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The Antecedents of a 'Chilly Climate' for Women Faculty in Higher Education

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Abstract: *The literature on women's under-representation in academia asserts that faculty women face a 'chilly climate', but there are few theoretically based studies examining this proposition. Relational demography, organizational justice, and social network theories all identify possible antecedents of 'chilly climate'. Using survey data of faculty at a private Midwestern US university, we test whether the perception of exclusion (chilly climate) is influenced by demographic dissimilarity, and perceptions of fairness and gender equity. We find that faculty women perceive more exclusion from academic departments with a low representation of women, consistent with relational demography. Perceptions of procedural fairness and gender equity are powerful factors that foster inclusion and warm the climate for both men and women. The 'chilly climate' for women faculty is a complex phenomenon with multiple causes. Policies that fail to address these multiple causes are unlikely to be effective.*

Academia has traditionally been highly male-dominated and gender-segregated. The proportion of women among full-time faculty in US colleges and universities peaked at 36 percent in 1879, declined to 22 percent in the early 1960s (Bernard, 1964), and only surpassed its 1879 level in 2004 (AAUP, 2005). Almost 40 years after the demise of formal legal barriers to women's participation in higher education, women's under-representation among the professoriate persists, and worsens with academic rank and institutional prestige (Touchton et al., 2008; West and Curtis, 2006). The search for the sources of bias and barriers that contribute to this persistent under-representation continues to be of great interest (National Academy of Sciences, 2006; National Science Foundation, 2003).

The professoriate is a highly gendered occupation. Many organizational practices in academia are based on culturally imbedded beliefs and assumptions about gender (Williams, 1995). For example, employers prefer workers who are unencumbered by non-work (i.e. family) responsibilities. In academia, this preference is exemplified by the overlap of the tenure clock with prime child-bearing years. Somewhat counter-intuitively, the flexibility of academic work makes it inhospitable to women with caretaking responsibilities. The work of research and

teaching is time-intensive, complex, and has high cognitive requirements. Much of this work is done outside of a standard eight-hour day. This lack of boundaries between work and life increases work–family conflict (Bailyn, 1993). Gender segregation occurs across academic departments. A handful of departments tend to be female-dominated, but the majority is male-dominated. Gender segregation also occurs hierarchically in university settings. For example, 85 percent of full professors with more than 10 years in their field are male (Monroe et al., 2008). The gendered milieu of higher education is likely both a cause and reflection of women’s under-representation across the profession.

One often cited barrier to women faculty members’ achievement and advancement is a ‘chilly climate’ (Sandler, 1986) for women – defined as exclusion, devaluation, and marginalization (Aisenberg and Harrington, 1988; Astin and Sax, 1996; Bernard, 1964; Caplan, 1993; Chamberlain, 1988; National Academy of Sciences, 2006; National Science Foundation, 2003; Simeone, 1987; Widnall, 1988; Wylie, 1995). This issue first gained visibility outside of the academy when the Massachusetts Institute of Technology released a report ‘acknowledging that female professors here suffer from pervasive, if unintentional, discrimination’ (Goldberg, 1999: A16). The report found that exclusion from PhD committees, group grants, and decision-making was a common problem across departments – even when women were on, or chaired important committees (Hopkins et al., 2002).

Department climate affects important work outcomes of women faculty (Settles et al., 2006, 2007; Xu, 2008). They tend to be less satisfied with their job and more likely to quit than their male colleagues. But department climate mediates the impact of gender on job satisfaction and intentions to quit (Callister, 2006), and voice mediates the impact of department climate on job satisfaction (Settles et al., 2007). Although a plethora of studies, books and task forces describe a climate of exclusion and marginalization of women faculty, and others document the impact of climate on work outcomes, ‘[t]he more difficult part is to understand the *reasons* inequities arise, the reasons for marginalization. . . and to address these’ (Hopkins et al., 2002: 8).

The purpose of this study is to investigate the causes of a chilly climate for faculty women. We draw on the literature in relational demography, network theory, gender, organizational justice, and diversity climate in order to identify several factors that create – or ameliorate – a chilly climate for women in higher education. We test our model of the antecedents of a chilly climate using data from a Midwestern university in the US. By examining multiple antecedents of chilly climate, our findings provide insight into a range of actions and policies that universities can

take to warm the climate for women faculty.

The chilly climate in academia

A chilly climate for women faculty – informal exclusion, devaluation, and marginalization – is a major impediment to women faculty members' achievement because exclusion strikes at the very heart of the academic enterprise.

These matters of professional culture, organizational membership, and patterns of inclusion and exclusion are central to science because research is a social process . . . Such exclusion limits the possibility not simply to participate in a social circle but rather to do research, to publish, to be cited. . . . In a study of 200 research efforts in psychology, Garvey (1979) found that less than 15 percent of initial ideas for projects originated from formal sources such as journal articles or presentations at professional meetings. Rather, the germ for the projects originated in informal networks of information. (Fox, 1991: 195)

Compared with men, women faculty are less likely to feel a sense of belonging in their departments, that they have satisfactory social networks, or that they are privy to departmental discussions about research, teaching, and promotion (Blakemore et al., 1997). The nature of faculty women's relationships with their colleagues differs dramatically from men's. Faculty men were three times more likely to report receiving career help from colleagues than women, while women were four times more likely to report career harm (Gersick et al., 2000). Faculty men reported sharing inclusive strategies to win the game of reputation, while faculty women reported tests of skill to prove that they had the right to play the game (Gersick et al., 2000).

The descriptive literature suggests that '[t]he chilly climate for women cannot be separated from the problem of numbers' (Sandler, 1986: 3; also Riger et al., 1997). Similarly, relational demography predicts that exclusion is a proximal outcome of demographic dissimilarity. Tokenism, homophily, and network theories provide theoretical propositions about the processes created by demographic dissimilarity that lead to the exclusion and marginalization of women faculty, and their likely impact.

Relational demography and the chilly climate

Relational demography theory holds that demographic differences between individuals and their work group impact the nature of their workplace interactions, how they experience their work environment, and a variety of work outcomes (Kirchmeyer, 1995). It draws upon several theoretical frameworks. Kanter's (1977) tokenism theory holds that individuals in token positions

in organizations face increased visibility and performance pressures, assimilation into stereotypical roles, and contrast effects that heighten the commonalities among majority individuals and exaggerate their differences from the minority. The similarity-attraction paradigm (Byrne, 1971) proposes that demographic similarity will increase social integration, cohesion, and attachment to the group (Riordan and Shore, 1997) by making it easier to communicate, predict behavior, and develop trust and reciprocity (Ibarra, 1992). Owing to homophily – the preference for others like oneself – contact occurs more often among people who share similar demographic traits than among those who do not. Network theory holds that similarity structures social networks, which determine the information individuals receive, as well as their attitudes and interactions (McPherson et al., 2001).

The relational demography literature often implies that all demographic differences are equally meaningful (Vecchio and Bullis, 2001). However, several authors note that the social significance of gender needs to be differentiated from other demographic characteristics. Sex roles that underlie the social division of labor create gender-typed traits that impact interaction patterns. Because traditional stratification systems and sex roles are reproduced through daily activities and discourse, in highly sex-segregated work environments (West and Zimmerman, 1987) sex-role spillover will make it far more difficult for women in non-traditional occupational roles to succeed (Gutek, 1985). It is not demographic dissimilarity per se, but rather dissimilarity that is inconsistent with relational norms (i.e. roles, social norms, and status associated with specific social categories) that produces negative interpersonal interactions (Tsui et al., 2002; West and Zimmerman, 1987).

Studies that test the distal outcomes of relational demography on women in non-academic work settings have found both negative and positive effects of gender minority status on women. The variability in findings may be owing to many studies' inability to control for the correlation between gender composition and relational norms. Several studies use data from female-dominated organizations or departments (e.g. Chatman and O'Reilly, 2004; Konrad et al., 1992; Riordan and Shore, 1997; Wharton et al., 2000), in which relational norms are less likely to be violated. Only two studies clearly reflect women's experience in male-dominated organizations (Tolbert et al., 1995; Tsui et al., 1992), and only the former captures the impact on women of being in a non-traditional occupation. Studies that do not control for job type (gender traditional or non-traditional) may confound the effects of demographic dissimilarity with the effects of job characteristics that vary systematically with gender composition, such as autonomy or job challenge (Chatman and O'Reilly, 2004; Konrad et al., 1992). Using data on academic

faculty, a male-dominated and male-typed occupation, allows a test of relational demography propositions in a context of violated relational norms.

Two empirical studies tested the impact of relational demography on job outcomes in a university setting. Tolbert et al. (1995) examined the impact of the proportion of women faculty in a department on the turnover rate of both male and female faculty, using the department as the unit of analysis. The turnover rate of tenure track women faculty was not significantly related to the percentage of women in the department. However, there was evidence that the conditions that lower departments' likelihood of having tenured women faculty are likely to induce higher turnover among women faculty (Tolbert et al., 1995). Wharton et al. (2000) examined the effect of gender composition within departments on the job satisfaction of *non-faculty* classified employees. They found that the job satisfaction of both men and women was lower in more gender balanced departments than in either male- or female-dominated departments, and that the effects of gender dissimilarity were symmetric for men and women. Neither study examined the effect of perceived discrimination, unfair treatment, or exclusion.

Toward a comprehensive model of chilly climate

Relational demography is fundamental to the creation of a chilly climate, creating a self-reinforcing cycle that perpetuates the under-representation of women. However, other antecedents are likely to be at play. We develop a comprehensive model of the antecedents of chilly climate in order to reflect its complexity, and to insure that our empirical results are not biased by the omission of variables that are correlated with gender or representation level. The model presented here (see Figure 1) proposes that the level of women's representation in their academic department (percent women), and a perceived lack of procedural fairness and gender equity in their department each directly affect faculty members' perception of informal exclusion from their department. Women are expected to perceive greater exclusion than men, owing to differential access to the informal networks of the department. Thus, the model proposes that gender has a direct effect on perceived exclusion. Gender is also expected to moderate the impact of women's representation, procedural fairness, and gender equity on exclusion. We represent the proposed moderating effect of gender with arrows to the paths of each antecedent of exclusion. The theoretical rationale for the model draws from the literature on interpersonal network theory, occupational segregation, and organizational justice as well as relational demography, and is explicated below.

Antecedents of a chilly climate

The central function of academia is the production and dissemination of knowledge. As discussed above, knowledge creation occurs within tightly knit professional networks. Thus, a complete understanding of department climate within academia requires the incorporation of interpersonal network theory. Women face structural constraints in developing personal networks because homophily (preference for others like oneself) strongly influences network formation (Ibarra, 1993; Mehra et al., 1998). Most academic departments are male-dominated, so women academics have fewer opportunities to develop homophilous ties within their department. They must place greater reliance on heterophilous ties, which tend to be weaker and are more subject to disruption (South et al., 1982). Women are less desirable network contacts for men owing to gender stereotypes and attributions (Ibarra and Smith-Lovin, 1997), so women confront even greater difficulty developing heterophilous ties than do men. However, Mehra et al. (1998) found that exclusionary pressures were more responsible for women's marginalization than their preference for women friends (homophily). Owing to both exclusionary pressures and homophily, women are likely to develop fewer and weaker network ties within their department than their male colleagues. Faculty decision-making, mentoring, informal conversations about research, and formal collaboration all take place within the informal networks of the department. The absence of strong ties to informal departmental networks will create perceptions of exclusion.

Hypothesis 1: Women are more likely to report perceptions of exclusion from the informal networks within their departments than men.

We expect that the gender composition of academic departments will directly impact women's perceptions of exclusion or chilly climate, based on relational demography. Both Chatman and O'Reilly (2004) and Konrad et al. (1992) found that most affective reactions of women to their work environments were positively related to the proportion of women in their work groups. Tokenism, similarity-attraction, and homophily all imply that the more under-represented women are within their department, the greater exclusion they will experience.

Hypothesis 2: Women in academic departments with a lower percentage of women will report greater perceptions of exclusion than women in departments with a higher percentage of women.

It is not possible to predict the impact of departmental gender composition on men owing to countervailing forces. A straightforward homophily analysis suggests that men's perceptions of exclusion will be greater in departments with high levels of women's representation. However,

several additional factors are likely to be at play. Surges in women's representation will increase the intrusiveness of their presence (Yoder, 1991), generating a threat effect on men's majority power (Blalock, 1967, 1982) and status contamination – the perceived status of the department may decline as the percentage of women in the department increases (Tolbert et al., 1995). Surges (rapid increases) in representation can occur in departments with low levels of female representation. (We measure current representation levels, so we are unable to test for the impact of surges.) In contrast, men in traditionally female-dominated departments/disciplines chose their discipline knowing that they would likely be in the gender minority in their work environment. Men in 'sex-inappropriate' jobs may have rejected stereotyped sex roles (Koberg and Chusmir, 1991), so their attitudes and interactions with women colleagues may differ from men in traditionally male-dominated fields. In addition, female-dominated departments are perceived to be more supportive by both men and women faculty than departments with a lower representation of women (Riger et al., 1997). Thus, men in traditionally female-dominated departments are expected to react less negatively to gender composition than men in departments with lower proportions of women faculty. Finally, men in token positions not only avoid exclusion, but experience advantaged treatment from women peers and superiors (Williams, 1992, 1995). Because we expect conflicting effects of gender composition on men's perceptions of exclusion, we make no prediction, but pose it as a research question.

Another source of alienation from departmental networks emanates from perceptions of fairness (or lack thereof) in departmental decisions. The group-value/relational model of organizational justice proposes that 'individuals want to be respected and appreciated as full members of valued social groups . . . [P]rocedural justice signals to people that they have standing and dignity within the collective' (Cropanzano et al., 2001: 63). Fair procedures convey symbolic messages of inclusion, because procedural justice implies that one is a valued member within a group (Tyler and Lind, 1992; Van Prooijen et al., 2004).

We anticipate that there are two dimensions of organizational justice that will have a particularly significant impact on women faculty members' perceptions of exclusion – procedural fairness as it relates to important decisions that impact everyone in the department, and fairness specifically with respect to gender equity. We expect that both men and women who perceive that there is procedural fairness in departmental decisions will perceive less exclusion from the collegial environment of their department, based on the group value/relational model of organizational justice.

Hypothesis 3: Men and women who perceive high levels of procedural

fairness will perceive less exclusion from their departments than men and women who perceive low levels of procedural fairness.

Women are more likely than men to perceive that their gender is a cause of inequitable treatment (Mor Barak et al., 1998). Perceptions of gender inequity are expected to increase the salience of women's gender identity and their out-group status, thus increasing women's perception of exclusion. We expect men to be less aware of gender inequity in their department, either because they are less aware of it, or because they are motivated to interpret it as non-gender based. Even if gender inequity is perceived, it is less likely to impact them directly. Therefore, we expect that perceptions of gender inequity will not impact men's perceptions of exclusion.

Hypothesis 4a: Women who perceive a low level of gender equity in departmental decisions will perceive more exclusion from their department than women who perceive a high level of gender equity.

Hypothesis 4b: Men who perceive a low level of gender equity in departmental decisions will not perceive more exclusion from their department than men who perceive a high level of gender equity.

Methods

Sample

Surveys were sent via campus mail to all (507) tenure track faculty at a private Midwestern university. Our analyses are restricted to tenure track faculty, since the expectations, pressures, and job demands of tenure track positions differ significantly from non-tenure track positions. In order to maximize the response rate, the survey had no identifying information. A separate numbered postcard sent with the survey and returned to another office was used to identify non-respondents for follow-up. Three hundred and seventy tenure track faculty returned completed questionnaires, for a 73 percent response rate.

Among the respondents, 108 were women and 258 were men. (Four respondents did not report their gender, and so were dropped from the analyses.) Response rates differed by gender and rank. Women's response rates were somewhat higher than men's (79 percent for women versus 70 percent for men) and response rates increased with rank (62 percent for assistant professors, 72 percent for associate professors, and 85 percent for full professors).

Dependent variable

Exclusion

Eight items inquired about perceptions of exclusion from informal interactions (e.g. I feel

isolated at work, I feel welcome and included in social gatherings [reverse-coded]). A seven-point Likert-type response scale was used, ranging from 1 (completely disagree) to 7 (completely agree). Several of the items were taken from the workplace prejudice/discrimination inventory (James et al., 1994), but modified to reflect the academic context. Several other items were created for this study based on descriptions of the chilly climate in academia. This scale captures the chilly climate for women faculty as that literature has conceptualized the construct.

Independent variables

Gender

Respondent gender was coded 1 for women and 0 for men.

Percent women

Respondents were asked to report the percentage of faculty in their department that are women, with options of 0, 1–10 percent, 11–24 percent, 25–49 percent, and 50 percent or more.¹ Note that this variable reflects the perceived gender composition of the department. The responses were transformed into a single variable, using the midpoints of each range.² For women, this relational demography variable captures the extent to which the respondent is demographically similar to other faculty members in the department; for men it captures the extent to which the respondent is demographically different.

Organizational justice

Sixteen items inquired about the perceived fairness of decisions within the individual's department, and capture two distinct dimensions of organizational justice: general procedural fairness and gender equity. Many of the decisions that impact faculty most directly occur at the department level and are strongly influenced by the decision-making style and procedures of department chairs (Lucas, 2000). All organizational justice items focus on how group authorities – for our purpose, department chairs – make decisions (Blader and Tyler, 2003). Nine questions relate to procedural fairness, without reference to gender. They inquire about the perceived relationship between performance and reward, and whether criteria are applied uniformly in the allocation of resources. Several of these questions were taken from Mor Barak et al.'s (1998) organizational fairness scale and modified for the academic context. Others were developed for this study, inquiring into equity issues that arise in academia. For gender equity, seven items reference perceived gender inequities, asking whether course preparations, course scheduling, course reductions, and committee assignments were assigned equitably, regardless of gender. These questions were developed specifically for this project, to inquire into perceptions of gender

equity with respect to core workload issues. Ambrose and Cropanzano (2003) and Greenberg (1990) contend that justice measures should be context-specific, and Schneider and Reichers (1983) call for climate measures that are facet-specific (i.e. climate for gender equity). (See Table 3 for all items.) All items use a seven-point Likert-type scale, ranging from 1 (completely disagree) to 7 (completely agree).³

Control variables

The faculty member's rank is controlled via two variables, Assistant (coded 1 if the respondent was an assistant professor, zero otherwise) and Associate (coded 1 if the respondent was an associate professor, zero otherwise). The omitted reference category is Professor, so the coefficients for Assistant and Associate Professor measure the impact of that rank compared with full Professors.

Statistical procedures

We performed an exploratory factor analysis on 24 items intended to measure exclusion and organizational justice perceptions using principal components analysis with Varimax rotation. A confirmatory factor analysis was then run on the 17 retained items using LISREL. For each factor, the average of the component items was used as the scale score in the regression analyses.

We used linear regression analysis to test the effects of the antecedents on perceptions of exclusion or chilly climate. A hierarchical procedure was used to assess the additional and unique contributions of sets of independent variables that represent theoretically distinct antecedents. The model is estimated with the data for men and women combined (pooled sample), in order to test whether gender has a direct impact on perceptions of informal exclusion. We test whether gender (Woman) is a significant moderator of the antecedents of exclusion by including interaction terms of Woman with Percent women, Procedural fairness, and Gender equity. We also estimate and report the model separately by gender for ease of exposition.

Results

Descriptive statistics and correlations among the variables are reported for the pooled sample in Table 1, and for women and men separately in Table 2.

The distribution of men and women faculty by the perceived gender composition of their departments is instructive. In this sample, roughly 40 percent of women are in majority female

departments, 58.3 percent are in majority male departments, and 13.7 percent are in departments with fewer than 10 percent women. In contrast, 89 percent of men are in majority male departments, 64.6 percent are in departments with 75 percent or more men, 8.4 percent are in departments with no women, and only 10.4 percent of men are in majority female departments. These data are consistent with a feminizing occupation – a traditionally male occupation into which women have gained entry (Gatta and Roos, 2005), and within which job segregation persists. A few departments are female-dominated, but most women faculty work in minority female environments, and almost all male faculty work in majority male environments.

The exploratory factor analysis produced three factors with clean loading patterns. Several of the variables loaded on more than one factor, so they were dropped from subsequent analyses. The results of the confirmatory factor analysis using the 17 retained items are reported in Table 3. The first factor, named Exclusion (the dependent variable), consists of six items measuring informal exclusion, or chilly climate. The second factor, named Procedural fairness, consists of five items about resource allocation or evaluations based on uniformly applied criteria. The third, named Gender equity, consists of six items, five that specifically reference equity ‘regardless of gender’ and a measure of women’s perceived exclusion from formal positions of power. Table 3 also reports the coefficient alpha for each scale, which ranges from .84 to .88, as well as the Goodness of fit and Comparative fit indices.

The results of the linear regression analyses are reported in Table 4, separately by gender in columns 1 and 2, and for the pooled sample of men and women in column 3. Step 1 includes the control variables for academic rank (Assistant or Associate Professor), as well as gender (for the pooled sample). Step 2 adds the percentage of women in the department, to test for the effects of relational demography. Step 3 adds perceptions of both procedural fairness and gender equity, to test the impact of organizational justice on exclusion or chilly climate. Step 4 adds the interaction of woman with the percentage of women in the department, procedural fairness, and gender equity, to test whether the antecedents of exclusion differ significantly by gender.⁴

Step 1 tests our first hypothesis, that women will experience greater exclusion from the informal networks of their academic departments. The results for the pooled sample (column 3) support Hypothesis 1: women perceive significantly more exclusion from their departments than men.

In Step 2, the perceived percentage of women in the department is added to the model. This step tests Hypothesis 2: that demographic dissimilarity contributes to the exclusion of

women from informal departmental networks. Consistent with this hypothesis, we find that women in departments with fewer women colleagues perceive greater exclusion than women in departments with a higher percentage of women. The R^2 change for this step is statistically significant for the women's regression, so the gender composition of the department adds significantly to the explanatory power of the model for women. At Step 2, without the inclusion of additional antecedents, the coefficient of Percent women is not significant in the men's regression, indicating that the perceived gender composition of their department has no effect on men's perceptions of exclusion – at least within the range of women's representation observed for this university.

The addition of fairness perceptions in Step 3 tests Hypothesis 3, that perceived procedural fairness in departmental decisions will reduce perceptions of exclusion for both men and women; and Hypothesis 4, that perceived gender equity will reduce perceptions of exclusion for women but not men. The coefficients of Procedural fairness are negative and significant for women, men, and the pooled sample, supporting Hypothesis 3. The coefficients for Gender equity are also negative and significant for both women and men. This supports Hypothesis 4a, that women will feel less excluded if they believe that there is gender equity in departmental decisions. However, we predicted that gender equity perceptions would not impact men's perceptions of exclusion (Hypothesis 4b), which was not supported. Adding the fairness measures dramatically increases the explanatory power of the model for both women and men.

The addition of the interaction between Woman and Percent women to the pooled sample in Step 4 tests whether there is a significant difference between women and men in the impact of demographic dissimilarity on exclusion perceptions. The main effect of Percent women is no longer statistically significant, but the gender interaction with Percent women is negative and significant. This indicates that women's departmental representation significantly influences women's perception of exclusion, but not men's. The interactions of gender with the fairness measures were not significant (so they are not reported in Table 4). The impact of fairness perceptions on perceived exclusion does not differ significantly between men and women. We discuss possible explanations and implications for our findings below.

Discussion

Exclusion from informal collegial networks can happen to anyone, regardless of gender. However, our results confirm the observations of the large descriptive literature on the chilly climate: women perceive greater exclusion from the informal networks of their academic

departments than do their male colleagues. Although the effect size of gender declines once other theoretically important antecedents of chilly climate are added to the model, it remains a significant predictor of perceived exclusion. This suggests that even if a department becomes more gender balanced, women are likely to continue to perceive that they are excluded from informal department networks. Our relationships with our colleagues create the environment within which our professional lives occur, and impact our identity and our worth. Particularly in academia, signals about our talent and 'selective nurturing reverberate through networks' (Gersick et al., 2000: 1028). In a profession in which informal collaboration and mentoring is directly instrumental to the primary measure of success – publications – women's exclusion, however unconscious or inadvertent, constitutes a powerful barrier to achievement. Informal exclusion reinforces the gendered nature of academia by perpetuating the hierarchical stratification of men and women faculty (West and Zimmerman, 1987; Williams, 1995). If exclusion lowers research productivity, fewer women will attain full professor.

Our results confirm the proposition from relational demography that gender minority status within their department contributes to the perceptions of exclusion of women faculty from informal networks, rendering the climate chilly. Whether owing to women's preference for homophily or the exclusionary practices of men – or both, women are less likely to feel a part of the collegial environment of their department as the percentage of female colleagues declines. The impact of gender representation remains significant for women, even after other powerful antecedents are added to the model. In contrast, we find that men's perception of exclusion from their department is unaffected by the proportion of women faculty, a finding that appears to be inconsistent with relational demography. In interpreting this finding, however, it is useful to recall that almost 90 percent of the men in our sample are in the majority in their departments and almost two-thirds are in overwhelmingly male-dominated departments. Only about 10 percent of men are in the minority; too few to influence the estimated impact of gender representation on men's perceptions of exclusion. Even for male faculty who are in the minority, this finding is consistent with Williams's (1992, 1995) proposition that men are advantaged even in situations in which they are the tokens. Male supervisors and clients, as well as the women with whom they work pressure men who work in feminine specialties into administrative or leadership roles, such that they ride a glass escalator. Empirical studies (Budig, 2002; Hultin, 2003) confirm that men's wage and promotion advantages in token situations are simply extensions of the male advantage that occurs in male-dominated occupations. Such advantages would be unlikely to obtain if men suffered exclusion in female-dominated environments.

We find that the perception of procedural fairness in departmental decision-making is a powerful factor increasing perceived inclusiveness (i.e. reducing perceived exclusion) for both women and men. This is consistent with the finding of Settles et al. (2007) that perceptions of effective departmental leadership increase faculty women's sense of voice in department procedures and decision-making. This finding has important practical implications: the divisiveness that sometimes accompanies increased diversity can be mitigated by instituting procedures that enhance fairness for all and ensure transparent decision-making.

It is interesting that both women's and men's perceptions of exclusion are reduced by perceived gender equity, and in equal measure. We had reasoned that men are less likely to perceive gender as a cause of inequity, either because they are less aware of it, or because they are motivated to interpret it as non-gender based. There is a significant gender difference in the level of perceived gender equity in our sample, with means of 4.4 and 6.0 for women and men, respectively (see Table 2). However, it is noteworthy that a given level of perceived gender equity impacts men's and women's climate perceptions equally. This may suggest the absence of a zero-sum mentality among male colleagues – that is, fairness for women is not perceived as coming at the expense of men. Alternatively, Miner-Rubino and Cortina (2007) find that men who perceive hostility toward women have lower psychological well-being and job satisfaction. Perhaps this is because hostility toward women is viewed as a general indication of organizational injustice. Our procedural fairness measure is strongly correlated with the gender equity measure for both women and men, so our results are consistent with this explanation. Alternatively, some male faculty may have felt that men were the victims of gender inequity and responded accordingly. Among our six gender equity items, four are phrased as 'regardless of gender' rather than referencing women specifically.

This study takes a holistic approach to the study of organizational climate, testing relational demography propositions while simultaneously examining the impact of gender and organizational justice perceptions. Thus, it provides insights into how to promote inclusion while increasing diversity. Much of the contemporary concern about the under-representation of women in the professoriate by the National Science Foundation (NSF) and National Academy of Sciences (NAS), and many studies of the chilly climate for women faculty, are limited to the STEM (science, technology, engineering, and math) disciplines (Callister, 2006; Monroe et al., 2008; Settles et al., 2007; Xu, 2008). Our results suggest that, on average, women face a chilly climate across a comprehensive university whenever they are in the minority in their department. They are likely to face similar challenges regardless of discipline.

Limitations

One limitation of our study is the potential impact of common methods bias (Doty and Glick, 1988). All of our measures are derived using the same method, self-reporting from one survey instrument, leading to the possibility of inflated correlations among our measures. However, Meade et al. (2007) assessed the likely impact of common methods bias and found that its magnitude is often minor. Another limitation of the study is that the measure of relational demography used is based on perceptions, and is reported as a range of gender proportions, instead of one continuous measure. We chose this approach to ease the response burden and because it enabled us to promise complete anonymity (by not asking respondents to identify their department); a decision that likely contributed to a high response rate. However, this approach reduced the variance of the Percent women variable, limiting our ability to test for possible non-linear effects of gender composition on climate perceptions. In addition, the data are from a single university, which limits the generalizability of the results. We modified and supplemented existing measures of procedural fairness and gender equity perceptions, following Ambrose and Cropanzano's (2003) assertion that fairness measures should be tailored to each workplace context. Nonetheless, our measures should be validated in other university settings.

Implications and recommendations for future research

We draw on the relational demography, interpersonal network theory, gender, diversity climate, and organizational justice literatures to investigate the antecedents of a chilly climate for women faculty. The study provides some of the most comprehensive empirical evidence to date about the antecedents of a chilly climate, and how they impact men as well as women. It suggests several fruitful directions for further research. It would be useful to examine other theoretical literatures to identify additional variables that may contribute to exclusion from informal networks within the academy. A comprehensive model that includes both the antecedents of chilly climate and its role as a mediator of work outcomes such as job satisfaction, intentions to quit, quit rates, and research productivity should yield additional insights.

This study examines perceptions of organizational justice, specifically procedural fairness. Current organizational justice research suggests that interactional justice, which directly measures the interpersonal treatment received by peers and superiors, may be another important antecedent of a chilly departmental climate (e.g. Lamertz, 2002). Future research on chilly climate should include all dimensions of organizational justice as well as the social

relationships and interpersonal networks individuals share with co-workers and superiors (Umphress et al., 2003).

By identifying several key antecedents of the exclusion of women – and men – from the collegial life of their departments, we provide evidence that can inform policy to address this issue, thus positioning universities to tap the full talent and potential of all faculty members. This study suggests several concrete actions that universities can take to provide a more inclusive and welcoming environment for women. Gender balancing strategies are potentially beneficial, given that exclusion is reduced in departments in which women have greater representation. This is unlikely to be a panacea, however. Women perceive greater exclusion even after the impact of gender composition is controlled, owing to the tenacity of gendered norms and relationships (West and Zimmerman, 1987; Williams, 1992, 1995). In addition, if surges in women's representation create significant backlash, that would need to be addressed. The likelihood of backlash may be minimized by ensuring procedural fairness and gender equity in departmental decision-making, as doing so produces more inclusive environments for everyone. Attending to the process and nature of departmental decision-making should benefit all, while also warming the climate for women faculty. Finally, our findings suggest that universities can improve the climate for women by providing more formal structures that foster inclusion: training programs to increase colleagues' awareness of the informal exclusion that occurs, formal mentoring programs to ensure that everyone has a mentor, and evaluation systems for department chairs that hold them accountable for creating an inclusive environment for all faculty.

Notes

- 1 We sought to protect anonymity, so reporting departmental affiliation was optional, and many did not report it. In lieu of departmental identification, we asked for gender composition of the department.
- 2 Other functional forms of the percentage women faculty variable were tested: percentage of women squared, to allow for a curvilinear effect of demographic composition, and alternatively, a series of indicator variables for three of the four levels of women's representation, to allow for piece-wise non-linear effects. Neither of the alternative specifications produced significant results, so they are not reported.
- 3 For the Exclusion, Gender equity and Procedural fairness questions respondents were also given the option of 'don't know'. Rather than deleting these observations as missing values,

we recoded them as 'neither agree nor disagree'. McKnight et al. (2007) argue that the consequences of simply excluding observations with missing data on some variables can lead to selection bias, reduce the likelihood that the data from the remaining sample will be normally distributed, impair measurement reliability and validity of constructs, and reduce sample size and thus statistical power. When missing values can be justifiably replaced, these problems are minimized.

- 4 Step 4 was initially run with all three interactions with gender. However, since the gender-fairness interactions were not statistically significant, the model was re-run with only the Percent women interaction, and reported in Table 4.
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Appendix

Figure 1: Model of the antecedents of a chilly climate for women faculty

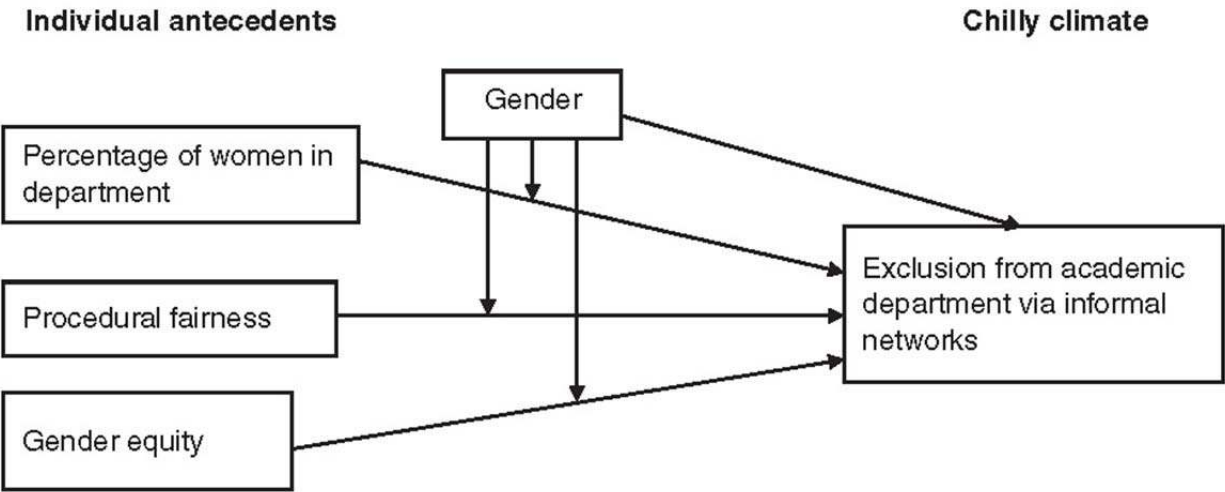


Table 1: Correlations, means and standard deviations, pooled sample

Variable	Mean	SD	1	2	3	4	5	6	7
1. Assistant Prof.	.27	.44	–						
2. Associate Prof.	.44	.50	–.55**	–					
3. Gender	.28	.45	.23**	.03	–				
4. Procedural fairness	4.97	1.63	–.01	–.17**	–.26**	–			
5. Gender equity	5.56	1.44	–.10	–.13*	–.51**	.63**	–		
6. Percent women	24.38	17.17	.13*	–.00	.30**	.01	–.01	–	
7. Exclusion	2.88	1.54	.01	.18**	.4**	–.66**	–.57**	–.02	–

Dummy variables were coded as follows: Assistant Prof (1 = Assistant, 0 otherwise), Associate Prof (1 = Associate, 0 otherwise), Gender (1 = woman, 0 = man).

** $p < .01$; * $p < .05$.

Table 2: Correlations, means and standard deviations, women and men

Variable	Mean	SD	1	2	3	4	5	6
Women								
1. Assistant Prof.	.44	.50	–					
2. Associate Prof.	.47	.50	–.83**	–				
3. Procedural fairness	4.29	1.83	.15	–.25*	–			
4. Gender equity	4.37	1.74	.24*	–.30**	.74**	–		
5. Percent women	32.74	17.24	.09	–.14	.25*	.36**	–	
6. Exclusion	3.72	1.73	–.20	.30**	–.68**	–.64**	–.37**	–
Men								
1. Assistant Prof.	.21	.41	–					
2. Associate Prof.	.44	.50	–.45**	–				
3. Procedural fairness	5.23	1.47	–.01	–.13*	–			
4. Gender equity	6.01	0.98	–.17**	–.02	.51**	–		
5. Percent women	21.19	16.06	.06	.04	.02	.05	–	
6. Exclusion	2.55	1.33	–.00	.11	–.61**	–.41**	–.01	–

Dummy variables were coded as follows: Assistant Prof (1 = Assistant, 0 otherwise), Associate Prof (1 = Associate, 0 otherwise), Gender (1 = woman, 0 = man).

** $p < .01$; * $p < .05$.

Table 3: Confirmatory factor analysis of the fairness and exclusion items

Exclusion items	Exclusion	Procedural fairness	Gender equity
At work I feel isolated.	.68		
In my dept., colleagues do not share some job-related information with me that they share with others.	.62		
I have opportunities to collaborate on research with other members of my dept. (reverse coded)	.55		
An 'old boys' network' runs my dept.	.77		
I feel welcome and included in informal and social gatherings with most members of my dept. (reverse coded)	.67		
I feel that my input and opinions are solicited and valued in faculty decisions in my dept. (reverse coded)	.79		
Procedural justice items			
There is a clear relationship between performance and reward in my dept.		.77	
Dept. chairs evaluate faculty fairly and accurately.		.78	
Research support is allocated on the basis of uniformly applied criteria in my dept.		.77	
Equipment (e.g. computers, lab space) is allocated based on uniformly applied criteria in my dept.		.75	
Dept. chairs provide adequate feedback regarding progress toward tenure and promotion.		.74	
Gender equity items			
<i>Taken as a whole</i> , there is general equity in my dept for such things as the number of course preparations, students taught, and required student contact hours, regardless of gender.			.89
Courses are assigned to faculty in an equitable manner in my dept in terms of graduate/undergraduate, labor-intensity, and scheduling/meeting times, regardless of gender.			.93
Procedures for course load reductions are applied uniformly in my dept.			.83
In general, the number of committee assignments is reasonably uniform across faculty members in my dept, regardless of gender.			.73
Women have equal access to appointments to the more powerful college and university committees, relative to their numbers and rank.			.49
In my dept, research by women faculty members is valued less than research by men. (reverse coded)			.63
Alpha	.88	.84	.87
Goodness of fit index		.88	
Comparative fit index		.97	

Note: The following two items were removed from the measures because they loaded on both the Gender equity and Exclusion scales:

'Women are given serious consideration for administrative appointments in my department/unit' and 'I sometimes find my competence or expertise questioned by some of my colleagues'.

Table 4: Regression analyses of exclusion or ‘chilly climate’, pooled and by gender

Step	Women	Men	Women and men
<i>Step 1</i>			
Asst.	.16	.06	.03
Assoc.	.43*	.14*	.18**
Woman	–	–	.32**
R ² total	.10	.02	.14
<i>Step 2</i>			
Asst.	.13	.07	.05
Assoc.	.36*	.15*	.19**
Woman	–	–	.36**
Percent women	–.33**	–.02	–.13**
R ² Δ	.11	.00	.02
F for Δ	12.58**	0.06	6.38**
R ² total	.18	.02	.16
<i>Step 3</i>			
Asst.	.06	–.02	–.01
Assoc.	.15	.03	.05
Woman	–	–	.12**
Percent women	–.17*	–.01	–.05
Procedural fairness	–.44**	–.53**	–.49**
Gender equity	–.23*	–.14*	–.21**
R ² Δ	.33	.37	.34
F for Δ	32.77**	73.42**	116.54**
R ² total	.54	.38	.50
<i>Step 4</i>			
Asst.	–	–	–.01
Assoc.	–	–	.05
Woman	–	–	.29**
Percent women	–	–	.01
Procedural fairness	–	–	–.49**
Gender equity	–	–	–.19**
Pct women × woman	–	–	–.20*
R ² Δ	–	–	.007
F for Δ	–	–	5.15*
R ² Total	–	–	.51

Dummy variables were coded as follows: Assistant Prof (1 – Assistant, 0 otherwise), Associate Prof (1 = Associate, 0 otherwise), Gender (1 = woman, 0 = man).

** $p < .01$; * $p < .05$.