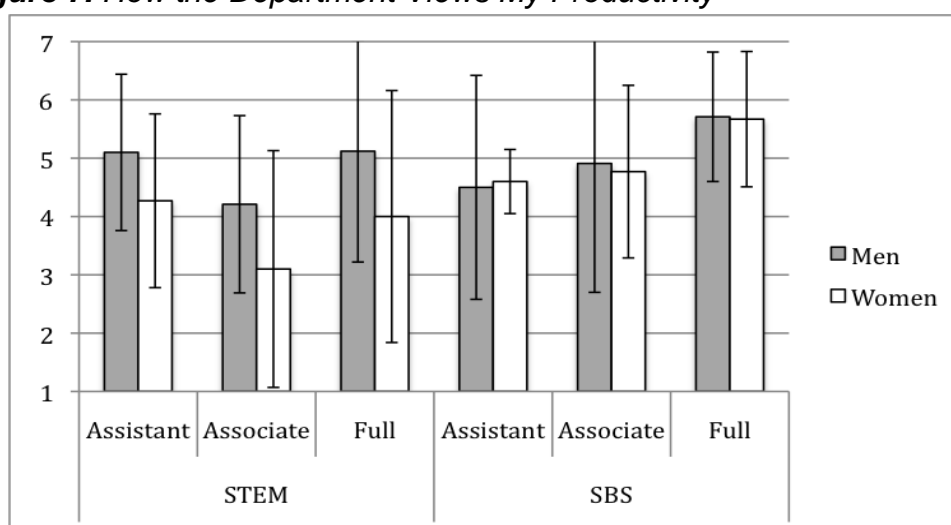
We used a one-item measure, adapted from the University of Michigan's ADVANCE climate survey, to assess the number of committees a respondent has chaired to assess leadership opportunities. The ANOVA revealed a significant main effect of rank,  $F(2, 134) = 12.95$ ,  $p = .00$ , but no other significant mean differences were found. Figure 6 shows that full faculty ( $M = 2.35$ ,  $SD = 1.00$ ) and associate faculty ( $M = 2.24$ ,  $SD = 1.09$ ) were similar, and chaired more committees than assistant faculty ( $M = 1.23$ ,  $SD = 0.53$ ).

**Figure 6. Number of Committees Chaired**

### g) How the Department Views My Productivity

We used a one-item measure, adapted from the University of Michigan's ADVANCE climate survey, to assess departmental views of productivity. The item was, "Using the criteria you checked above, how do you think your department views your productivity, compared to the departmental average?" Respondents rated this item using a 7-point rating scale ranging from 1 (less productive) to 7 (more productive). Higher scores denote higher perceptions of how the department views the respondent's productivity. The ANOVA revealed a significant main effect of field,  $F(1, 148) = 4.28, p = .04$ . Figure 7 shows that faculty in SBS ( $M = 4.98, SD = 1.58$ ) rated their departments' views of their productivity significantly better than those in STEM ( $M = 4.54, SD = 1.75$ ).

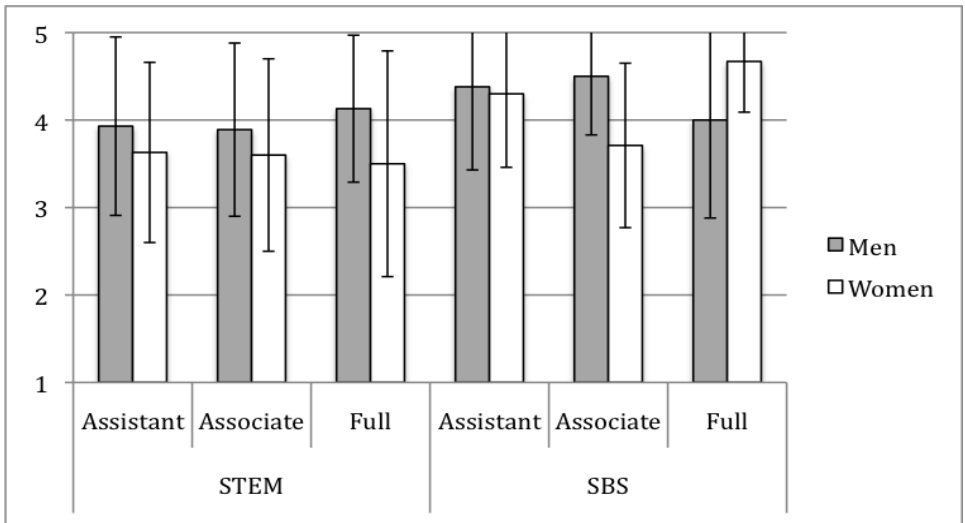
**Figure 7.** How the Department Views My Productivity



### h) Department is Open to Women

We assessed respondents' perceptions of whether the department is open to women using questions adapted from the UIC survey. We used the two items with the highest factor loadings. These two items were reliable ( $r = .41$ ) and were: "Faculty would be comfortable with a woman or a man as department head" and "The climate for women in my department is good." Respondents rated the items on a 5-point agreement scale, from 1 (strongly disagree) to 5 (strongly agree). Higher scores denote higher perceptions of the openness of the department to women. The ANOVA revealed a significant main effect of field,  $F(1, 146) = 5.56, p = .02$ . Figure 8 shows that faculty in SBS ( $M = 4.17, SD = 0.89$ ) had higher ratings of the department being open to women than those in STEM ( $M = 3.90, SD = 0.97$ ).

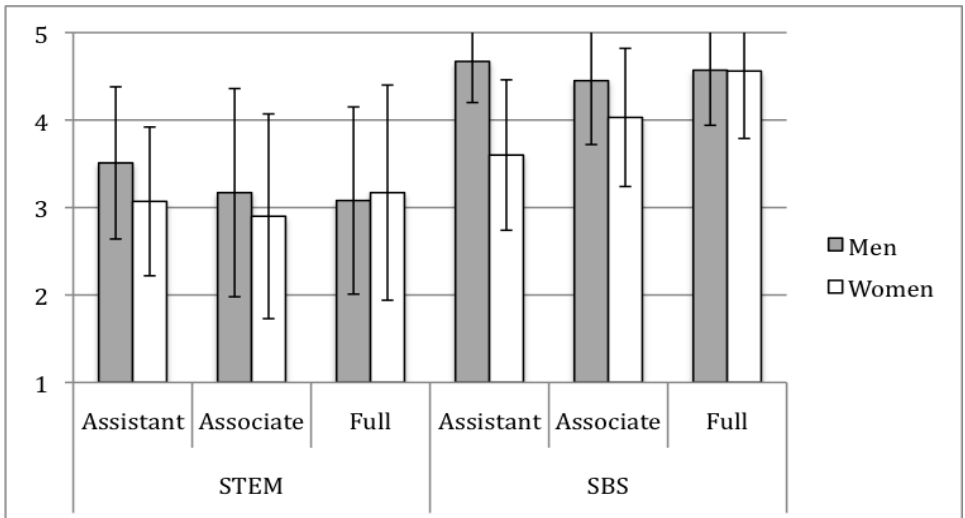
**Figure 8. Department is Open to Women**



**i) Department Advances Women**

We assessed the level to which faculty believed that their departments advance women, using a 3-item subscale adapted from UIC survey. Scale items were determined by using exploratory factor analysis and included: “My department has difficulty retaining women faculty”, “There are too few women faculty in my department”, and “My department has too few women in leadership positions”. This was a reliable subscale ( $\alpha = .78$ ). Respondents rated each item on a 5-point agreement scale, from 1 (strongly disagree) to 5 (strongly agree). Higher scores denote more positive perceptions about departmental advancement of women. The ANOVA revealed a significant main effect of field,  $F(1, 147) = 30.85, p = .00$ . Figure 9 shows that SBS faculty ( $M = 4.27, SD = 0.77$ ) reported that their departments were better at advancing women than STEM faculty ( $M = 3.17, SD = 1.05$ ).

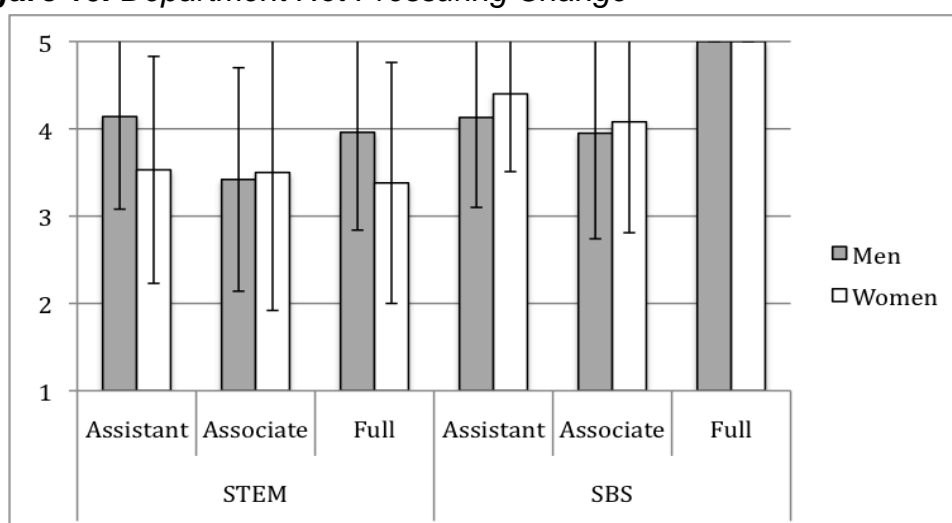
**Figure 9. Department Advances Women**



### j) Department Not Pressuring Change

We assessed the level to which faculty believe that their departments pressure them to change through a 2-item subscale adapted from the University of Michigan's ADVANCE climate survey. Scale items were determined by using exploratory factor analysis and included: "I feel pressure to change my research agenda to fit in" and "I feel pressure to change my research agenda to make tenure/be promoted". This was a reliable subscale ( $\alpha = .75$ ). Respondents rated each item on a 5-point agreement scale ranging from 1 (strongly disagree) to 5 (strongly agree). Again, items were reversed so that higher scores denote less pressure to change. The ANOVA revealed a significant main effect of field,  $F(1, 148) = 9.40, p = .00$ . Figure 10 shows that SBS faculty ( $M = 4.30, SD = 1.06$ ) reported less pressure to change than STEM faculty ( $M = 3.73, SD = 1.24$ ). (Note: The absence of an error bar denotes zero variability).

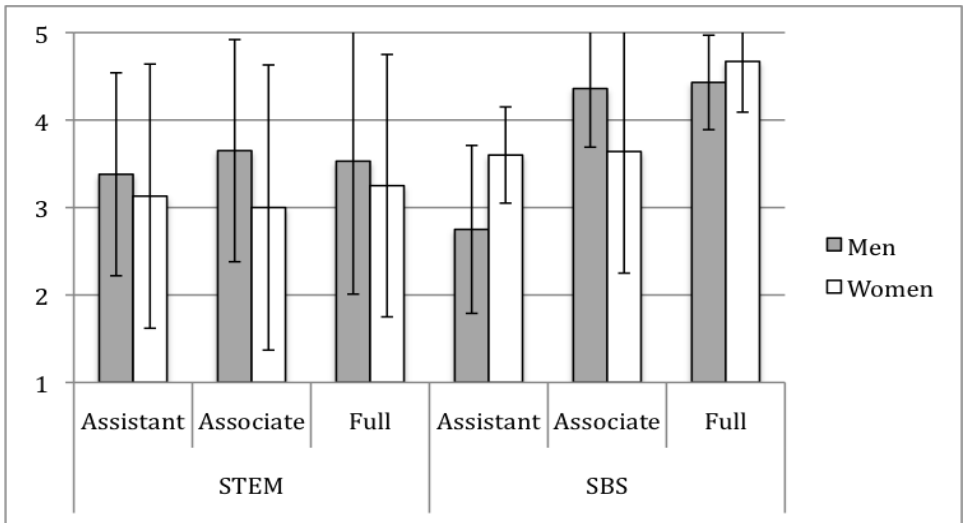
**Figure 10. Department Not Pressuring Change**



### k) Equal Decision Maker

We used a one-item measure to assess the level to which faculty believe they are full and equal decision-makers in the department: "I am a full and equal decision-maker in my unit/department," adapted from UM's survey. Respondents rated items on 5-point agreement scales, from 1 (strongly disagree) to 5 (strongly agree). The ANOVA revealed a significant main effect of field,  $F(1, 150) = 4.49, p = .04$ . Figure 11 shows that faculty in SBS ( $M = 3.93, SD = 1.07$ ) reported greater beliefs of being full and equal decision-makers compared to those in STEM ( $M = 3.43, SD = 1.39$ ).

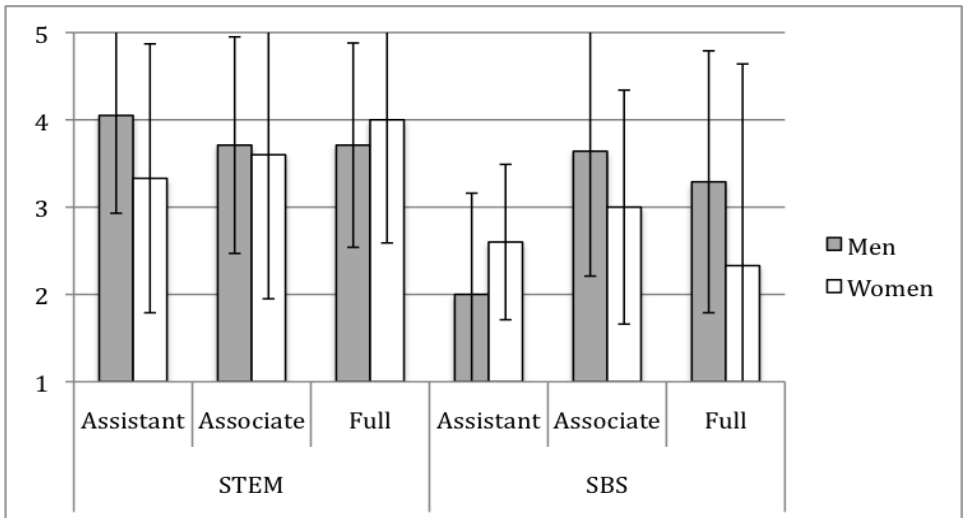
**Figure 11. Equal Decision Maker**



**1) Sense of Fit in the Department**

We used one item to assess the sense of fit faculty have in their departments: “Others seem to find it easier than I to fit in,” adapted from UM. As above, respondents rated the item on a 5-point agreement scale. The ANOVA revealed a significant main effect of field,  $F(1, 144) = 10.83, p = .001$ . Figure 12 shows that STEM faculty ( $M = 3.72, SD = 1.27$ ) reported greater sense of departmental fit than SBS faculty ( $M = 3.02, SD = 1.42$ ).

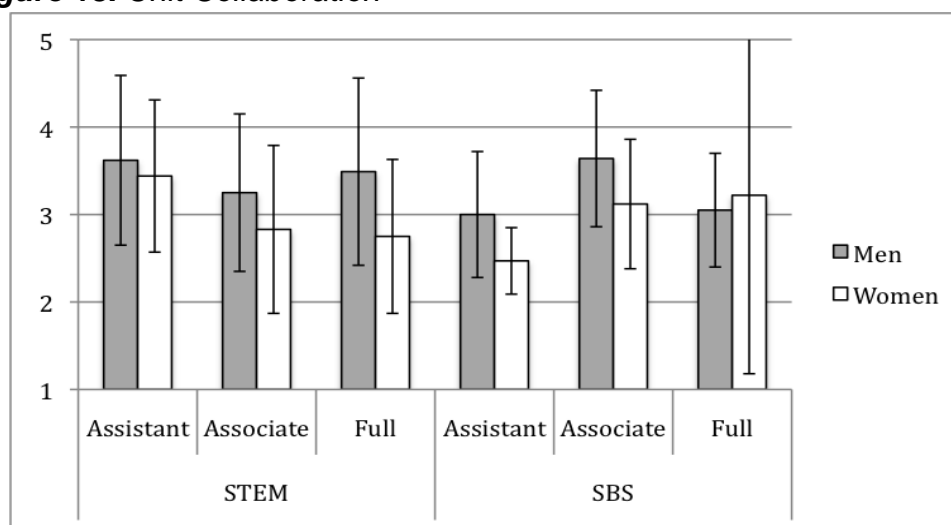
**Figure 12. Sense of Fit in the Department**



### m) Unit Collaboration

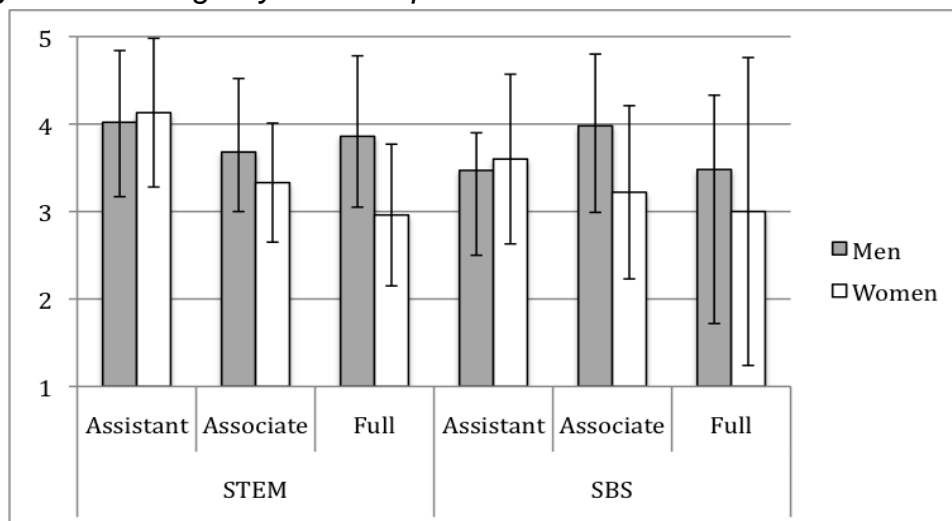
Unit collaboration was assessed with a 3-item subscale adapted from UM's climate survey. Respondents rated their level of satisfaction on a 5-point scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Scale items were determined with exploratory factor analysis and included: "Opportunity to collaborate with other faculty", "Amount of social interaction with members of my unit/department", and "Level of funding for my research or creative efforts". This was a reliable subscale ( $\alpha = .77$ ). The ANOVA revealed a significant rank by field interaction,  $F(2, 149) = 3.45, p = .03$ . Figure 13 shows that STEM assistants ( $M = 3.55, SD = 0.92$ ) rated unit collaboration higher than SBS assistants ( $M = 2.70, SD = 0.59$ ). Within SBS, associates ( $M = 3.35, SD = 0.78$ ) rated unit collaboration higher than assistants ( $M = 3.16, SD = 0.92$ ).

**Figure 13. Unit Collaboration**

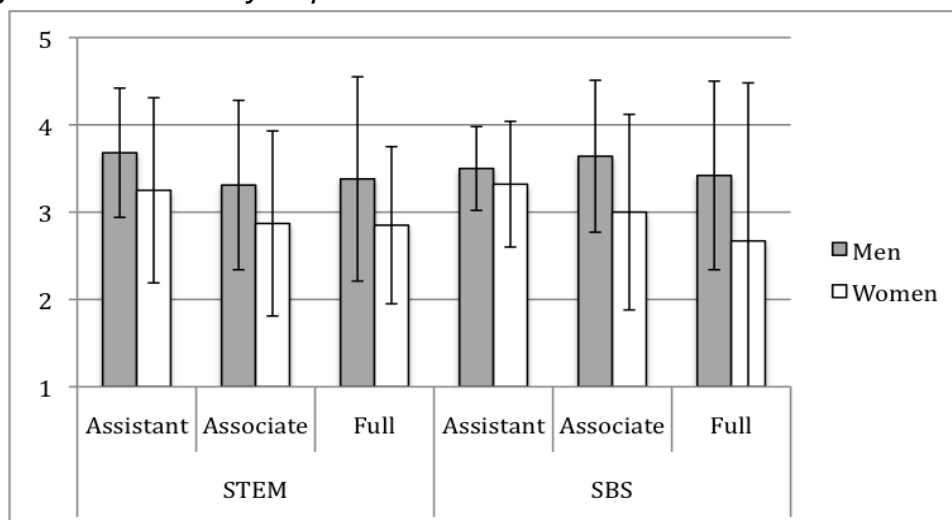


### n) Collegiality in the Department

We assessed respondents' perceptions of departmental collegiality with questions adapted from UM's climate survey. We used the six semantic differential items with the highest factor loadings: friendly (1 = friendly, 5 = hostile; reverse scored), cooperative (1 = cooperative, 5 = competitive; reverse scored), respectful (1 = disrespectful, 5 = respectful), collegial (1 = collegial, 5 = contentious; reverse scored), collaborative (1 = collaborative, 5 = individualistic; reverse scored), and supportive (1 = unsupportive, 5 = supportive). The scale was reliable ( $\alpha = .91$ ). The ANOVA revealed a significant main effect of sex,  $F(1, 149) = 4.04, p = .05$ . Figure 14 shows that men ( $M = 3.81, SD = 0.85$ ) reported a greater sense of collegiality than women ( $M = 3.52, SD = 0.98$ ).

**Figure 14. Collegiality in the Department****o) Valued by Department**

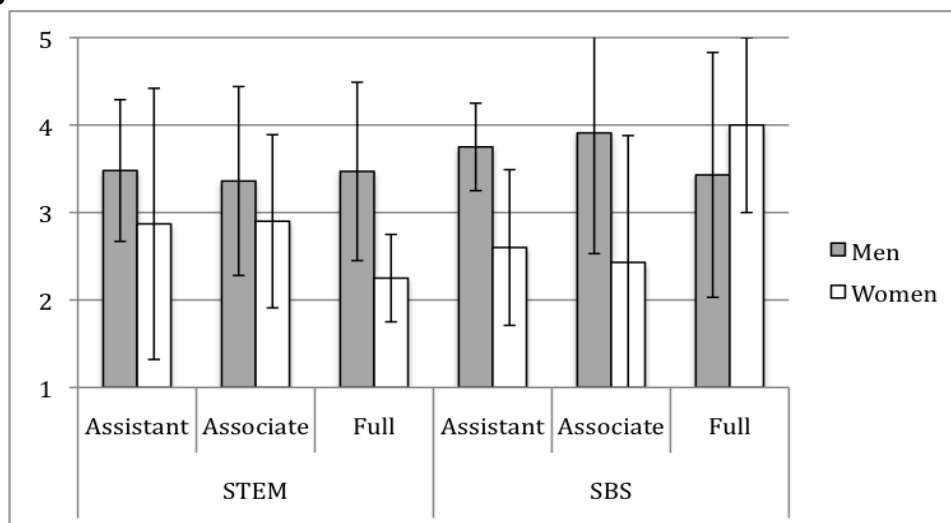
We assessed the level to which faculty feel valued by their departments with a 5-item subscale adapted from UM's climate survey. Respondents rated their level of satisfaction with each item on a 5-point scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Scale items were determined with exploratory factor analysis and included: "Sense of being valued for my teaching by members of my unit/department", "Sense of being valued for my research, scholarship, or creativity by members of my unit/department", "The recognition I get for my research, compared to others in my unit/department", "The recognition I get for my teaching, compared to others in my unit/department", and "The recognition I get for my service work, compared to others in my unit/department". This was a reliable subscale ( $\alpha = .90$ ). The ANOVA revealed a significant main effect of sex,  $F(1, 149) = 5.25, p = .02$ . Figure 15 shows that men ( $M = 3.45, SD = 0.98$ ) felt more valued by their departments than women ( $M = 3.05, SD = 1.05$ )

**Figure 15. Valued by Department**

**p) Balance between Professional and Personal Life**

A single item assessed respondents' satisfaction with the balance between professional and personal life. Satisfaction (on a 5-point scale) was rated with respect to the item: "Balance between my professional and personal life," adapted from UM. Higher scores denote better balance between professional and personal life. The ANOVA revealed a significant main effect of sex,  $F(1, 149) = 9.08, p = .003$ . Figure 16 shows that men ( $M = 3.49, SD = 1.05$ ) rated more satisfaction with professional/personal balance than women ( $M = 2.75, SD = 1.29$ ).

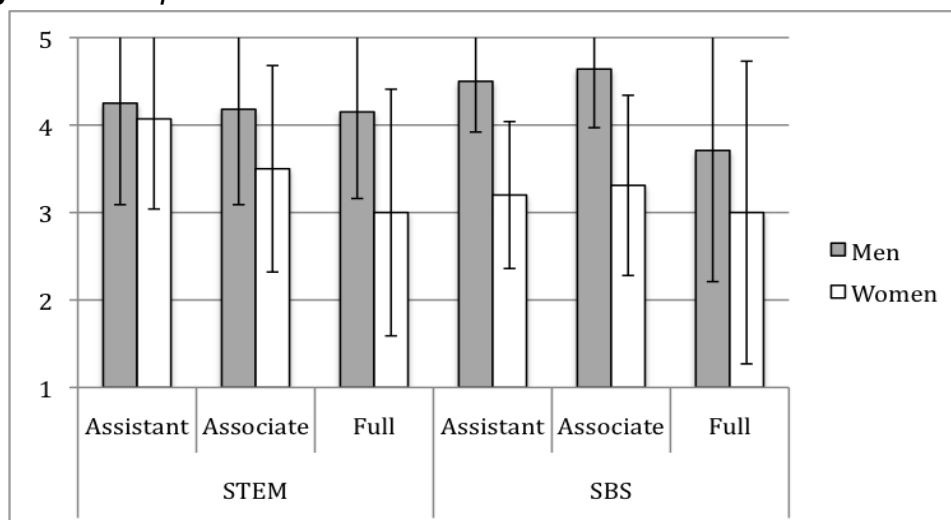
**Figure 16. Balance between Professional and Personal Life**



**q) Departmental Non-Sexism**

We used a one-item measure from UM to assess sexism: "Please rate the climate of your unit/department on the continuum." Respondents rated the item on a 5-point continuum ranging from 1 (non-sexist) to 5 (sexist). This item was reverse-scored so that higher scores denote less departmental sexism. The ANOVA revealed a significant main effect of sex  $F(1, 148) = 15.30, p = .00$ . Figure 17 shows that men ( $M = 4.21, SD = 1.05$ ) rated their department as less sexist than women ( $M = 3.52, SD = 1.13$ ).

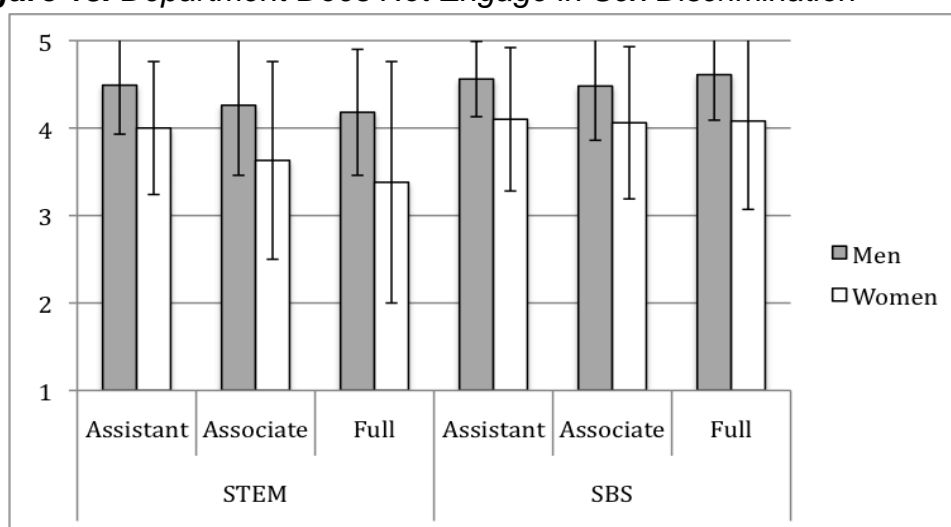
**Figure 17. Departmental Non-Sexism**



### r) Department Does Not Engage in Sex Discrimination

We assessed respondents' perceptions about their departmental sex discrimination using questions adapted from the University of Colorado at Boulder (UC), UIC, and UM climate surveys. Four items had sufficiently high factor loadings in our exploratory factor analysis, were reliable ( $\alpha = .74$ ), and thus were retained: "Some colleagues make me feel inadequate, as if I were hired because of my gender," "My colleagues expect me to be a spokesperson for others of my gender," "Sex discrimination or harassment is a problem in my department," and "Faculty do not often speak up when they see an instance of sex discrimination." Items were rated on 5-point agreement scales, as before. Higher scores denote less departmental sex discrimination. The ANOVA revealed a significant main effect of field,  $F(1, 148) = 4.00, p = .05$ , and a significant main effect of sex,  $F(1, 148) = 11.35, p = .001$ . Figure 18 shows that faculty in STEM ( $M = 4.15, SD = 0.82$ ) reported more sex discrimination than those in SBS ( $M = 4.21, SD = 0.73$ ), and women ( $M = 3.91, SD = 0.92$ ) reported more sex discrimination than men ( $M = 4.33, SD = 0.69$ ).

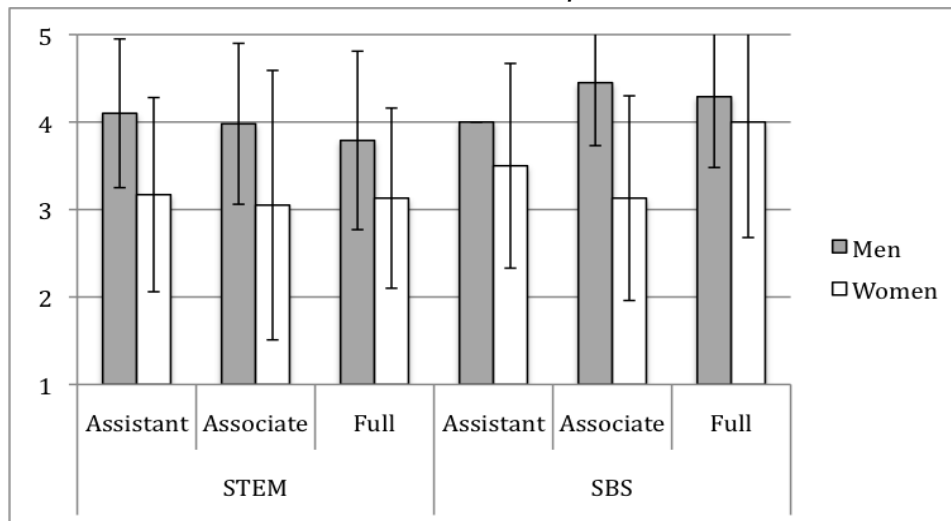
**Figure 18.** Department Does Not Engage in Sex Discrimination



### s) Women have Influence in the Department

We assessed perceptions that women have influence in the department, using questions from UIC's survey. The two items with the highest factor loadings were reliable ( $r = .47$ ): "Women faculty are less likely than men to have influence in departmental politics and administration" and "Men faculty are more likely than women faculty to be involved in informal social networks within the department." Items were rated on 5-point agreement scales. Higher scores denote perceptions of greater influence of women. The ANOVA revealed a significant main effect of sex,  $F(1, 145) = 12.96, p = .00$ . Figure 19 shows that men ( $M = 4.01, SD = 0.90$ ) had higher ratings of women faculty's influence than women ( $M = 3.35, SD = 1.17$ ).

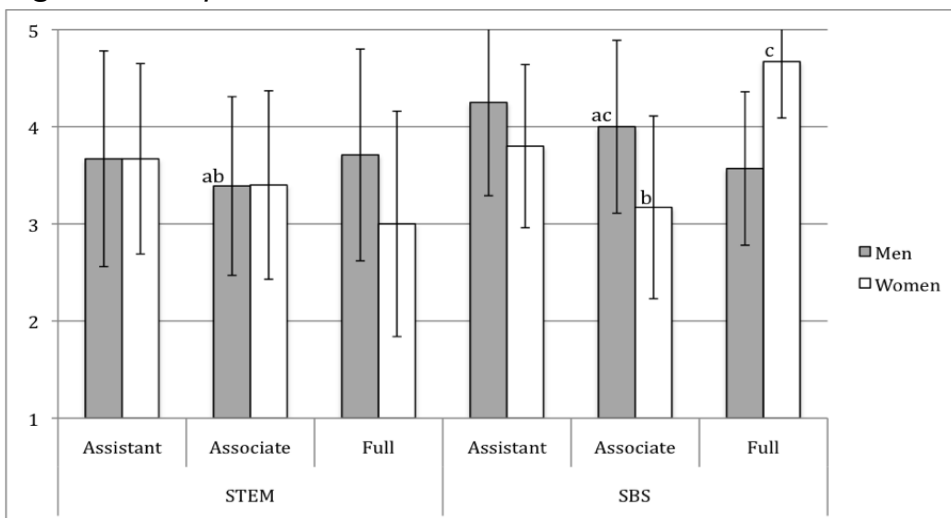
**Figure 19. Women have Influence in the Department**



**t) Department has Enhanced Climate for Women**

One item assessed general department climate for women: “My department has taken steps to enhance the climate for women.” This item was from the UIC’s climate survey. Respondents rated this item on a 5-point agreement scale. Higher scores denote perceptions of an enhanced department climate for women. The ANOVA revealed a significant main effect of field,  $F(1, 145) = 4.33, p = .04$ . Figure 20 shows that STEM faculty ( $M = 3.56, SD = 1.02$ ) had lower ratings of an enhanced department climate for women than SBS faculty ( $M = 3.74, SD = 0.94$ ). However, this was qualified by a significant field by rank by sex interaction,  $F(2, 145) = 3.45, p = .03$ . Within SBS, associate women ( $M = 3.17, SD = 0.94$ ) had lower ratings than associate men ( $M = 4.00, SD = 0.89$ ) and full women ( $M = 4.67, SD = 0.58$ ). Associate STEM men ( $M = 3.39, SD = 0.92$ ) had lower ratings than full SBS women ( $M = 4.67, SD = 0.58$ ). (Note: Means with different letters are significantly different,  $p < .05$ ).

**Figure 20. Department has Enhanced Climate for Women**



### **Summary**

There were no field, rank, or sex differences in general workplace attitudes, such as job satisfaction. These findings are comparable to other ADVANCE institutions (e.g., UM). However, as with other institutions' climates, we found significant differences in perceptions of the climate between tenure-track faculty in a number of other areas, discussed below. The purpose of this research is to understand how to improve the academic climate. As such, the findings are interpreted to focus on who is not faring well compared to who is thriving.

#### **Differences by Field**

We found a number of significant differences in perceptions of climate between STEM and SBS tenure-track faculty. Overall, SBS faculty reported a warmer climate than STEM faculty. STEM faculty reported more pressure to change and more sex discrimination than their SBS counterparts. STEM faculty reported less departmental advancement of women and departmental openness to women compared to SBS faculty. STEM faculty rated that their departments had less favorable views toward their productivity, and that they were less equal decision-makers in their departments, compared to SBS faculty. The single exception to this warmer climate for SBS was that STEM faculty reported a greater sense of fit in their departments than SBS faculty.

#### **Differences by Rank**

The number of peer-reviewed publications was significantly influenced by rank. As might be expected, number of publications increased as a function of rank, with full professors publishing more than associates or assistants. Rank and field interacted to influence perceptions of unit collaboration. SBS assistant faculty rated unit collaboration lower than SBS associates and STEM assistants.

#### **Differences by Sex**

There were many differences in perceptions of climate that depended upon the sex of the responder. In general, women tenure-track faculty perceived a more negative climate than men. Women faculty reported less favorable perceptions of their leadership, departmental collegiality, the balance between their professional and personal life, that women have influence in their department, and that they are valued by their department, compared to men's ratings. Women faculty also reported more sex discrimination in their departments, and that their departments are more sexist, compared to men.

There were several significant interactions of the other independent variables (field, rank) with sex. There was an interaction of rank and sex on number of committees served. Although associate and full professors chaired more committees and served on more committees than assistants, as would be expected. The main effect of rank for number of committees served was qualified by a significant rank by sex interaction demonstrating that associate women served on significantly more committees, whereas assistant men served on the least of all groups. Next, there were two 3-way interactions (field, rank, sex) involving intentions to quit and the department enhancing the climate for women. Women who were STEM associate professors or

SBS full professors had the highest intentions to quit. Those with the lowest intentions to quit were men in general (excepting SBS associates), and women who were STEM full professors. Lastly, the main effect of field on perceptions that the department has enhanced the climate for women, showing that STEM faculty had less favorable perceptions than SBS faculty, was qualified by a 3-way interaction. This interaction showed that SBS associate women had less favorable perceptions than their full women, or associate men counterparts, and that STEM associate men had lower perceptions than SBS full women (the latter of whom had high ratings that the department has enhanced the climate for women).

### **Conclusions**

There are numerous important differences in perception of the workplace climate between those tenure-track faculty who reside in STEM compared to SBS fields. Some of the relative hospitable nature of the SBS climate may be due to the relative equal distribution of men and women, across rank, in those fields. SBS faculty perceptions that the department is open to and advances women, and does not engage in sex discrimination, are less likely to be disputable partly due to distribution. These findings support the idea that when group representation in a department approaches 20%, group characteristics (e.g., sex, race) no longer become salient and identification with the larger group (i.e., department) is more probable (NAS, NAE, & IMNA, 2007). Given the current economic outlook, it is unlikely that the consortium could hire 60 more STEM women tenure-track women (to equalize numbers; see Table 4b). There may be other attributes within the SBS climate that STEM can consider to enhance its own climate. Perceptions of how the department views one's productivity, reporting departmental pressure to change, and fitting in the department are all lower in STEM versus SBS fields. These findings could be partly due to the increased institutional aspirations for their faculty to secure ever more external funding – which often times requires a degree of shift in research focus and heavier workload. These are aspects of the field and institution, however, and leave little guidance for department chairs and colleagues.

Chairs and colleagues are more likely to have an influence on the many sex differences in perceptions of department climate. First, women rated their leadership lower than men. To understand where perceptions may differ requires investigation of how leadership was measured. Items included: effectiveness as an administrator, shows interest in faculty, empowers faculty, and treats faculty even-handedly, provides useful performance feedback, communicates consistently with faculty, and creates a cooperative, supportive environment. These items might be useful for informing the chair training workshop initiated by LEADER. Addressing some of these items with chair training (e.g., providing a cooperative, supportive environment, providing useful performance feedback, treats faculty even-handedly) might go a long way toward diminishing sex differences in other areas of climate. For example, women have a lower sense of departmental collegiality, feel less valued by their departments, and believe they have less departmental influence than men. These perceptions exist despite there being no sex differences in number of publications, number of committees served, and number of committees chaired – more objective indicators of performance. In fact, SBS women associates serve on more

committees than most other groups, and STEM men assistants serve on fewer committees than any other group.

Perhaps this mismatch between perceived and actual productivity is one indicator that the felt climate is actually different for men and women. Regardless of the veridicality of these perceptions, it is important to note that there are differences in perceptions of department climate for men and women faculty that could be addressed. Additional differences in perceptions of climate include that women report less satisfaction with professional/personal life, more departmental sexism, and more departmental sex discrimination than men. One way in which LEADER helps to address these perceptions is by holding unconscious bias workshops to inform 1) STEM search committees, 2) STEM chairs, 3) all STEM tenure-track faculty, and expanding from there, that we all (men and women) hold biases that serve to disadvantage women STEM academics. These workshops provide specific ways to address these biases (e.g., being aware of and correcting biases apparent in annual evaluations). In addition, LEADER is helping institutions to implement mentoring and LEADER itself is offering coaching to facilitate skill building in assistant and tenured STEM women faculty, respectively.

In summary, the LEADER consortium is comprised of four diverse institutions that have joined together to address a regional and national concern - enhancing the recruitment, advancement, and success of STEM women. This first consortium climate survey provides the backdrop through which we begin to understand our regional climate and enhance the environment for STEM women in the academy. This second analysis, comparing faculty in STEM and SBS fields, helps to paint a more complete picture of the STEM climate within the LEADER consortium. The findings point to aspects of the climate that can be addressed by institutional leadership, departmental chairs, and male and female colleagues within departments. We all have a role to play in making the consortium environment successful for those reaching for it.

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