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The University as a Gendered Organization: Effects on Management Type, Climate and Job Satisfaction

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THE UNIVERSITY AS A GENDERED ORGANIZATION:
EFFECTS ON MANAGEMENT TYPE, CLIMATE, AND JOB SATISFACTION

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By
Margaret E. Crowder

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EFFECTS ON MANAGEMENT TYPE, CLIMATE, AND JOB SATISFACTION
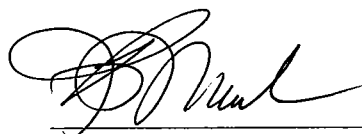
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To my mother, Pat Chai, who is my best friend, my biggest fan, and the best parent I could ever want or need. I love you to the "restaurant at the end of the universe" and beyond.

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Numbers of women holding faculty positions in science, technology, engineering, and mathematics (STEM) remain low in university systems, despite gains women have made in achievement of advanced degrees. No one reason is clearly the culprit for the low numbers, though women in STEM have been shown to have more negative perceptions of climate, be more dissatisfied with their jobs, and have greater inclination to leave their positions than men.

As males comprise a majority of STEM employees, the masculine-genderedness of these organizations may create a more dissatisfactory work environment for women. This may, in turn, have negative impact on the retention and promotion of women. The concept of genderedness has been defined by relative numbers of males, occupation type through language, and through the hierarchical nature of the bureaucratic organizational system. Both STEM disciplines and university environments have been considered gendered based on these definitions.

One potential component that has not been strictly applied to gendered organizations is organization system management type. As female leaders tend to be more participative while male leaders tend to be more authoritative, this study proposed that measurements of organization system type could be utilized as an additional indication of organizational genderedness. In addition, the study proposed that more

authoritative styles of management systems in gendered organizations would yield lower satisfaction and more negative climate perceptions for women.

Faculty members from a comprehensive university were surveyed for their perceptions of system organization type, climate, and job satisfaction. Survey results were analyzed to determine if perceptions varied by gender, college type (STEM or non-STEM), rank, and organizational hierarchical level.

The study determined that faculty perceived the system management type within ascending hierarchal university levels as increasingly more authoritative and that gendered colleges are perceived as more authoritative than non-gendered colleges. This may provide a new way to help define organizational genderedness. The study also found that correlation existed for both male and female faculty between perceptions of organizational system type and both climate and job satisfaction. However, the perception difference between genders was not significant enough to provide evidence for differential effects for women versus men.

CHAPTER I: STATEMENT OF THE PROBLEM

Background

Gender by the Numbers

There exists in the world of academia a "leaky pipeline" of highly qualified and high-performing women: women are not rising into positions of high rank and leadership in numbers similar to their male colleagues. In 2005-2006, women earned nearly half (48.9%) of all doctoral degrees awarded by Title IV degree-granting institutions (National Center for Education Statistics, 2007), but during the same time frame, only accounted for 41% of tenure-track, 26% of tenured, and 19% of full professor positions at doctoral-granting institutions (West & Curtis, 2006). As these faculty positions generally require a doctoral level education, it would be expected that the gender proportion, particularly of the entry-level tenure-track rank, should not be substantially different from that for awarded doctoral degrees over the previous few years. As even five years prior (2000-2001), women accounted for 46% of all doctoral degrees conferred (National Center for Education Statistics, 2004), there is clearly some gap in the numbers of women who are qualified for employment at these levels and the numbers of women who achieve these ranks. The gap is especially clear in higher-level administrative positions. In 2008, females only accounted for 37% of chief academic officers (CAOs) at baccalaureate institutions, and 32% of CAOs at doctoral-granting institutions (Eckel, Cook, & King, 2009). Moving to the level of college president, only 23% of these positions were held by women in 2006. The percentage of female college presidents varied by institution type, with nearly 29% women presidents at two-year colleges, and fewer than 14% women presidents at doctoral-granting institutions (J. King & Gomez, 2007).

The leaky pipeline is perhaps of even more concern in the areas of science, technology, engineering, and mathematics (STEM), where fewer numbers of women enter the pipeline to begin with and similar issues related to loss of female numbers continue through the ranks. It is well-known that females are underrepresented in the STEM disciplines (National Center for Education Statistics, 2004), especially in the non-life sciences, and though women now account for 57% of all bachelor's degrees awarded (National Center for Education Statistics, 2009), women only received an average of 42.7% of bachelor's degrees within the physical sciences and engineering majors (Sonnert, Fox, & Adkins, 2007). At the level of doctoral degrees, women in 2005 accounted for nearly 48% of those awarded in the biological and agricultural sciences, but between less than 17% to just over 35% of doctoral degrees in the physical sciences and engineering (National Science Foundation, 2008).

Internal and External Factors – Self, Society and Environment

Reasons for the disparities between gender numbers both in STEM areas and in academic positions of high rank and leadership are many. Research on the subject of gender and employment, academia, and STEM has investigated both internal reasons (the difference model) and external reasons (the deficit model) for disparity with respect to the sexes in science. External reasons are primarily societal and environmental, while internal reasons are intrinsic to the sexes themselves (Sonnert & Holton, 1996). Despite all the research that has been done over the past several decades, there is no consensus in the research community on the exact cause of gender disparity in STEM disciplines.

Including studies dealing with both internal and external models, various authors have investigated the following: issues associated with lack of equitable education,

including educator bias and self-bias with respect to gender and learning differences between the sexes (Beyer, 1998; Dee, 2007; Scantlebury & Baker, 2007) ; societal constraints and the choices made by women (Ceci & Williams, 2011; Ceci, Williams, & Barnett, 2009; Eagly & Carli, 2007; Emslie & Hunt, 2009; Hewlett, Luce, Shiller, & Southwell, 2005); discrimination factors, bias, and deficits theory, the idea that external structural factors associated with STEM discipline environments has kept females from rising to the same levels as their male counterparts (Kjeldal, Rindfleish, & Sheridan, 2005; Settles, Cortina, Malley, & Stewart, 2006; Shollen, Bland, Finstad, & Taylor, 2009; Xu, 2008); unequal organizational structure of the workplace (J. Acker, 1998; J. Acker & Van Houten, 1974; Park, 1996); the possibility that females are less capable of high achievement in STEM, particularly as indicated by scoring at the highest levels on STEM discipline evaluative measures, such as standardized tests (Halpern et al., 2007; Nowell & Hedges, 1998). This last viewpoint is perhaps most famously represented in comments made by the former president of Harvard University, Lawrence H. Summers, in 2005, when he proposed that "there are issues of intrinsic aptitude" (Remarks, para. 6) for reasons why women are found less frequently in high academic positions associated with science and engineering.

Issues of internal versus external causation are rooted in feminist theory. More traditional feminist theory falls in line with internal psychological analyses. From a differential gender perspective, traditional feminist theory sees women's societal problems as self-generated, at least to the extent that a woman is individually different from a man in ways of thoughts, actions, perceptions, and values. This is not to say that the more traditional feminist theories don't propose societal constraints for women, but

that inherent variations between women and men are at the root of gender inequity. Another version of feminist theory ascribes women's problems to external causes, generally focusing on structural inequalities that exist in social values and norms, economic institutions, politics, and national policies (Hyde, 2007; Meyers et al., 2005). The lines separating various types of feminist theories are blurred; even internal and external causation are often difficult to distinguish from one another. Patriarchal systems are an example of one arena in which this is true. Patriarchal systems are defined by masculine power and so women may be excluded from positions of power and leadership. Over time, the patriarchal values become indoctrinated into the system culture, such that the internal and external causations become entangled.

Leadership Styles – Preference and Satisfaction

As a combination of both internal and external factors is likely, it is important to consider both in a study of gender issues in STEM. One internal factor relates to a possible preference in different leadership styles between the sexes. Some studies have shown that women may be more collaborative leaders than men. Women tend to work more through team building, be more democratic, and are more in touch with their subordinates (Book, 2000; Eagly & Carli, 2003). Lyman, Ashby, and Tripses (2005) support these conclusions with their research of female leaders in educational environments. However, these leadership attributes don't seem to be restricted to just good female leaders, but to good leaders of both genders as the work of Lyman et al. (2005) correlates strongly with that from other authors like Bennis and Nanus (2007), Kouzes and Posner (2007), and Marzano, Waters, and McNulty (2005), on basic leadership styles and qualities inherent to overall successful leadership. Regardless, it

may be that women are perceived as more democratic leaders, whether they actually are or not (Bass, Avolio, & Atwater, 1996).

In fact if there is an observable difference between the genders, it may be that, at least in leadership style, women leaders have a more advantageous style than their male counterparts, as Eagly (2007) showed a positive relationship between female leadership styles and higher rates of effectiveness. Women may have a more transformational style of leadership, which is a relationship focused way of achieving goals. This contrasts with transactional leadership which leans more toward an impersonal exchange of pay for services between leaders and subordinates to obtain goals (Marzano et al., 2005). The more effective transformational style of leadership "may be especially advantageous for women because it encompasses some behaviors that are consistent with the female gender role's demand for supportive, considerate behaviors" (Eagly & Carli, 2003, p. 825).

As transformational, cooperative approaches are more associated with female leaders (Eagly, 2007), transactional leadership styles are more frequently associated with male leaders (Druskat, 1994). And although "transformational leadership may be autocratic and directive or democratic and participative" (Bass, 1997, p. 136), both transformational and democratic/participative qualities have been associated with females (Eagly & Johannesen-Schmidt, 2001).

In terms of employee satisfaction with various leadership styles, female employees have been found to be less satisfied with the transactional, active management-by-exception style (Druskat, 1994) and less satisfied with autocratic leadership (Kushell & Newton, 1986) than their male counterparts. This would stand to

reason, as active management-by-exception leaders are described as being "so aggressive in their management behavior that followers of this leadership style believe that they should not take risks or demonstrate initiative" (Marzano et al., 2005, p. 14), and therefore the environment such leaders engender is not conducive to a democratic/participative organizational management type.

Organizational Structure – Gendered Organizations

Leadership and management style are vital components to an organization's structure, and when one considers the external potential causes of gender disparity in STEM disciplines, organizational structure is a subject that has received somewhat less attention in the literature. Much work has been done in organizational theory and on organizational structure in general. It wasn't until Joan Acker (1990) posited the theory of gendered organizations, however, that organizations were no longer considered to be gender-neutral entities. Acker defined a gendered organization as one in which "advantage and disadvantage, exploitation and control, action and emotion, meaning and identity are patterned through and in terms of a distinction between male and female, masculine and feminine" (p. 146) and explicated the ways in which an organization could be gendered: through divisions, in both work and space; with symbolism; by power structures in communication; through self-identity of workers as gendered entities; and in the underlying concepts of societal relations and organizational logic.

Within masculine, gendered organizations, women who are successful may experience negative consequences:

[Women] are expected to be communal because of the expectations inherent in the female gender role, and…agentic [assertive] because of the expectations

inherent in most leader roles. However, because agentic displays…can appear

incompatible with being communal, women are vulnerable to becoming targets of

prejudice. (Eagly, 2007, p. 4)

This holds true for both women in positions of leadership (Eagly, 2007) and for women who achieve general career success (Heilman, Wallen, Fuchs, & Tamkins, 2004). In terms of academic employment, universities may be considered as gendered organizations, due to labor divisions, the nature of promotion and tenure requirements, and the hierarchical structuring of the university system (Bird, 2011; Park, 1996). These arguments align well with a review by Britton (2000), who outlined the three most common ways in the literature in which organizations are to be considered masculine-gendered: organizational structure of hierarchy through bureaucracy, employment of a higher number of males versus females, and in culture through language and symbolism (such as by portrayals of success through masculine stereotypes, aggressive nature, and gendered terminology). This latter idea points particularly to organizations where masculine ideals are inculcated into the culture.

Following from these descriptions of the nature of gendered organizations, arguably one of the most gendered areas within university systems would be in STEM disciplines. Universities as a whole are hierarchical bureaucracies, STEM fields are traditionally viewed as masculine in nature, and within the STEM disciplines there are often higher numbers of male than female faculty members. Therefore, if a university or any subsection within a university can be considered a gendered organization, there should be some measurable effect of that genderedness on female perceptions of the work environment. It is also possible that the masculine gendered nature of a university system

affects the system management within the organization; more male leaders/more male coworkers could employ more transactional and authoritative methods of management, creating a less satisfactory environment for female employees. If females experience lower job satisfaction levels and more negative perceptions of work climate, females may then be more likely than males to leave that employment environment. In a time when recruitment and retention of females in STEM disciplines is considered crucial by universities for improvement of diverse representation, any external factor that is having a negative impact on this issue needs to be measured and better understood so that future possibilities for removing or altering that factor may be proposed.

General Definitions of Terms

Definitions of some of the more particular terminology used during this research are provided here. The terms are defined for use within this study and may have some variation in the broader literature.

An *organization* is a group of people working together for a common cause. For the purpose of this study, the organization is considered to be an employment entity, and in particular, a university.

A *gendered organization* is one in which a particular gender is dominant in the power structure to the point of privilege. In the literature, the dominant gender regarding this particular concept has been masculine (J. Acker, 1990; Bird, 2011; Britton, 2000). For the purpose of this research, a gendered organization will therefore be one in which masculine dominance is prevalent.

Organizational climate is the environment of an organization and includes: physical factors; social factors; communication and power structures; and the inherent

ethics, mores and methods, of the organization (R. Tagiuri, in Owens & Valesky, 2011). Though a study of organizational climate may appear to be interchangeable with organizational culture, and in fact both investigate social interactions, culture is traditionally more focused on the perceptions and identities of individuals and climate looks more at the organization as a whole. Culture has lent itself to qualitative study, while climate studies have been more quantitative and generalizable in nature (Denison, 1996).

Organizational level is defined for purposes of this research as one of three distinct hierarchical levels within a university, listed from largest to smallest as: overall university level, college level, and department level.

Collegiality, or interaction with colleagues, is a human relational support, part of the organizational climate, and measured through perception of communication, socialization, and relationships with coworkers in an employee's primary unit of work which is generally at the department level of an organization (Bilimoria et al., 2006; Case Western Reserve University, 2008).

Institutional support represents the job facilitation resources provided by the organization and may come from money, benefits, work load, and physical structures (Bilimoria et al., 2006).

Mentoring refers to support given within the organization. In a university, it is "advice or counsel on scholarly or career issues, or sponsorship or advocacy on…behalf [of an individual]" (Bilimoria et al., 2006, p. 360).

Organizational system type is the management-type profile, as determined by Likert's (1961) management system types and may be one of four varieties: exploitative

authoritative, benevolent authoritative, consultative, and participative. Likert later

labeled these systems as System 1, System 2, System 3, and System 4, respectively

(Likert, 1967).

STEM is an acronym used frequently to denote the disciplines of science,

technology, engineering, and mathematics.

Purpose of the Study

Problem Statement

The numbers of women in both administrative and faculty positions in areas of science,

technology, engineering, and mathematics (STEM) are increasing as feminist

movements, primarily associated with the liberal feminist perspective, have pursued and

obtained some level of educational and legal equality for women. However, numbers of

women in these roles are still considerably lower than overall college graduation rates

and workforce presence for the genders would predict. Along with the issues of

perception and negative bias against women in the workforce, and the choices women

make in their lives and careers, the issue of male dominance in organizational structures

is one of the possible reasons proposed to explain this phenomenon. In the current study,

an investigation of faculty perceptions of climate and job satisfaction levels and the

organizational structure of a single mid-sized, rural, southern, comprehensive state

university will be performed to help answer the central research question, "Does the

identification of a more authoritative organizational system within individual university

units or levels correspond to a higher level of dissatisfaction for associated female

faculty?" The null hypothesis for the central research question is: H_0 For female faculty,

no relationship exists between perceptions of organizational system type and reports of

job satisfaction.

Study Hypotheses

H_1 Female and male faculty will differ in their perceptions of the combined constructs measuring organizational system type, climate, and job satisfaction.

H_{2a} Female faculty in male-dominated colleges (gendered colleges) will report lower job satisfaction than their male colleagues.

H_{2b} Female faculty in male-dominated colleges (gendered colleges) will report more negative climate perception than their male colleagues.

H_3 Faculty perceptions of organizational system type will differ at the three organizational levels (department, college, and university).

H_4 Faculty perceptions of organizational system type will be more authoritarian in gendered colleges than in non-gendered colleges.

H_{5a} Faculty will differ by hierarchical ranks in their reports of job satisfaction.

H_{5b} Faculty will differ by hierarchical ranks in their perceptions of climate.

H_{5c} Faculty will differ by hierarchical ranks in their perceptions of organizational system type.

H_{6a1} Lower job satisfaction ratings by female faculty will be correlated with perceptions of more authoritarian type organizational systems.

H_{6a2} Negative perceptions of climate by female faculty will be correlated with perceptions of more authoritarian type organizational systems.

H_{6b1} Lower job satisfaction ratings by male faculty will be correlated with perceptions of more authoritarian type organizational systems.

H$_{6b2}$ Negative perceptions of climate by male faculty will be correlated with perceptions of more authoritarian type organizational systems.

H$_{6b1}$ Lower job satisfaction ratings by male faculty will be correlated with perceptions of more authoritarian type organizational systems.

H$_{6b2}$ Negative perceptions of climate by male faculty will be correlated with perceptions of more authoritarian type organizational systems.

The variable relationships for this study are illustrated graphically in Figure 1.
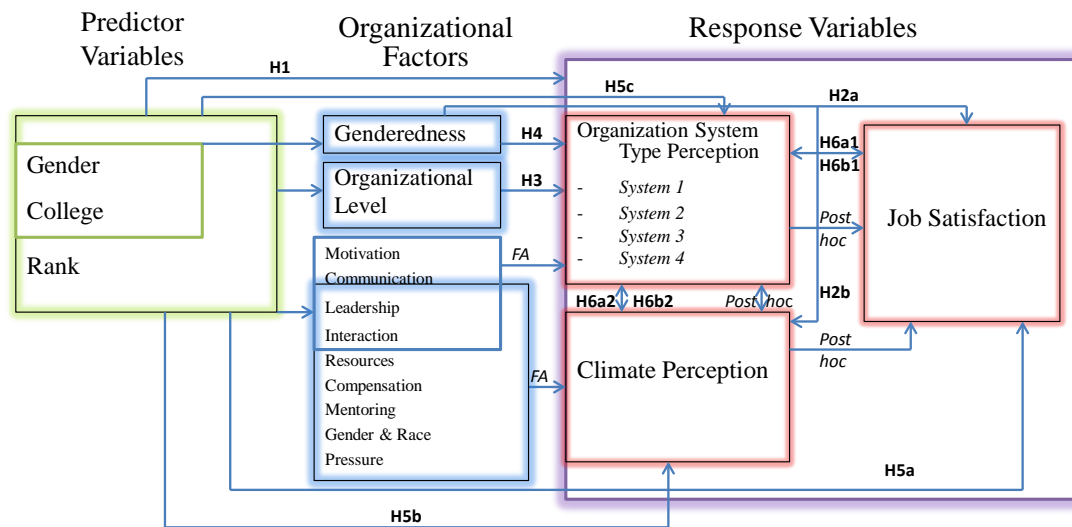
Figure 1. Hypothesized relationships for a variable framework. "*FA*" is factor analysis.

Significance of the Study

One goal of the proposed research project is to provide a new way to help define gendered organizations. It is hypothesized that organizational systems with greater masculine influence (higher ratios of male to female employees and male stereotyped disciplines) will display a more authoritarian, hierarchical system type, when evaluated based on employee perception. By surveying faculty with an instrument partly based on moderately revised items from Likert's (1967) profile of organizational characteristics, it should be possible to determine whether a relationship exists between more authoritative

systems of organization management types (defined by Likert as System 1, exploitative authoritative and System 2, benevolent authoritative) and the traditionally defined gendered organization.

Another goal of the proposed research is to investigate the various layers of system types that may exist within a university system. It is hypothesized that when organizational layering is considered, multiple system types may be found within a single organization. Three levels, or units, of a university system will be analyzed in this study. University level, college level, and department level management system types will be determined and compared with several faculty perception items also evaluated for each level.

In order to address the leaky pipeline for women in STEM disciplines in academia, the research will also look at the relationship of a gendered organization structure to the job satisfaction at various promotional levels for both men and women in academic institutions. It is hypothesized that a masculine-gendered structure will be reflected in faculty perceptions that are closer to System 1 or System 2 styles of organizational management type and result in greater dissatisfaction among female employees.

This study will also contribute to the bodies of literature pertaining to gendered organizations, the climate of academia, women in academia, women in STEM disciplines, and organizational structure.

Limitations to the Study

No study of factors involving open systems, and especially ones that involve social aspects, can account for all variables that may affect the system. This study is no

exception. The study is limited, in part, by those variable factors not included for measurement and analysis. Factors such as motivation, personal life situation, age, organizational and individual bias, discriminatory factors besides gender, race and ethnicity, and differences between specific department or program discipline are not measured as a part of the study survey. Another limitation of this study is the use of only one university, and therefore one university type (comprehensive public) in one region of the U.S. (rural southeast) for the study. Certainly it may be expected that the climate and organizational factors at other university types (such as private institutions, Research I schools, historically black colleges and universities, women's colleges) could vary from both the institution presented in this study and from each other. The region of the country may also influence external factors in this study, as regional culture could have affected participant responses. An additional limitation is that responses are not assured from all faculty members at the study institution. Results may not accurately reflect the perceptions of the institutional population or the broader faculty population. The data from this study are also self-reported and cross-sectional.

Summary

Women continue to be underrepresented, both inside and outside of academia, in leadership and in STEM disciplines. In university systems, women are not as likely as men to receive tenure and/or high rank, nor are they as likely to rise to levels of administration. This is particularly true in STEM fields. A goal of many in academia is to increase not only numbers of women recruited and retained in STEM faculty positions, but also to increase the numbers of female leaders.

Though many potential reasons for lower numbers of women have been

hypothesized and investigated, no consensus exists for specific causation. It is likely that the reasons are complex, involving multiple factors, both internal and external. Within university systems, items such as organizational climate, organizational leadership style, and organizational structuring are external factors that may be measured and described, to some degree, to understand whether and how these components affect female employment in the world of academe.

As universities are already considered to be gendered organizations in terms of overall structure, leadership and climate become the main points of focus for this study. Leadership style, as defined by system management type perceptions, and workplace climate evaluations will be evaluated for differences across university hierarchical levels, college disciplines, and employee factors such as gender and rank.

It is hoped that the results of this study may be used not only to further research into organizational systems and the concept of gendered organizations, but also to provide more insight into the leaky pipeline of women in STEM fields in academia. If system management types can be correlated with gender differences in climate and job satisfaction, it is possible that changes to system type would help "plug the leaks" in the STEM pipeline, and increase numbers of women in STEM disciplines. Even beyond the university system, the results could be applicable to the wider organizational world in helping to explain and work toward breaking the glass ceiling for corporate female employees.

CHAPTER II: REVIEW OF THE LITERATURE

In order to provide proper foundation for this study, a review of relevant literature is necessary. Recurring themes from the study involve gender issues and organizational characteristics, including management systems (leadership styles) and work climate. Other important areas include specifically: university structures, female employment, and females in STEM disciplines. Accordingly, this review will cover pertinent theoretical backgrounds from areas of leadership, organization, and feminism. It will also include organizational climate with respect to the work environment, along with the more focused topics of women in higher education and, particularly, women faculty in STEM disciplines.

Leadership, Feminism, and Organizations: A Framework

Leadership

Leadership Styles

Leadership has many styles, and effective leadership may take multiple forms. Though, in reality, the majority of leadership in organizations would fall somewhere between the following two extremes, leadership, like an organization structure itself, can be thought of as inorganic or organic: it can be either task-focused or follower-focused. McGregor's (1960) Theory X and Theory Y are two separate conceptual frameworks regarding associations between workers, leaders, and organizations. Under Theory X, workers are assumed to dislike work and are, therefore, required to be managed strictly and closely supervised. A Theory X worker would never be expected to participate in leadership decisions, nor would they desire to do so. Under Theory Y, workers are thought to work to satisfy innate needs and may, therefore, be often left to their own

devices. Workers may want to help in decision making processes and worker opinions are highly sought by leaders. Theory X and Y represent two extremes of organizational behavior, where Theory X lends itself to leaders who are "motivating, controlling, and managing in the classical sense" (Owens & Valesky, 2011, p. 18), and Theory Y lends itself to leaders who have "commitment to mutually shared objectives, high levels of trust, mutual respect, and [who help] people in the organization…get satisfaction from the work itself" (Owens & Valesky, 2011, p. 19). Another way to think about these styles of leadership is that Theory X is more transactional and Theory Y is more transformational.

Transactional and transformational styles of leadership were first described by Burns (1978). Transactional leaders focus on quid pro quo; they desire specific behaviors and completion of tasks designed to obtain specific results toward pre-determined performance goals. Workers are treated as more of a "means to an end" for the organization, and little connection may be made between the values of individual employees, values of management, and the overall values of the organization. Transactional leaders can be classified in different ways and may demonstrate varying styles and levels of involvement by and with employees. On the more extreme end of transactional style, leaders may conduct lower-order transactions based upon monetary rewards and benefits, whereas approaching transition into a more transformational style, transactional leaders may conduct higher-order, relationship style transactions based in mutual trust, respect, and sacrifice (Kuhnert & Lewis, 1987). Transactional leaders typically use affirmation to recognize both successes and failures of subordinates and contingent rewards to honor individual achievements based upon hard work and

performance. Monitoring and evaluation are key parts of this style of leadership, as leaders must be able to identify various behaviors and practices for their overall impact on the organization and then provide feedback on those items in order to obtain the best results (Marzano et al., 2005). Although higher-order transactional leaders may seem similar to transformational leaders, the significant difference in styles comes from subordinate response: subordinates under transactional leaders do not experience a transformation of their goals and beliefs (Bass, as cited in Kuhnert & Lewis, 1987).

"Vital to transformational leadership are the articulation by the leader of end values and the acceptance of those values by followers" (Kuhnert & Lewis, 1987, p. 654). Transformational leaders focus on the buy-in of their personnel toward organizational goals. Employees are treated as individuals, are challenged to change the status quo for the betterment of the organization, are motivated to perform even beyond set goals, and are inspired by the outward expressions of their leaders' abilities, drive, and internal values. For success, transformational leaders are required to provide individual consideration, intellectual stimulation, inspirational motivation, and idealized influence. Leaders who adopt this style of leadership are change agents interested in challenging the status quo to consider if better results may be achieved in the process, they are flexible and adaptable, and encourage the expression of a wide variety of ideas, even those contrary to their own. Transformational leaders set a good example for their employees through outward demonstration of their core ideals and beliefs, they develop relationships with their employees and recognize individuals as persons outside of the organizational structure, they develop democratic processes to determine goals and take action, and they create work environments in which positive change thrives (Marzano et al., 2005).

If the levels of lower-order to higher-order transactional to transformational leadership may be considered as developmental, through developmental theory, it becomes possible to ascribe every individual, be they leader or subordinate, to a particular developmental level. In this situation, it would be appropriate to consider whether matching leader-subordinate, or leader-at-higher-order than subordinate levels are necessary for organizational satisfaction and leader effectiveness (Kuhnert & Lewis, 1987).

Leadership: Best Practices

Best practices in leadership often correspond well with transformational styles of leadership. Three best practices found in multiple works on leadership are collaboration, creative insubordination, and values-centered decision making (these may be identified by slightly different terminology) (Bennis & Nanus, 2007; Kouzes & Posner, 2007; Lyman et al., 2005; Marzano et al., 2005). These are basic leadership practices and qualities that are inherent to overall successful leadership.

Collaborative leaders are ones who work to build relationships within organizations. These leaders expand decision making to include the individuals most affected by those decisions (Lyman et al., 2005). Collaborative decision making can be found in aspects of leadership styles outlined by Bennis and Nanus (2007) in issues dealing with communication, empowerment, and transformational leadership. Marzano et al. (2005) included collaboration under the various leadership types of instructional, transformational, total quality management (TQM), and servant leadership. Lefton and Buzzotta (2004) categorized collaborative leadership behavior under their Q4 leadership behavior, which is identified as "dominant-warm" and "collaborative" (p. 21).

Collaborative decision-making also follows closely from two of Kouzes and Posner's (2007) five practices of exemplary leadership. Relationship and team building within trusting environments spark conversations and promote action.

Creative insubordination can be identified with going against status quo, manipulating the system to work in creative ways to achieve goals, and working to alter the system to better serve the needs of the organization's constituents. Essentially, creative insubordination involves looking at issues from perspectives outside of existing systems and models (Lyman et al., 2005). Evidence of creative insubordination is found in Bennis and Nanus (2007), who expressed leader creativity as problem finding that enables leaders to develop new directions to better their organizations. Marzano et al. (2005), dealt with insubordination within their 21 responsibilities of the school leader and within their plan for effective school leadership, where the description of second-order change includes the idea that the chosen change "lies outside existing paradigms," "conflicts with prevailing values and norms," and "may be resisted…" (p. 113). From Kouzes and Posner (2007), creative insubordination was included in the proposition that leaders must sometimes question and oppose status quo to enact meaningful change.

Value-based decision making is indicated in research from Marzano et al. (2005), who found strong personal values within servant leadership, which results from a leader who highly values others' needs, and value-centered leadership. In their plan for effective school leadership, Marzano et al. mentioned the need for strong ethics, integrity, and common values when creating and maintaining a leadership team. Leaders need a set of guiding personal values for each of those items to occur successfully. Kouzes and Posner (2007), indicated that "values serve as guides to action…values are

empowering…values also motivate" (p. 53), and that commitment to an organization relates most to high clarity of personal values, and that shared values between organizations and their members result in better performance in a number of arenas, including company income. Hart (2005) expanded on the concept of values to show how shared values between employees and an organization directly influence trust in the organization and therefore leaders should work to understand and when possible, align the values of both.

Leadership Practices of Women

In terms of organizational leadership, the study of leadership theory has shown that women may be naturally more synergistic leaders than men; women are perceived as more likely to be considerate of individuals, are more likely to be team builders, and are more likely to share the process of leadership through democracy (Book, 2000; Eagly & Carli, 2007; Lyman et al., 2005). The research findings from Lyman et al. (2005) demonstrated that strong and successful female leaders are collaborative leaders who find ways to alter or work creatively within bureaucracies, use political connections and power to make positive changes, and make leadership decisions based upon personal value systems of what is right and what is best for others. The same practices of leadership are also found in high proportions of women from the research of Eagly and Johannesen-Schmidt (2001), where female managers scored higher on a transformational leadership scale associated with mentoring and serving individual needs.

Creative insubordination is another theme of women leaders in Lyman et al. (2005). Women in leadership can be perceived as troublemakers. Jill Blackmore wrote, "strong women often are seen as difficult, dangerous, and even deviant, because they

'trouble' dominant masculinities and modes of management by being different" (in Lyman et al., 2005, p. 61). However, women in the Lyman et al. study of female school administrators used creative insubordination, not to be sources of trouble, but to enact changes for improved service to students, employees, and communities. This leadership style was motivated by three core items: values, student need, and accomplishing goals. Creative insubordination requires a certain amount of risk-taking and may make it difficult for a leader to practice this behavior without a strong, value-based initiative (Lyman et al., 2005).

For successful leaders, value-centered decision-making is inherent to both collaborative decision-making and creative insubordination. Personal value-based, passionate leadership is an important foundation for success in guiding others and creating and inspiring a vision of change. Women leaders in Lyman et al. (2005) "provide a clear model for leadership defined by moral authority, derived from purpose and clarity of values" (p. 120). Female leaders in Eagly and Johannesen-Schmidt (2001) similarly expressed idealized influence in behavior and attributes, and provided inspirational motivation of employees. This related to communication of values and goal optimism.

The research, both that investigating specifically women in leadership and that investigating non-gender differentiated leadership, shows that the qualities of good, effective leadership may be generalizable across genders. The themes from studies on leadership best practices are repeated in studies of women leaders and their styles. So, where women's leadership styles were shown to be different from those of men, it appears that women's leadership styles were in fact the more effective styles (Eagly,

2007).

Women in Leadership

Is there a difference in the leadership style of men and women? Manning (2002) found no difference in either self- or employee perceptions of transformational leadership styles in men and women. Dobbins and Platz (1986) proposed that there are no gender differences in leadership style or effectiveness, and that all future research focus instead on stereotypes and bias in the perceptions of leadership roles. However, researchers Eagly, Johannesen-Schmidt, and van Engen (2003) analyzed leadership style differences and concluded that women tend to have a transformational leadership approach while men are more likely to have a transactional or laissez-faire leadership style. Women may take on the more transformational style as it uses a more culturally feminine approach (Eagly, 2007). Transformational leadership works to more fully develop relationships and common values with employees, resulting in an environment of greater empowerment for subordinates, while transactional leadership is focused on quid pro quo and uses a system of exchange and reward to achieve goals (Kuhnert & Lewis, 1987). Eagly (2007) proposed that this style difference creates an advantage for female leaders as a more effective method of leadership; transformational leadership is considered to be a preferred leadership style (Marzano et al., 2005).

Still, the negative perceptions of women's leadership styles and effectiveness may control the underrepresentation of women in positions of leadership and management (Applebaum, Audet, & Miller, 2003). Both the idea of women in leadership positions and the nature of proposed feminine leadership styles may work against women in the working world, as a patriarchal system of leadership leaves no room for issues of

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diversity. "The patriarchal model of progress…pushes inexorably towards monocultures, uniformity and homogeneity" (Shiva, 2006, p. 238). In patriarchal systems, women are therefore more likely to be marginalized.

Though the numbers have been improving over time, studies still indicate employee preference for male leaders over female leaders. Unfortunately prejudices of perception and bias are at play. These prejudices are seen more clearly when women are placed in positions of leadership in more traditionally masculine fields (Eagly, 2007). As male-dominated systems support gender bias in perception, this supports the furthering of research into organizational and group structures as a potential source of barriers to female success. Powell (1990) asserted that organizations need to erase the assumption that there are gender differences in leadership abilities and realize that there will be good and bad managers of both sexes. The focus, once ability is removed as a factor, is therefore on perceptions of leaders and the development of policies that minimize gender-biased experiences.

Applebaum et al. (2003) have a somewhat combined view of gender ability in leadership; in a review of the research, they concluded that though "women's leadership style is, at this point, different from men's…men can learn from and adopt 'women's' style and use it effectively as well" (p. 49). Langford, Welch, and Welch (1998) contended that the style differences seen in male and female leadership are due to variations in power and not gender, and that the use of power by individuals of either gender is situational. It is therefore the situation, not leader gender which determines whether more autocratic "male" styles or more participative "female" styles are used. Both gender dominance and job type may affect the organizational situation.

This viewpoint is supported by previous research from Druskat (1994), who found that women leaders who worked in all-female environments and were in charge of all aspects of their organizations were perceived by their subordinates to exhibit more transformational styles of leadership. The study also considered an all-male environment in which male leaders were reported to demonstrate much higher levels of transactional leadership. Though the research did not use a contrasting mixed-gender environment, the author implied that had males with power been a part of the all-female organization, the findings may have indicated less transformational leadership styles being used by female leaders. The inclusion of men could spark the broader societal influences of patriarchy and disrupt the gender power balance. Although no mixed-gender organization was included in the study, some interesting gender differences in employee job satisfaction were reported. Both males and females reported a preference for transformational styles, and in fact, male job satisfaction was more greatly associated with perceived transformational leadership. The author felt that gender expectations could tie to these findings and that, as females may have had greater presumption of having transformational, relationship-centered leaders than males, the job satisfaction levels of males were more likely to be positively affected by the welcome but unexpected presence of relational leaders. As the study from Druskat was performed in only single-sex human-service, educational, and health-related organizations, the author proposed that future research should investigate other work areas and include evaluations of both genders for a single organization.

Although focused only on leader self-perceptions, M. Gardiner and Tiggemann (1999) covered both dual-gender and multi-occupational aspects of leader research and

indeed discovered differences between different types of work in the sense of both gender prevalence and leadership style. Male dominated industries used for the study were in areas such automotive and computer work, and academia. Female-dominated industries were in areas including health care and early childhood education. Women in predominantly male industries reported using less interpersonal leadership styles than women working in predominantly female industries. Interestingly, women in male-dominated industries also reported a decline in mental health (as measured by a common mental health screening test) when they used more interpersonal leadership, while men in those same industries reported better mental health when they used interpersonal leadership. Women in male-dominated industries also reported increased levels of stress and discrimination. The same findings were not found for women and men in female-dominated industries.

The gender composition of an organization affects not only the leadership style, but also the perception of subordinate satisfaction with that style. Foels, Driskell, Mullen, and Salas (2000) conducted a review and found that as the number of male members increased in an organization, overall member satisfaction with interactive, democratic styles of leadership decreased. A more recent review by Skakon, Nielsen, Borg, and Guzman (2010) did not consider gender differences but discovered that transformative leaders who participated in more positive style interactions with their employees were found more likely to have more satisfied and productive employees. In terms of overall employee satisfaction as measured in either democratically or autocratically led groups, a study from Kushell and Newton (1986) showed that though both female and male subordinates expressed greater dissatisfaction with autocratically

led groups, females reported significantly higher leader satisfaction ratings than males under democratic group leadership, and displayed even more significant dissatisfaction than males under autocratic group leadership.

Obviously, greater understanding of the dynamic interactions between perceptions, leadership style, group composition, and job satisfaction are necessary in order to make broader interpretations regarding what determines the best leadership for an organization, but it appears that male-dominated groups tend toward more autocratic styles of leadership, and that women under autocratic leadership are generally more dissatisfied with that leadership than are their male colleagues.

Social Perceptions and Leadership

In consideration of perception in groups as the cause of disparity in numbers between males and females in top positions, a 1978 study by Porter, Geis, & Walstedt (as cited in Hyde, 2007) demonstrated that women were less likely to be perceived as a leader when placed at the head of a table of mixed-gender individuals than were men in the same situation. Women were only seen as leaders in the investigation when the group was composed of solely females. These gender perception variations may hinge on status beliefs as they relate to gender stereotypes in which society associates men with a higher level of competency than women (Ridgeway, 2001). These perceptions may take the form of rational bias, where employees exhibit and justify gender-based discrimination as the norm in a particular work environment (Trentham & Larwood, 1998); sex bias, in which women are less capable than men due to inherent biological differences; or social bias, in which women are socialized into adopting qualities less identifiable with leaders. Add these issues to the possibility that women may also be affected by such factors as

lack of acceptance within the work environment and personal issues of attitude and self-confidence (Applebaum et al., 2003), along with a variety of other social and structural constraints within both the workplace and society at large, and it is clear that women are likely to be disadvantaged both in the initial pursuit of leadership positions and in terms of group perception or self-perception, even when placed in positions of organizational leadership.

"Women may have perceptions of themselves as 'other,' different, and at odds with traditional administrators and administrative norms…; women suffer from a lack of public support and credibility necessary for effective leadership" (M. E. Gardiner, Enomoto, & Grogan, 2000, p. 124). Perhaps it is no surprise then, that women are generally underrepresented in occupational positions of leadership. If women are constantly struggling against negative leadership perceptions, their ability to achieve top management and executive positions could be significantly reduced. Patriarchal systems may influence perceptions of both self and others in terms of gender bias. As perception is a social construct often filtered through a colored lens of bias, and feminism (specifically of the liberal, Marxist, some cultural, and postmodern strands) tends to recognize that gender is also a social construct and that perception of gender is conceived by individuals and culture (Hyde, 2007), alteration of perception and bias, and therefore alteration of gender oppression, requires social change. The question remains as to whether this social change could be effectively enacted through alteration of organizational structure. Strictly liberal feminists would argue that the overthrow of the oppression of women may be created through political policy change. The Equal Rights Amendment (ERA) was proposed through the work of the liberal feminist movement

(Donovan, 2000). Under liberal feminism, ideally equality issues would be erased if proper legislation, like the ERA, was enacted. Unfortunately, the amendment was never passed, and has not even been ratified in fifteen of the states (Alice Paul Institute, 2010, The Equal Rights Amendment, para 2).

Whether social perceptions or even ability are most important to variance in gender leadership issues, feminist theories and perspectives provide insight. The work done by feminist social theorists in all of the various perspectives of feminism creates a framework for understanding the problems for women in leadership and potential obstacles to women pursuing STEM discipline education and employment. Research into leadership and STEM gender issues should make careful study of feminist perspectives and, in particular, the organizational aspects of gender.

Feminist Theory

Feminist social theory is one lens through which to view the issues associated with gender, science disciplines, organizational structures, and leadership. A wide variety of sub-theories, or perspectives, exist within feminist theory, with one difference between these perspectives related to internal versus external causation. Internal causation considers that inherent differences between the genders exist and cause disparities, while external causation considers that social and environmental effects weigh disproportionately on the sexes to generate differences. An example of the interdependence of internal and external causation comes from a consideration of the effect of patriarchy on the psychology of the sexes. Patriarchal societies institute structures and value systems that result in an internalization of patriarchal ideology by the individuals in that society (Millett, 2000). In other words, an external cause results in an

internal change. This makes it nearly impossible to study one without the other; internal and external causation are closely entwined. Regardless of the specific type of theory, and whether the major issues are internal or external, "feminist theoretical frameworks address, above all, the question of women's subordination to men: how this arose, how and why it is perpetuated, how it might be changed and (sometimes) what life would be like without it" (S. Acker, 1987, p. 421).

In a patriarchal society, such as exists in the majority of the world, the subordination of women to men is evident in nearly all its aspects. Patriarchal structures in business and education can be argued to affect women's success rates in leadership roles (Calás, Smircich, & Bourne, 2007). In Kate Millet's foundational book "Sexual Politics" (2000), she outlined the theory of patriarchal sexual politics in several frameworks: ideological, biological, sociological, class, economic and educational, force, anthropological (myth and religion), and psychological. Through each of the categories, Millet distinguished the pervasiveness of patriarchal influence on the roles, perceptions, and controls related to gender. Millet proposed that any argument for differences between the sexes in the social distinctions of status, role, and temperament must necessarily cite evidence unrelated to physical distinctions and instead rely upon cultural causation. She said that if there are true internal differences in the sexes, they will only be able to be seen when both sexes are in a true state of equality. This cannot happen under the present state of patriarchy, which is persistent in its social presence. Patriarchy, said Millet, has a "…tenacious or powerful hold through its successful habit of passing itself off as nature" (p. 58). Some feminist theories deal directly with the issue of patriarchy; others reject patriarchy as a major issue for feminist thought.

Rosabeth Moss Kanter (1977) considered patriarchal structures within the confines of corporate entities. One way in which she determined women to be disadvantaged within a corporate structure was through the prevalence of male managers grooming and developing more male managers. Kanter surmised that the desire for well-established organizational systems to stick with known entities necessarily kept women from reaching management-level positions, as women were largely untried in those circles and were even considered to be possibly unreliable from the standpoint that they might leave a position due to marriage or childrearing. Kanter also wrote extensively about the issue of power in an organization and concluded that employee attitudes of favoritism for male leadership were subtly veiled preferences for the power that those male leaders represented.

Feminist Perspectives

Several feminist perspectives will be used in combination to help define this research. Five of the main varieties of feminism are: 1) liberal, 2) cultural, 3) Marxist (or social), 4) radical, and 5) postmodern (Hyde, 2007; Jaquette, 1982; Whelehan, 1995). A number of other theories are mentioned in the literature; some of these are lesbian feminism, black feminism, dualism/capitalist-patriarchy feminism, feminist standpoint theory, multicultural/global feminism, gynocentric feminism, and power feminism (England, 1993; Kozlowicz, 2007; Meyers et al., 2005; Whelehan, 1995; Young, 2006). Even other theories exist to explain differences between males and females, such as psychoanalytic, sociobiology and evolutionary psychology, social learning theory, cognitive-developmental, and gender schema. All of the theories mentioned deal in gender variations, but not all of these may be considered to have specifically feminist

perspectives (Hyde, 2007). Each type of feminist theory seeks to explain differences between the genders, in some sense, and all may be used as a way in which to consider the question of a lack of women in positions of leadership and in STEM disciplines and how group and organizational structures influence women.

Liberal feminism has been the basis for the women's movement during much of the 20th, and now the 21st, centuries. It is perhaps the oldest and most widely developed and adopted of the feminist theories (Whelehan, 1995). Liberal feminism embraces political machination for alteration of policy as the best way to create a more level playing field for women in the world (Hyde, 2007). Liberal feminists believe that equality may be found within existing capitalist economic and political systems (Einstein, as cited in S. Acker, 1987). The National Organization of Women (NOW) is representative of the liberal feminist movement. Founded in 1966, NOW is a civil rights organization dedicated to the advancement of women with the goal of "true equality for all women in America…and a fully equal partnership of the sexes" (Friedan, 1966, National Organization for Women, para. 1). Liberal feminism was a major driving force behind the attempted passage of the Equal Rights Amendment and ultimately responsible for the legal, educational, and economic advancement of women's rights in the past decades (Wallin, 1999). Liberal feminists work toward political change to afford women the "natural" rights of men based upon sameness between men and women in the capacity for rational thought. Following from this assertion, liberal feminists worked toward and were successful in gaining women the right to vote in the United States. Liberal feminists have been criticized, however, for supporting the myth of the "superwoman," a woman who successfully balances her work in home and family with

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available external employment opportunities. This has resulted from the unsuccessful attempt to remove both home and family obligations from their traditionally feminine responsibility (Whelehan, 1995).

Cultural feminism looks to psychological and sometimes biological aspects of the genders, expressing that there are sex differences that, to some proponents are related to inherent internal variation, and to others are the result of external social manipulations (Epstein, 1995). Cultural feminism differs from liberal feminism in that it desires and requires broad cultural change to occur, not just in the legal and political realms, but also in religion, marriage, and the home (Donovan, 2000). Cultural feminism of the "second wave," generally considered to encompass all feminist perspectives after to the 1960s (Nicholson, 1997), is less apt to view core differences in psychology and identity between men and women as biological and more apt to view them as socially constructed, cultural variations. This begins to align more with liberal feminist theory than traditional cultural feminism (Donovan, 2000). Either way, cultural feminists call for the differences between men and women to be accepted and celebrated. Theorists in this category of feminism call for new definitions, constructed by women and not the result of a masculine society, for women and their own gender culture (Alcoff, 1997). The ultimate goal of cultural feminism is to create value for gender traits which are "female" that equals the value ascribed to those traits that are "male" (Kozlowicz, 2007), thus resulting in a society that values feminine traits without seeking to alter them.

Marxist feminists, also called social feminists, though some would argue with this confluence of terms (Whelehan, 1995), believe that Marxism provides the basic tenets necessary to explain the oppression and exploitation of women within a capitalist society.

"In particular, the biological, physical and social reproduction of the propertyless finds its conditions of possibility set by the fluctuations and variations in capitalist accumulation processes" (Gimenez & Vogel, 2005, p. 6). There are some who believe Marxism cannot be branded with the feminist mark. These theorists assert that since Marxism is based in masculine thinking, it cannot be conceptually applied to feminism (Donovan, 2000). Karl Marx, however, did address the division of labor based upon sex: "within a family…there springs up naturally a division of labour, caused by differences of sex and age, a division that is consequently based on a purely physiological foundation" (Marx, 1906, p. 386). Marx also proposed that a wife and children are owned by the husband in a family, and that this ownership is the first representation of private property. Since material ownership and alienation of the labor force by capitalist employers are central Marxist themes, this would seem to provide a legitimate basis for socialist feminist theory. Marxism does not adequately describe the full oppression of women, though, as it relies upon the structure of capitalism to explain subjugation. A major conflict in Marxist feminism is that it does not explain why women were oppressed prior to the rise of capitalism (Donovan, 2000). One branch of Marxist feminists has worked to solve this conflict by incorporating themes from patriarchal systems into the capitalist model; these feminists are more likely to describe themselves as social feminists (Meyers et al., 2005). Marxist/socialist feminism is rooted in economic issues and policies and therefore has less connection with the social change called for by other brands of feminism (Whelehan, 1995).

Radical feminism proposes that masculine power is the basis of all inequality and discrimination issues for women; oppression from a patriarchal society is at the root of all

oppression of women (Donovan, 2000). As patriarchy may be defined as "a set of social

relations which has a material base….[which] is men's control over women's labor

power….[and] is maintained by excluding women from access to necessary economically

productive resources and by restricting women's sexuality" (Hartman, 1997, p. 103), the

potential connection of patriarchy to oppression is clear. Radical feminism sees this

oppression of women as grounded in sexual issues that are controlled by violence; men

wield ultimate biological control over sexuality (S. Acker, 1987). In fact, some radical

feminists propose that the act of sex itself demonstrates violence against women (Epstein,

1995). Radical feminism puts issues of oppression in the family and household in the

forefront of the feminist battle. One set of feminists ascribing to this theory desire,

similar to cultural feminists, the increased valuation of women's labor and household

activity (Shelton & Agger, 1993). But, unlike cultural feminists, they propose a

separatist policy as the only way for women to be truly freed of oppression. Other radical

feminists believe an androgynous approach, removing gender systems entirely, is the

only solution (Meyers et al., 2005). Either situation seeks to find an environment free of

patriarchal structure and masculine-dominated theories. Gender is viewed as a social

construct in every aspect of their lives which women must either alter or escape

(Whelehan, 1995).

Postmodern feminism is less involved in social and political movements and more

in working to change the realm of thought and research in academic circles. Postmodern

feminists call views of reality and claims of truth into question by making investigations

into epistemology (Hyde, 2007). This postmodern theoretical perspective rejects the

study of gender differences, patriarchy, and social oppression so prevalent in traditional

feminist thought. Postmodern feminism proposes that gender is the social framework within which all social theory on women's issues must be considered, though the concept of gender itself is too restrictive; for postmodern feminists, traditional theory does not go far enough to determine gender-related issues in different times, cultures, and contexts (Hackett & Haslanger, 2006). Though extreme postmodern theory requires abandoning history and philosophical models, even to the point of removing the symbols of gender and sex entirely, postmodern feminism need not follow this path (Brooks, 1997). A strength of postmodern feminist theory is its flexibility to individualize situations and allow for greater diversity for all feminist thought (Fraser & Nicholson, 2006).

The underlying goal of feminism, in all its forms, is to understand and subvert the oppression of women. A "first wave" of feminism largely focused on political and legal gains for women; much of the current second wave of feminism is attempting a more revolutionary change, or at least is coming to the realization that gender equality goes deeper than legislative policy (Whelehan, 1995). If, based upon the successes of first wave feminism, opportunities for women to attain leadership positions and succeed in STEM disciplines are equal to that of men, more parity could be expected in numbers of men and women in those roles. Unfortunately, as second wave feminism has discovered, equality has not been reached; parity has not been attained.

Feminist theory and studies surrounding areas of gender disparity can help define the reasons behind why women have not found equity. Feminist theory can also provide ideas for moving toward equity both in leadership and STEM discipline success. Within university systems, a liberal feminism perspective is necessary to provide a basis for the alteration of university policies to become more inclusive of women. Cultural feminism

gives a backdrop for social and cultural changes to occur within universities, social and radical feminism help explain power disparities and seek to remove the patriarchal foundation for university systems, and postmodern feminism adds an interesting philosophical filter for all gender studies.

Organizations

Organizational Systems

One area in which both social structures and leadership have been investigated is in the field of organizational research. Regardless of the organization, there are two basic components within the organization: people and structure. Because of this, organizations may be viewed as either living or non-living; organizational functions are either mechanical or biological (Perrow, 1973). From the mechanical perspective, Frederick W. Taylor (in Owens & Valesky, 2011) developed the concept of scientific management within organizations and considered that factories functioned as machines and that productivity, even as it related to the human component, could be managed as engineering problems of efficiency. From the biological perspective, one of the early theorists was Henri Fayol (in Wren, 1995), who approached the issue of organizations through management and the method by which administrative duties were performed. Fayol looked at connections between the people of an organization and how management style affected those connections, and in turn, the productivity of the organization.

About the same time that Taylor and Fayol were writing about organizations, so was Max Weber. In the early 1900s, Max Weber (in Hatch & Cunliffe, 2006), identified organizational structure in his theory of bureaucracy with divisions of labor and authority and hierarchical designations of power. Weber idealized his bureaucratic theory and felt

that a true bureaucracy should be the goal of organizational management, and that true

bureaucracies would be emotionless and ultimately more effective and efficient than

other management styles (Owens & Valesky, 2011). Unfortunately, bureaucracies don't

tend to be as well managed as Weber's ideal, and the term "bureaucracy" now has a

negative connotation.

Over the decades that followed Taylor, Fayol, and Weber, theories on

organization systems were modernized to describe horizontal and vertical structuring and

allow for environmental fluctuation and variance (Hatch & Cunliffe, 2006).

Organizations are still comprised of both people (managers and non-managers) and

mechanisms (anything from machines to lists of rules and regulations), but modern

organizational theory tends to consider the effects of both on the organization as a whole.

Organizations are systems comprised of complicated interactions of people and

constructs, not just within the organization, but outside of it as well (Perrow, 1973).

Likert (1961) represented an early attempt to categorize organizational systems

and describe the effects of those systems on the interactions of the people within them.

Likert considered leadership/management as key to the development of various system

types and determined that certain types of systems were more likely to produce positive

outcomes in the organization, like supportive environments, reduced conflict, higher

employee satisfaction, and increased worker productivity. Toward the description of a

new theory of organizations, Likert identified four basic management systems within

organizations: exploitative authoritative, benevolent authoritative, consultative, and

participative group (p. 223). In order to evaluate an organization in terms of system type,

Likert (1967) subsequently developed a measurement scale that identified four numbered

systems to correspond with the management system types. System 1 fell at the

exploitative authoritative end of the scale, and System 4 fell at the opposite, participative

group, end of the scale. Likert felt that all organizations could improve by moving

toward a System 4 model of organization. He even envisioned a future, theoretical,

System 5 model that would eventually supersede System 4, and eliminate the need for

organizational hierarchy (Likert & Likert, 1976).

Of the four types of organizational systems identified by Likert (1967), the two

extreme end types can be associated with Theory X and Theory Y lines of thought. A

System 1 system corresponds well with a Theory X controlling, manipulative leader and

a System 4 system corresponds well with a Theory Y interactive, people-oriented leader

(Owens & Valesky, 2011). As Theory Y ascribing leaders have been shown more likely

to promote cooperative decision making in their own organizations (Russ, 2011) and to

have more supportive and relational communication styles (Sager, 2008), Theory Y and

therefore System 4, are not just identifiable as participative styles, but also as

transformational styles of organizational leadership.

Environmental Contingency Theory

An additional way to view organizations is through environmental contingency

theory, which grew from systems theory. Systems theory deals with organizations as

highly complex and interactive systems. Any organization, such as a university, is an

open system in a dense web of social and environmental interactions (Owens & Valesky,

2011). It is the open system and the interactions with various environments that

necessitate contingency theory and the ability for an organization to respond in various

ways to situations. Even within a closed system, the various included social systems will

interact in innumerable and unpredictable ways that require organizational flexibility. The behavior within in any organization is therefore contingent upon its environment, both external and internal.

Contingency theory has many aspects; it allows for the possibility of multiple solutions and multiple positive structures for various organizations. Burns and Stalker (in Hatch & Cunliffe, 2006) provided one interesting part of contingency theory. They argued that the environmental conditions of the organization determine its behavior. An organization in a stable environment will respond and behave differently than one in change or one in times of crisis. Any situation or decision is filtered through its current environment for viability and necessity. The leaders at a university, for instance, will make vastly different decisions in a time of good economic standing versus a time of lean budgets and cutbacks. Even small decisions and behaviors will alter based upon the environment. Each decision a leader makes must take into account multiple variables. A particular situation will not and cannot result in the same outcome every single time.

In university systems, incorporating greater numbers of female faculty into traditionally male-dominated disciplines and into positions of leadership represents an alteration of organizational environment such that both systems and contingency theory are important frameworks through which to work on organizational change.

Gendered Organizations

At the intersection of organizational theory and feminist theory is the theoretical concept of a gendered organization. Joan Acker (1990) is widely credited with developing this framework. Acker argued that the bureaucratic organization described and researched in traditional organization theory is not gender neutral, but highly

gendered. Gender identity, according to Acker, is wrapped up in such seemingly benign concepts as 'job' and 'worker.' "The worker with 'a job' is the same universal 'individual' who in actual social reality is a man. The concept of a universal worker excludes and marginalizes women who cannot, almost by definition, achieve the qualities of a real worker because to do so is to become like a man" (p. 150). Acker also asserted that the gendered class structure exists to maintain hierarchy and positions of power for those currently at the top; gendered organizations are in place to help maintain masculine control. Acker's article concluded by contending that transformational change in organizations and organizational research is necessary to produce more equality between the genders. The theory of gendered organizations eventually arose from this seminal paper.

Fletcher (1998) proposed that, even through studies and recommendations from research into the gendered nature of organizations, transformational change toward gender equality would not be easily made. Fletcher was interested in work culture, with a focus on the relational practices of employees, in a technology company in which the norms and values centered on tangible items and relational practices weren't recognized for their significance. In the study, the researcher divided relational practice into four areas: preserving, task-related practices; mutual empowering practices related to supporting the achievement of others; achieving practices related to self-promotion; and creating team practices toward creating a better environment for the entire team. As a whole, Fletcher found that relational practices were not recognized as true work in the organizational culture. From her findings, Fletcher concluded that "behaviors such as relational practice are not merely overlooked in organizations, they are systematically

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disappeared through a process in which they are coded as private sphere (i.e., feminine) activities that stand outside the definition of work and competence" (p. 181). She went on to say that organizational transformation would "require an acknowledgment of and an engagement with the complex, gendered forces underlying current organizational norms" (p. 181) and that "challenging these norms…challenges not only the separation [of genders] but also the deeply held, gender-linked assumptions that maintain that separation and reinforce a patriarchal pattern of male dominance in the public sphere" (p. 182).

What makes an organization gendered? In the literature, three methods have been used most frequently to determine the gendering of an organization. As Britton (2000) outlined in her review of gendered organization research, all bureaucratic organizations may be inherently gendered, they may be gendered based upon an unequal percentage of male and female workers, or organizations may be considered gendered because they are grounded in descriptions and guidelines that are idealized in masculinity. Britton argued that these determinations of gendered organizations are inadequate and problematic, as they fail to fully address relationships between various aspects of the organizations and the workers, they tend to assume gendering, and considerations of inherent gendering reduce opportunities for progression away from gender inequalities in organizational structures.

Since Britton's article was published, others in the area of gendered organizational research have looked at organization structures in more detail, specifically in terms of worker relationships. Investigations into individual areas of gendering have yielded information on inequity in different aspects of industry and academe (Bird, 2011;

Collinson & Hearn, 1994; Miller, 2004; Park, 1996; Ramaswami, Dreher, Bretz, & Wiethoff, 2010). However, methods for determination of gendering remain largely the same, with assumption, gender ratios, and stereotyping of professions serving as guidelines for gendered organization selection and investigation.

Perhaps one reason for such difficulty in adequately defining a gendered organization lies in the disaggregation of the original concept itself: gender research is conducted separately from organizational research and the theoretical underpinnings for each are varied and distinct. Martin and Collinson (2002) argued strongly for a separation of the study of gendered organizations into its own research area. The authors felt that neither organizational nor gender research alone could adequately address the relatively new field, and that a full theoretical construct was necessary for the concept of gendered organizations. As such, Martin and Collinson advocated that researchers of gendered organizations were "free to do unorthodox, creative, and non-conventional work, both theoretically and methodologically. Freed from mainstream constraints, they can…[create] new concepts and methods that can explore and examine multiple conditions, meanings and consequences of 'gendered' work" (p. 257). Indeed, a wide variety of methods and ideas are found in literature on gendered organizations.

Research into gendered organizations has typically focused on industry, with fewer studies in university settings. The university, like industry, is a hierarchical organization, however, and therefore industry structures may be correlative to university structures (Bird, 2011). Park (1996) outlined one particular way in which universities are gendered by discussing promotion and tenure policies. She stated that these policies place higher importance on the research component of academic work, while ignoring or

belittling the aspects of teaching and service. Since women are more likely to have larger

teaching loads and undergraduate education roles, and more responsibilities for service

than their male counterparts, women become disadvantaged in the promotion and tenure

process. Park identified the university system as a masculine hierarchy, specifically

when it comes to evaluative schemas, and proposed alternative tenure and promotion

guidelines and criteria in order to stop "problematizing women" by instead

"problematizing the criteria by which women…are evaluated" (p. 74).

Bird (2011) conducted a recent study on gendered structures in a university

setting. Her research was designed around an intervention strategy to help expose,

address, and moderate the effects of gendering on female faculty members. Bird

commented on gendering as the result of several processes within the university system:

the valuation of research over teaching, ambiguity in the promotion and tenure process,

segregation of work type by perceptions of gender suitability, inequity in work-life

balance and caretaking issues, difficulties with networking, varying perceptions of

professional balance for teaching, service, and research, and imbalance between the

genders in administrative roles. Through all the different levels, Bird assumed the

gendering of university structures as bureaucracies designed around hegemonic

masculinities. The focus of Bird's research, much like that of Park (1996), was not on

how to measure the gendering of the structure, but on how to reduce the effects of what

she considered to be inherent gendering on inequities for women in academia. Through a

workshop intervention and an associated case study, Bird found that though faculty

became more aware of potentially gendered structures within the university system, they

were not necessarily convinced that those structures were gendered or that changes could

be made to the system. Even with a somewhat limited outcome, Bird maintained that gendered structure awareness was the first step toward affecting positive change.

Arnold and Peterson (1998) also investigated gendered university structures, but did not work with faculty. Instead, the authors chose to research non-instructional employees and illuminate the gendering in an area of universities not often discussed in the literature. In their study, a framework from Tijdens (in Arnold & Peterson, 1998) was used to separate structures within the organization based on industrial segregation, occupational segregation, and hierarchical segregation. The study also contained a component related to worker perception, in which the researchers sought to show influence of organizational structure, based upon the specific archetypes of clan, adhocracy, hierarchy, and market, on employee perception of the work climate. The authors applied their own definition of gendering in the four archetypes in order to interpret gendering effects. They defined work climate as an employee's immediate work environment (work unit), whereas organizational culture was defined as the broad scale organizational environment.

The Arnold and Peterson (1998) study integrated work in organizational theory, feminist theory, gender issues of segregation in higher education, and higher educational culture and climate. The researchers sought to answer questions regarding the existence of gendered sectors within noninstructional university structures, the relationship between gender and perceptions of organizational culture, and how gender, perceptions of organizational culture and climate, and gendered sectors relate to one another. Through their study, Arnold and Peterson found evidence for gender segregation by both job sector and hierarchical structure. The researchers demonstrated that gendering of the

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university organization existed within the organizational structure for non-instructional employees. Evidence was also found to show relationship between gender structure and employee sector to employee perception of organizational culture. The relationship between gender structure and employee sector to employee perception of organizational climate was not as clear, though the researchers felt there was still some relationship. One important piece of information not included in the Arnold and Peterson study was data on specific gendering (both gender mix and leader gender) of individual work units within the scope of the larger sectors and divisions.

On the industry front, Ramaswami et al. (2010) looked at mentoring relationships within male-gendered industries to determine if there was a correlation between organizational context, mentoring relationships, and career success. The researchers hypothesized that both career success, as measured by compensation, and career progress satisfaction, had greater association with female protégés mentored by senior males than with male protégés mentored by senior males in male-gendered industries. Ramaswami et al. found support for their hypotheses, as females with senior male mentors received significantly higher compensation and reported greater career progress satisfaction than males with senior male mentors in male-gendered industries. Included industries were ones chosen by the authors that they could identify as gendered through normative and numerical methods, such as those industries in which males made up over three-quarters of the workforce or industries perceived to be male stereotyped. Education, as a field of employment, was not considered in the study, as overall employment levels of males versus females did not approach the necessary ratio in order to consider education a gendered industry. As a side note, this is one possible reason why more studies have not

focused on identifying gendering in university structures. The Ramaswami et al. study also did not define gendering at different levels within the organization, but only focused on the effects of gender and organizational context with mentoring.

Miller (2004) also studied the gendered organization from the perspective of industry. Miller used the oil industry in Alberta, Canada as a framework for her study. She identified three aspects of gendering in the industry which all related to inherent gendering as a result of hegemonic masculinities: everyday interactions with separation along gender lines, value and belief systems with a subsequent division of labor, and symbolism and mythos associated with the frontier. She proposed that all three aspects tied together to create a "dense cultural web of masculinities" (p. 47) which she sought to identify and describe through her research. Miller was able to identify multiple examples for female employee experience of all three of her initially identified aspects of gendering in the oil industry within her data. Multiple aspects of both gendering and inequity were discussed through both interpretation of and narrative excerpts from her interview data, though the author did not clearly differentiate on levels and sectors of employment. Miller concluded that the oil industry in Alberta was "gendered to an intense degree because of the multiple points where masculinity is represented" (p. 69). She also concluded that this level of gendering is somewhat restricted to the industry and geographic area in her study, as both work to enhance gender inequities. The results of the study highlighted problems of gendered organizations, but did not present any new definitions for gendering determination and did not provide solutions for the gendering issues.

Gendered organizations have been studied in a variety of venues, including both

industry and academia. In universities, genderedness has been found in the

organizational structures (Bird, 2011), culture and climate (Arnold & Peterson, 1998),

and the university system itself (Park, 1996). Based on definitions of gendering that

depend upon high proportions of males to females, one would expect that masculine-

dominated areas in university systems would represent more masculine-dominant

gendered environments. The disciplines of science, technology, engineering, and

mathematics (STEM), by and large, historically have been and still are dominated by

males (National Science Foundation, 2012), and provide an interesting platform for

gendered organizational research.

STEM Gendering: Possible Causes

Ability

Variations in gender abilities have been widely studied (Halpern, 2000; Hyde,

Femmema, & Lamon, 1990; Voyer, Voyer, & Philip, 1995). In a review by Blickenstaff

(2005), a variety of proposed reasons for the dearth of women representation in science,

technology, engineering, and mathematics careers were identified and discussed. Those

reasons varied from biological, to attitudinal, to structural, to cultural. In terms of

biology, an early study on gender comparisons in academics proposed that while there

was no overall difference in general intelligence between males and females, there were

differences in spatial, verbal, and mathematical abilities between the genders (Maccoby

& Jacklin, 1974). Often, this view has persisted, though more modern analyses indicate

that there are negligible differences in verbal ability and mathematical ability; spatial

ability varies by type of spatial skill, and even some of the small gender differences in

ability have been narrowing over time (Hyde, 2007).

For the STEM disciplines, mathematical and perhaps spatial ability (specifically for engineering) have the most direct potential correlation. In 2005, when the then-president of Harvard University, Lawrence Summers, made a speech regarding differences in the abilities of males and females, he cited research that has shown a greater range of scores for males in standardized math tests than for females; i.e., there are more males than females at both higher and lower ends of the mathematical scale, something that Summers called the "different availability of aptitude at the high end" (Remarks, para. 4). If this difference is biologically derived, the expectation would exist that the difference would persist through time and exist all across the world; however, the variance associated specifically with high-performance has been decreasing in the United States and, in some other countries, does not exist at all (Spelke, 2005).

Though there are measurable differences in gender ability when it comes to spatial aspects (with respect to spatial perception and mental rotation), not all STEM disciplines require vast amounts of spatial manipulation. Even for those that do, such as engineering, there is evidence that spatial ability scores for both genders can be increased with appropriate training, and that high percentages of women can be retained in engineering programs when they are given this training (Hyde, 2007). Biology does not appear to be a factor in the relatively low number of women entering into and graduating with degrees in STEM disciplines. Intrinsic ability would, by extension, also not likely be a factor in the even smaller numbers of women receiving doctoral degrees and going on to tenure-track and tenured positions of employment in academia. Thus, if the leaky pipeline cannot be best explained by ability variance, other points must be considered. If ability is not the main issue holding women back from attaining academic positions in

STEM disciplines, then perhaps other internal factors of causation or external factors such as such as group structure, perception, stereotypes, and gender bias may be the key issues.

Bias and Discrimination

Ceci and Williams (2011) reviewed literature on gender bias and discrimination in STEM discipline employment in academe and concluded that these particular external causations for disparity in the numbers of female and male STEM faculty were minimal, except as attributed to resource allocation, societal constraints and norms, personal and family choices, and high-end ability differences between the genders (though this latter factor was considered secondary by the authors). The authors advocated for reform to focus on alteration of how society negatively restricts the choices women make regarding such things as family and discipline preference, as specifically follows from gender stereotypes.

Despite the findings from Ceci and Williams (2011), many other authors have found reason to believe bias and discrimination exist. In an article by Park (1996), the author identified multiple biases inherent to university systems. Park reviewed general policies on tenure and promotion, focusing on productivity items associated with research, service, and teaching loads. The author argued that guidelines associated with tenure and promotion are gender-biased, with a strong emphasis being placed on research despite the fact that many female faculty have heavy teaching loads, spend more time preparing for their classes and helping their students, and tend to place higher emphasis on the importance of their roles in teaching. In terms of service, Park contended, females are also participating in both more committee and professional work and in more

community service endeavors. This last idea corresponded with research from Porter (2007) that showed both female and minority faculty spending more time on committee work than their male and white counterparts. At the conclusion of her review, Park (1996) determined that universities are "a hierarchy built on the exploitation of women….If we are to transform the university into a more woman-centered institution, then we must begin by deconstructing this gendered hierarchy" (p. 77). Park advocated for a non-hierarchical transformation of university promotion and tenure systems as a start toward this process.

Even studies outside of STEM disciplines have shown disparity between men and women in academe. Morrison, Rudd, and Nerad (2011) took a modern look at the differential effects of marriage and family on the tenure process for men and women in the social sciences. The study focused on a large group of individuals who had received their doctorates within a specific timeframe and compared time between graduation and hire to a tenured or tenure-track position, tenure-track to tenure, and any change in employment from tenure to non-tenure-track or tenure/tenure-track to either non academic or unemployment. The authors found differences between men and women primarily in terms of the addition of young children early in the career process. Women with young children early in their careers experienced a slowing effect of obtaining a tenure-track position compared to men with young children. Interestingly, children appeared to have no effect on either men or women obtaining tenure, once they were in a tenure-track position. Morrison et al. (2011) also found a difference concerning gender and marriage. In particular, men who were married to partners with lower degree attainment were tenured earlier than both other men and other women, regardless of

marital status/partner educational achievement. The study demonstrated that gender difference in career advances, from either bias or social constraints, existed within academic structures.

Prior to women entering into faculty positions, is there bias even in the hiring processes of academe? McNeely and Vlaicu (2010) focused their research on the hiring trends and how those can impact both current and future numbers of women and men in STEM faculty positions. The authors used a large number of research universities across the country to provide the data in their study. Starting with numbers of females available in the applicant pools of various STEM disciplines, McNeely and Vlaicu found an unusual result: women are being hired at higher rates in disciplines where there is an overall lower percentage of female doctorates and existing female faculty. The authors proposed that this may be due to a concerted effort to specifically hire female faculty in those subject areas that have the most gender disparity. Tying into this idea is the authors' finding that "institutions seem to reduce their efforts to identify and hire qualified female faculty once they have reached a certain number that 'looks good,' based on some institutional target quotas" (p. 791). McNeely and Vlaicu also discovered differences in hiring trends between private and public universities, with public institutions hiring greater numbers of female faculty in STEM disciplines than private institutions. The authors concluded that greater understanding of hiring policies and practices is necessary to determine what specific differences exist between institutions and disciplines and how policy may be adapted to provide greater hiring opportunities for women in STEM disciplines into the future.

Bias, discrimination, and persisting stereotypes may have multiple levels of

negative effect on women faculty finding success in STEM academic careers. The hiring

process, structural weighting of factors that disadvantage women, and marriage and

family support differences all may create a difficult work climate for women. When a

negative climate is present for female faculty, it is likely to influence job satisfaction as

August and Waltman (2004) demonstrated that environmental conditions such as climate,

relationships, motivation, and influence were closely related to female faculty career

satisfaction levels.

Organizational Culture, Climate and Job Satisfaction in Academe

The terms culture and climate are somewhat indistinct and are used almost

interchangeably in some research. In a review from Denison (1996), the author

investigated the differences between the culture and climate throughout their

developments in literature. Culture originally began its description and use in studies as

something more qualitative in nature, something not definable by simple variables or data

points. Case studies focused on each person in an organization were well-suited to

research into culture. Climate, though having its roots in qualitative research as well,

became a factor to be defined by surveys and numbers, something that could be averaged

and broadly applied to larger groups and populations. Culture studies considered change

in an organization's interactions and structures through time, while climate studies

focused on measurable perceptions of both individuals and the organization itself.

Culture, as described by Denison, is "the deep structure of organizations, which is rooted

in the values, beliefs, and assumptions held by organizational members" and climate is

"rooted in the organization's value system, but….[is] largely limited to those aspects of

the social environment that are consciously perceived by organizational members" (p.

624). Later in the review, Denison summarized this difference: "Climate refers to a *situation* and its link to thoughts, feelings, and behaviors or organizational members….culture, in contrast, refers to an *evolved context* (within which a situation may be embedded)" (p. 644).

Though Denison (1996) began his review differentiating between culture and climate, he ended his review arguing that culture and climate are measures of the same thing, but from different perspectives. The separation between literature on culture and climate arises mainly from the historical origins of each and the theoretical underpinnings for the research. Denison contended that both culture and climate studies consider organizational and group environments and that regardless of the theoretical origins of each concept, the research on culture and climate necessarily begins to overlap. To conclude his review, the author called for increased integration between culture and climate research to improve the understanding of social and organizational environments.

Mills (1988) was one of the earlier advocates for the inclusion of gender considerations in organizational studies of culture. In a review, the author argued that studies of culture must necessarily include gender, as gender and culture are both social constructs in terms of expected and accepted behaviors. Mills asserted that portions of Marxist and materialist viewpoints could be used to best explain the assumptive non-gendered development of organizations through separation of family and work and the systematic emplacement of increasingly bureaucratic structures in employment sectors. Mills called this a feminist materialist context for organizational research and contended that through this perspective, greater understanding of the disenfranchisement of women in the workplace could be attained. As women were socially associated with family and

home and the concept of work was separated from those areas, women were considered farther and farther from the developed norms of organizational workers and employment, unless that work was accepted as feminine in nature. As men continued to dominate any work outside of that small feminine sphere, the cultures within most workplaces became not the idealized non-gendered arenas, but increasingly masculine gendered and exclusionary of women workers. Mills considered organizations as important areas of rule development for social behavior and norms and believed that, as such, any studies of organizational culture must consider gender: "…organizations should be viewed as frameworks of human experience which have key implications for the construction and reproduction of gendered relationships…" (p. 366).

Including the aspect of gender in their culture study, van Vianen and Fischer (2002) collected data in a non-academic environment in the Netherlands to determine if specific gender culture preferences are predictive factors of an employee's career ambitions. Within their literature review, the authors asserted that:

"…organizations are based on norms and beliefs, which are more adhered to by men than by women. Thus masculine cultures…consist of hidden assumptions, tacit norms and organizational practices that promote forms of communication, views of self, approaches to conflict, images of leadership, organizational values, definitions of success and of good management, which are stereotypically masculine" (p. 316).

Van Vianen and Fischer proposed that one reason for a dearth of women in management and upper management positions is women have less of a preference for masculine culture, and would therefore be less apt to aspire to become managers, where masculine

culture would be dominant. The authors hypothesized that employees with more

masculine culture preferences would have greater desire to move into the more

historically masculine defined roles of management. By using different group levels for

comparison (managers at both senior and mid-levels, and non-managers), van Vianen and

Fischer found that there were differences between the groups in terms of culture

preferences, with managers tending toward masculine culture more than non-managers.

Gender differences were also present, as women at all levels of employment were less

likely than men to have masculine culture preferences. Following from this, and in

agreement with one of the authors' hypotheses, women were also found to be less likely

to aspire to management positions than their male counterparts. Van Vianen and Fischer

concluded that women may be excluded or exclude themselves from management

positions based on a persistence of masculine culture in those male-dominated arenas.

One limitation to this study concerned its dealing with only certain factors (such as

competition, effort, and work pressure) to determine gendered culture types, without

including factors relating to more social interactions between individuals. The authors

call for future studies to consider more of those interactions in order to get a more broad-

based picture of organizational culture.

A variety of factors were included in a university study by Settles et al. (2006) of

the relationship of organizational climate to job satisfaction. Focusing on tenured and

tenure-track female science faculty from a single, large public university, the authors

surveyed participants about issues related directly to gender, about general climate

conditions, and about leadership, job satisfaction, influence perceptions, and research

productivity. In their results, they found that positive climate and leadership perceptions

were more likely to yield higher job satisfaction ratings and that negative gender issues, such as sexual harassment and discrimination, were more likely to be associated with lower job satisfaction ratings. The data from Settles et al. supported a deficits theory for women in the sciences, as it indicated the presence of greater organizational difficulties for women than men to succeed and be satisfied with careers in academe.

August and Waltman (2004) conducted a general study of women in universities to discover the factors determining career satisfaction. The authors used a conceptual framework involving environment, demographics, and motivators to guide their research. Environmental conditions with a focus on climate, relationships, and power were found to be most important to female faculty as a whole. A secondary focus was found with the motivator of salary parity. Tenured women also found greater career satisfaction when their workloads were comparable to those of their colleagues. While salary, workloads, and power issues were more important to tenured female faculty, collegial relationships were more important to non-tenured women. This indicated that there are significant differences in satisfaction drivers between female faculty at various levels in their careers. However, as the study was only done at a single Research I institution, and only faculty of greater than a year employment were considered, there were some limitations. Each of the factors found through the August and Waltman study may not be applicable to different institutional types.

Bilimoria et al. (2006) also presented research on gendered relevance of various job satisfaction components, specifically with respect to research university faculty. Faculty at one institution were surveyed based on various items related to job satisfaction, leadership, mentoring, resources, and collegial support. Gender was one of the items

requested within demographic items. The authors identified leadership and mentoring as indirectly important to faculty of both genders for job satisfaction, and determined that the mediating factors of collegial environment and institutional support highlighted some differences between the genders, with female faculty placing more importance on collegiality issues and male faculty placing more importance on resource support from within the institution.

Women, STEM, and Job Climate and Satisfaction

Combining feminism, organizations and leadership style, work climate, and STEM disciplines is the area of women in STEM faculty positions at colleges and universities. A number of studies have investigated various aspects of this topic, with a major goal of finding ways to recruit, retain, and promote women in faculty and leadership positions.

In an article by Bilimoria, Joy, and Liang (2008), the authors made proposals for organizational transformation in university systems to create more parity between men and women in STEM disciplines. Information from various universities participating in the National Science Foundation's (NSF) grant program, ADVANCE Institutional Transformation, was included in the review. Most universities conducted studies of climate at both the university and department levels. Outcomes of these studies showed that female faculty in STEM disciplines, in contrast with male faculty, "perceive the internal climate at their universities as more disrespectful, noncollegial, sexist, individualistic, competitive, nonsupportive, intolerant of diversity, and nonegalitarian" (Bilimoria et al., 2008, p. 432). Bilimoria et al. (2008) contended that simple solutions to the problem of few women in STEM disciplines and even fewer in leadership in STEM

disciplines do not exist and that multiple levels of organizational and social change need to occur before equity can potentially be achieved. The authors called for university systems to have increased data collection on diversity and women's issues, intentional thought on how to overcome inequity, and transformational change in leadership and culture at various levels within university systems.

Callister (2006) specifically studied STEM disciplines and how both gender and climate affect job satisfaction. The author included a faculty member's plan to leave their job as another aspect of the study. The underlying constructs behind Callister's study were similar to those of August and Waltman (2004) in that she used motivators such as salary and environmental factors such as relationships. Callister also included power in her study by incorporating in some structural aspects of an organization, such as access to information and resources. Multiple differences were found between male and female faculty with females more likely to be less satisfied with their jobs and more likely to have plans to leave those jobs. Climate within the faculty member's department was found to impact both satisfaction levels and plans to quit. The author concluded that this may be due to female faculty placing an increased level of importance on departmental climate and collegial relationships over their male counterparts, so that if an unsatisfactory climate exists, women are more likely to be dissatisfied with their jobs and be more likely to leave their jobs. Callister's study did not look at a wide variety of aspects of climate, such as leadership, frequency and level of collegial relations, and various communication factors. The study also involved only STEM faculty in a single research university, though the level of the institution is not specified.

Settles et al. (2006) dealt with women in STEM and social science disciplines and

faculty satisfaction in relation to job climate, leadership, and perceptions of bias and harassment. The theoretical construct for the authors' research was deficits theory, which proposes that external climate factors related to employment in STEM disciplines differentially affect men and women with respect to satisfaction, retention, and achievement. Settles et al. sought to investigate the validity of the theory by studying the effects of climate factors such as discrimination, harassment, and leadership. The outcomes of productivity and perceptions of job satisfaction, influence, and access to resources were evaluated. Through the study, the authors found that when female faculty have negative perceptions of their work environment, they are more likely to have lower job satisfaction. Conversely, when female faculty had positive perceptions of climate factors, they were likely to be more satisfied on the job. The authors also discovered that although traditional STEM faculty (physical science faculty) reported more negative perceptions of their work climates, in terms of harassment, bias, and leadership effectiveness than their social science colleagues, they did not have lower measured outcomes in terms of job satisfaction, productivity, or perceived influence. The authors concluded that this might be due to different methods those faculty have developed to deal with job stresses. Some drawbacks to the Settles et al. study are that it only dealt with female faculty in STEM and social sciences at one large public university.

Research from Xu (2008) considered how lower climate and job satisfaction perceptions by female faculty in STEM disciplines lead to desire to leave their position and therefore possible decreased rates in retention of position. As with Settles et al. (2006), Xu's study also incorporated deficits theory as an underlying construct to the research, holding with the idea that external and not internal factors are the causes behind

deficiencies of female numbers in STEM disciplines. Both tenure and tenure-track, male and female STEM faculty responses from a large national survey were included in Xu's research. The results of the study showed that female faculty reported higher intention to leave their positions than male faculty, though women did not actually leave their jobs in higher numbers than men. The factors found to be most influential on a female faculty member's intention to leave her position were related to organization structure, specifically climate and promotion and resource support. And though climate was also an important factor for male faculty's desire to leave, worries about promotion potential and resource support were only found to be significant for female faculty, implying that there are external issues that may lead to differential effects of satisfaction for men versus women in STEM discipline faculty positions. One limitation to the Xu study is that it only included data from research and doctoral universities and it did not incorporate information on attrition for reasons other than personal choice.

Summary

Studies from the areas of leadership, feminism, organizational systems, university systems, STEM gender disparity, and climate and job satisfaction all contribute to the literature that helps understand the issues surrounding female university faculty in STEM disciplines. Research on the leadership/management styles and preferences of women has indicated that women tend toward more transformational/participative styles. In organizations where women are more prevalent, these types of styles are utilized to a greater extent than in organizations where men are in higher numbers and styles more similar to transactional/autocratic leadership are used. In organizations that are structured in such a way as to be masculine gendered in nature (either through patriarchal

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hierarchies, gender divisions and numbers, or discipline type), it stands to reason that leadership/management styles would be expected to be more transactional/autocratic. As female subordinates under autocratic styles of leadership are more likely to be dissatisfied with their leaders and as leadership is a major influencing factor on work climate, women who are a part of a more autocratic organization may perceive their work climates in a more negative light than their male colleagues. Since climate is a major influencing factor on job satisfaction, those same women should therefore be more likely to have lesser job satisfaction than men.

STEM disciplines have historically been considered to be masculine disciplines, and they generally continue to be dominated by males. University STEM faculty are therefore more likely to find themselves in a gendered organization. If women STEM faculty face employment primarily in masculine gendered organizations, they are likely to find themselves under leaders who use autocratic management styles. In such a less satisfactory autocratic system, it is also possible that those women would have more negative perceptions of their work climates and satisfaction levels. This paper is the first attempt at linking the items of organizational system, management style, climate, and job satisfaction in a university faculty setting comparing the perceptions of STEM and non-STEM discipline male and female employees.

CHAPTER III: METHODOLOGY

Overview

This study hopes to find a relationship between university faculty perceptions of organizational system type and job and climate satisfaction levels. It is proposed that, due to a greater prevalence of male faculty and leaders, STEM discipline management styles will be more authoritarian in nature which would then lead to faculty perceptions of organizational system type as more autocratic. Following from this, it is also proposed that female faculty in STEM disciplines will have lower job satisfaction and more negative climate perception levels than male faculty in STEM. Other items of interest for the study are overall job and climate satisfaction levels by gender and rank, faculty perceptions of different organizational hierarchical levels, and measures of genderedness by both discipline type and male prevalence.

The various research questions for this study led to multiple hypotheses:

H_1 Female and male faculty will differ in their perceptions of the combined constructs measuring organizational system type, climate, and job satisfaction.

H_{2a} Female faculty in male-dominated colleges (gendered colleges) will report lower job satisfaction than their male colleagues.

H_{2b} Female faculty in male-dominated colleges (gendered colleges) will report more negative climate perception than their male colleagues.

H_3 Faculty perceptions of organizational system type will differ at the three organizational levels (department, college, and university).

H_4 Faculty perceptions of organizational system type will be more authoritarian in gendered colleges than in non-gendered colleges.

H_{5a} Faculty will differ by hierarchical ranks in their reports of job satisfaction.

H_{5b} Faculty will differ by hierarchical ranks in their perceptions of climate.

H_{5c} Faculty will differ by hierarchical ranks in their perceptions of organizational system type.

H_{6a1} Lower job satisfaction ratings by female faculty will be correlated with perceptions of more authoritarian type organizational systems.

H_{6a2} Negative perceptions of climate by female faculty will be correlated with perceptions of more authoritarian type organizational systems.

H_{6b1} Lower job satisfaction ratings by male faculty will be correlated with perceptions of more authoritarian type organizational systems.

H_{6b2} Negative perceptions of climate by male faculty will be correlated with perceptions of more authoritarian type organizational systems.

To investigate these hypotheses, the study conducted was a parallel-samples cross-sectional design which compared the quantitative data obtained from the one-time survey results of different populations sorted by gender, discipline, administrative duties, and rank within the same university setting.

Sample

The target population for the study was full-time university faculty members. The sample was taken from a single, mid-sized, rural, comprehensive state university in the South. Sample members were reached via email through a mass faculty email list maintained by the University. While all of the University's full-time faculty were accessible in this way, there was also some overlap of the email list into staff and part-time university employees. A collection of demographic data and a subsequent exclusion

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of those individuals not part of the target population were performed in an effort to confine results to full-time faculty.

At the time the survey was conducted, the University in the study employed 761 full-time faculty (see Table 3.1 for a full break-down of faculty numbers) (Booth, 2012) across six colleges.

Table 3.1

Full-Time Faculty Population for the Study

College	Gender	Rank				
		Instructor	*Assistant Prof*	*Associate Prof*	*Full Professor*	*Other*
	Female					
Business	15	1	7	2	2	3
Educ. and Behavioral	54	6	19	15	14	0
Health	101	30	35	23	4	9
STEM	44	13	16	4	9	2
Arts and Humanities	98	16	28	34	17	3
Interdisciplinary	55	30	14	9	2	0
Total	367	96	119	87	48	17
	Male					
Business	53	3	10	17	18	5
Education	37	4	3	13	15	2
Health	41	3	12	17	7	2
STEM	130	12	38	34	45	1
Arts and Humanities	106	15	28	36	24	3
Interdisciplinary	27	12	7	8	0	0
Total	394	49	98	125	109	13
University Total	761					

Research Design

Data Collection

The survey was administered via a Qualtrics platform survey link sent via mass faculty email late in the spring semester 2012 (Appendix A). Email recipients were asked to voluntarily participate in the "[University] Organizational Characterization"

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study to collect data regarding faculty perceptions of various aspects of the University.

Faculty were then instructed that by following the link to the survey, they supplied their

implied voluntary consent to participate in the study. The survey was open for

participation for a total of eleven days, spanning two work weeks. Three follow-up email

reminders were sent out over the span of survey availability, for a total of four emails.

Participants were excluded, through the Qualtrics platform, from taking the survey more

than once.

Instruments and Measures

The survey instrument used for the study contained 68 Likert-style items related

to faculty perceptions and seven additional items on faculty demographics. The entire

survey instrument is found in Appendix B. Though there were 38 questions, there were a

total of 68 items, as 15 of the items were asked for each of the three different

organizational levels of department, college, and university. This comprehensive 68 item

survey on perception was broken into segments with the first section of 30 (ten questions

asked at three different organizational levels) related to organizational system

management type, the next 15 (five questions asked at three different organizational

levels) to both job satisfaction (two of the five questions) and climate (the remaining

three questions of the five, devoted to the areas of leadership, resources, and mentoring),

and the final 23 items to issues with job satisfaction (two items) and the climate

perception areas (the remaining 21 items) of resources, compensation, collegial

interactions, leadership, pressure, gender and race/ethnicity, and mentoring. For

simplicity, item numbers indicated in this study correspond to the survey order of the 38

distinctive questions and do not count any "sub-item" organizational levels.

Demographic items pertained to gender, college affiliation, ethnicity, rank, appointment type, and administrative duties. All demographic items included a "decline to answer" option and several included a write-in option for "other." A final item was included to give participants the opportunity to provide any additional comments.

Survey items were adapted from existing surveys. Each item was measured on a four-point Likert scale and included a fifth, 'not applicable' (N/A) option. A four-point rather than a five-point Likert scale was chosen for its simplicity, its correspondence to the survey models, in particular Bilimoria et al. (2006) and Case Western Reserve University (2008), and based on research that indicates the lack of a mid-point ('neutral') option may reduce the likelihood of social desirability bias (the increased potential for respondents to answer survey items in ways that they believe would be more socially acceptable, or positive) in the results (Garland, 1991) and that scale response may be statistically similar irrespective of the number of scale options (Leung, 2011; Matell & Jacoby, 1972), though there are certainly other research findings (see Cummins and Gullone (2000) for a brief overview of Likert scale constructions). Participants were not forced to answer any individual questions in order to be able to move on in the survey, such that if a respondent felt uncomfortable with or did not want to answer any given item, they could still complete the remainder of the survey.

Organizational system management items were based extensively on Likert and Likert's (1976) work on organization management systems and the resulting Profile of Organizational Characteristics (POC). As the original POC was developed with industrial management systems in mind, the items adapted for use in this study's survey were chosen based on their relevance to university systems. Items were also streamlined

for choice correspondence to a simplified and more clearly defined Likert-style scale. For an example of an original Likert and Likert item and how it was altered for this study's scale, see Table 3.2. The four scale choices of "Strongly agree," "Somewhat agree," "Somewhat disagree," and "Strongly disagree" for the organizational system management survey items corresponded to Likert and Likert's System 4, System 3, System 2, and System 1 type management systems (items 3, 5, 7, and 10 were reverse coded). Those systems follow from Likert's (1961) earlier work which labeled these systems as (in the same order): Participative group, Consultative, Benevolent authoritative, and Exploitive authoritative.

Table 3.2

Comparison of an Original Likert and Likert (1976) Item to Revised Version

Item	Scale choices			
Original Extent to which your supervisor behaves so that subordinates feel free to discuss important things about their jobs with him or her	Subordinates do not feel at all free to discuss things about the job with their supervisor	Subordinates feel slightly free to discuss things about the job with their supervisor, but discuss things guardedly	Subordinates feel quite free to discuss things about the job with their supervisor, but with some caution	Subordinates feel completely free to discuss things about the job with their supervisor and do so candidly
Revised I feel completely comfortable talking to administrators about important unit issues	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree

Note. Choices in the survey were presented with the "strongly agree" option first.

Climate and job satisfaction items were chosen from university faculty satisfaction survey items investigated by Bilimoria et al. (2006) and those within a university survey conducted of its faculty by Case Western Reserve University (2008). The responses for survey items corresponding to both job satisfaction and climate perception were designed to elicit either more positive or more negative responses for each. Scale choices were organized at the end points as either "Strongly satisfied" to "Strongly dissatisfied" or "Strongly agree" to "Strongly disagree." Items 27-31 were reverse coded.

Only one source, Bilimoria et al. (2006), provided measurements of internal reliability of items. Cronbach's alpha scores ranged from 0.76 to 0.91 for the various sections of their survey, which was divided up into areas of general job satisfaction, leadership, mentoring, resources, and collegial relations. Reliability results for the current survey are presented in the next chapter.

Procedure

The first part of this study involved research into existing measurement scales for faculty climate and job satisfaction and for organizational system types. Once the previously developed scales were collected from Bilimoria et al. (2006), Case Western Reserve University (2008), and Likert and Likert (1976), individual items were chosen for relevance to both academia and to the particular hypotheses for this study. As was indicated in the Instruments and Measures section, some items were reworded to attempt clarification, and the organizational system type items from Likert and Likert (1976) were rewritten to model a standardized four-point Likert response scale of strongly agree, somewhat agree, somewhat disagree, and strongly disagree. The survey was developed

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(and eventually administered) on the Qualtrics online survey platform. Survey items were grouped according to the theoretical underlying constructs of organizational system type, job satisfaction, and climate perception.

Next, baseline demographic information was obtained for the chosen study university through their office of human resources and once approval was obtained through the study university's Institutional Research Board (IRB), the survey was emailed to all potential study participants.

Variables

The survey was designed to evaluate faculty perceptions of organizational system type and climate, and their job satisfaction. The survey items were divided up into these three main constructs, and then sub-divided into other sub-constructs based on the literature (Bilimoria et al., 2006; Likert & Likert, 1976). Survey items 1-10 corresponded to the construct for organizational system type and were divided into the sub-constructs of leadership (items 1-3 and 6), communication (items 5 and 7-9), interaction (item 4), and motivation (item 10). Survey items 11, 12, 16 and 17 related to the construct for job satisfaction, and survey items 13-15, and 18-38 identified the construct for climate perception and were divided into the sub-constructs of leadership (items 14 and 32-36), interaction (items 21-26), pressure (items 27-29), gender and ethnicity (items 30 and 31), resources and compensation (items 13 and 18-20), and mentoring (items 15, 37 and 38). 15 of the 38 item questions were asked at three different organizational levels. All ten of the organizational system type items were asked at all three levels, two of the job satisfaction items were asked at all three levels, and three of the climate perception items were asked at all three levels. In this way, comparison across all major constructs could

be made for department, college, and university levels. All items were not asked at all three levels due to the negative impact that would have had on the length of the survey and the reasoning that all items may not be applicable at all three organizational levels, such as (satisfaction with) "salary." For those single-layered items that mention organizational unit, such as "Colleagues in my primary unit value my work," respondents were asked to consider that "primary unit" is the department level, or their most immediate sphere of work within the University.

The variables for the study were grouped according to control variables, the somewhat overlapping groups of organizational factors, and the various levels of dependent variables. The main dependent variables for the study were overall faculty job satisfaction and perceptions of climate and organizational system type. It was hypothesized that perceptions of climate and organizational system type were mediating variables for measures of job satisfaction (and that organizational system type also served as a mediating variable for climate perception). Control items collected through demographic information were gender, college affiliation, rank, administrative duty percentage, race/ethnicity, and appointment type (represented as either part-time, tenured, tenure-track, non-tenure track, or transitional faculty in optional retirement positions). The organizational factors included all the sub-construct factors contributing to faculty measures of organizational system type and climate perception.

An additional organizational factor was the concept of genderedness, which was determined based on previous work by both J. Acker (1990) and Britton (2000) that indicated genderedness was created through bureaucracy, dominant male numbers in the workplace, and culturally, such as through cultural stereotypes and historical gender

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typing of the nature of the work being performed. As universities are bureaucratic by

nature (Bird, 2011), this study focused on the last two parts of the gendered determination

and therefore defined genderedness based on a relatively high percentage of male versus

female faculty in an individual college and on type of work being performed. By both of

these characteristics, two colleges were defined as masculine gendered: the STEM

college and the business college. Both STEM and business are historically masculine

fields with masculine stereotypes. In addition, for the university in the study, the STEM

college full-time faculty was composed of only 25.3% females and the business college

had only 22% female faculty. For comparison, the education college was 59.3% female,

the college of health was 71.1% female, the college of arts and humanities was 48%

female, and the interdisciplinary college was 67.1% female. For purposes of the study,

the term gendered refers to a combination of data from both the STEM and business

college (female faculty comprise < 40% of the total college faculty), while non-gendered

refers to a combination of data from the colleges of education, health, arts and

humanities, and the interdisciplinary college (female faculty comprise > 41% of the total

college faculty).

Data Analysis

Data were downloaded from the Qualtrics website into an IBM Statistical

Package for the Social Sciences (SPSS) statistical software compatible file format. No

specifically identifying data were collected for the survey, so there was no need to code

responses for anonymity once the data were opened on the SPSS platform.

In SPSS, data were analyzed for both descriptive and analytical statistics.

Responses were coded as follows: "Strongly agree/Strongly satisfied" = "1," "Somewhat

agree/Somewhat satisfied" = "2," "Somewhat disagree/Somewhat dissatisfied" = "3,"

"Strongly disagree/Strongly dissatisfied" = "4," "N/A" = "5." Lower coded answers

were therefore associated with higher satisfaction/more positive perception levels and

more participative organizational system management; whereas higher coded answers

were associated with lower satisfaction/more negative perception levels and more

authoritative organizational system management. Several items that were presented on

the survey in a reverse-coded aspect were recoded in SPSS to correctly align with the

remainder of the items. The recoded data were from items 3, 5, 7, 10, and 27-31.

Participant responses of either "decline to answer" or "N/A" for individual survey items

were treated as missing data for purpose of analyses.

Principal axis factor analyses were conducted on the main constructs of

organizational system type and climate to determine the validity of the presence of the

theorized sub-constructs. Principal component analysis (PCA) was conducted on

individual constructs and certain sub-constructs to determine factor loadings and to

generate principal component variables for statistical analytic use of the constructs as

single items (first component extractions were utilized). Multiple PCA were conducted

on the constructs of organizational system type (items 1-10) and job satisfaction (items

11, 12, 16, and 17) at all three organizational levels (department, college, and university),

climate perception (items 13-15, and 18-38) at the three organizational levels, and the

climate sub-constructs of leadership (items 14, and 32-36 at all three levels), collegial

interaction (items 21-26), resources/compensation (items 13, and 18-20 at all three

levels), mentoring (items 15, 37 and 38), pressure (items 27-29), and gender and race

(items 30 and 31).

For evaluation of the various hypotheses, the Mann-Whitney U test was used to determine any significance of differences between independent groups within the sample set, such as the differences in perceptions of climate and job satisfaction between males and females in gendered colleges. Mann-Whitney tests were used to evaluate hypotheses 1, 2a and 2b, and 4 (see a listing of the study hypotheses at the beginning of this chapter). A Wilcoxon signed-rank test was performed for the purpose of comparing related samples, such as for comparison of faculty perceptions of organizational system type between the various organizational levels. Wilcoxon signed-rank was conducted to test hypothesis 3. The Kruskal-Wallis H test was performed for analysis of multiple independent groups within a sample set, such as for faculty rank differences in climate perception. Kruskal-Wallis H tests were used to test hypotheses 5a, 5b, and 5c. Pearson product-moment correlation was used to determine if correlations existed between variables, such as between female faculty perceptions of climate and organizational system type. Pearson product-moment correlations were conducted to test hypotheses 6a1, 6a2, 6b1, and 6b2.

Limitations to the Study

The data collected for this study were limited by faculty voluntary participation in the study through taking the online survey. There was also a limitation associated with the number of surveys that were actually completed. Even in completed surveys, some participants did not answer various individual questions, as there was no forced answer required for any one item. As with any survey, another limitation related to the honesty of participant responses. Although it was assumed that survey respondents had no reason to reply with answers that were other than honest (no identifying information was

collected with survey responses), it was always possible that individuals felt the need to give responses that they considered to be more socially acceptable and have study data fall prey to social desirability bias. Social desirability bias problems can affect the validity of the survey and therefore the results of the entire study (M. F. King & Bruner, 1999).

Data for the study may also be somewhat skewed by the response rate for particular colleges or faculty over others. As the survey link was necessarily sent out alongside the researcher's identity, certain faculty may have felt more socially or collegially obligated to take the survey if they were familiar with the researcher in either social or professional capacities.

Summary

This study was proposed based on the idea that masculine gendered organizations display more autocratic or authoritarian management styles and that female employees within those organizations would be therefore more likely to report lower job satisfaction ratings. The study was designed to demonstrate that female university faculty in STEM discipline colleges (as compared with male faculty in STEM colleges or female faculty in non-STEM disciplines) would have lower job satisfaction ratings corresponding to their perceptions of authoritarian style organizational system types.

The study utilized one university for the study and an online survey link was emailed to all faculty at the institution. Faculty were asked to voluntarily participate in the survey. Total full-time faculty at the institution at the time of the survey numbered 761 and those faculty represented six different colleges, one of which was a STEM college.

SPSS was utilized to analyze the data from the survey, using a combination of

descriptive and analytical statics. Results are discussed in Chapter 4.

CHAPTER IV: RESULTS

Overview

This study was designed to address several research questions regarding the satisfaction levels of women in STEM (and otherwise masculine-dominant) discipline faculty positions. Survey response comparisons were made between faculty on several distinctions: males and females in masculine-gendered disciplines, masculine-gendered and non-masculine gendered disciplines, and hierarchical ranks. Comparisons were also made between faculty perceptions at different organizational levels (university, college, and department).

The hypotheses for this study were:

H_1 Female and male faculty differ in their perceptions of the combined constructs measuring organizational system type, climate, and job satisfaction.

H_{2a} Female faculty in male-dominated colleges (gendered colleges) report lower job satisfaction than their male colleagues.

H_{2b} Female faculty in male-dominated colleges (gendered colleges) report more negative climate perception than their male colleagues.

H_3 Faculty perceptions of organizational system type differ at the three organizational levels (department, college, and university).

H_4 Faculty perceptions of organizational system type are more authoritarian in gendered colleges than in non-gendered colleges.

H_{5a} Faculty differ by hierarchical ranks in their reports of job satisfaction.

H_{5b} Faculty differ by hierarchical ranks in their perceptions of climate.

H_{5c} Faculty differ by hierarchical ranks in their perceptions of organizational system type.

H_{6a1} Lower job satisfaction ratings by female faculty are correlated with perceptions of more authoritarian type organizational systems.

H_{6a2} Negative perceptions of climate by female faculty are correlated with perceptions of more authoritarian type organizational systems.

H_{6b1} Lower job satisfaction ratings by male faculty are correlated with perceptions of more authoritarian type organizational systems.

H_{6b2} Negative perceptions of climate by male faculty are correlated with perceptions of more authoritarian type organizational systems.

These hypotheses were each considered and analyzed in this chapter.

Data Analysis

Survey Results

Survey responses were downloaded from Qualtrics to an SPSS-compatible format. Responses were then analyzed using SPSS 20.

Total survey responses numbered 253. 218 of these were completed surveys and once data responses were filtered to include only those faculty who identified themselves as either full-time tenured, tenure track, or non-tenure track employees, the number of responses was reduced to 172 (a response rate of 22.6% of all full-time faculty). Although all 172 responses represented completed surveys, some of the individual survey items within this subset were not answered, left intentionally blank, or answered with a "decline to answer" or "N/A" choice, such that the actual data numbers vary from item to item and therefore from analysis to analysis. In each case, these responses were treated

as missing data for the purposes of this study. Of these 172 completed responses, Appendix C displays the frequencies reported for each item in the survey, including demographics (with the exception of a breakdown of reported race and ethnicity due to a very low n). Unfortunately, the response rate from the business college was too low for that college to be analyzed separately from the STEM college as a gendered unit.

To determine the statistical analyses used to check the validity of the various hypotheses, the normality of the data was first considered. The frequencies of responses for each of the survey items (other than demographics) were graphed via histograms and checked for skewness. Although some of the item responses conformed to assumptions of normal distribution, data from others were highly skewed based on visual inspection of the histograms. As the normality assumption was only met for a small number of the items, non-parametric statistical tests were used to make the majority of the analyses.

Before any hypotheses were tested, the hypothetical components were analyzed by confirmatory principal components analysis. Based on the literature, it was suggested that items 1-10 all contributed to the main construct of organization system management type with the sub-constructs of leadership (items 1-3 and 6), communication (items 5 and 7-9), interaction (item 4), and motivation (item 10) (Likert & Likert, 1976). The remainder of the items contributed to the main constructs of job satisfaction and climate perceptions, with items 11, 12, 16, and 17 to overall job satisfaction levels and the remaining items (13-15 and 18-38) to climate perceptions with the various sub-constructs of climate broken down as follows: items 13 and 18 to resources, items 14 and 32-36 to leadership, items 19 and 20 to compensation, items 21-26 to interaction, items 27-29 to pressure, items 30 and 31 to gender and race or ethnicity, and items 37 and 38 to

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mentoring (Bilimoria et al., 2006; Case Western Reserve University, 2008). One

additional item (item 15) also related to mentoring and was added to assess respondents'

satisfaction levels with mentoring received, not just the level of mentoring received

(following from a professional development construct item in the Case Western Reserve

University faculty climate survey).

Internal Reliability of Constructs and Sub-constructs

Items from the Bilimoria et al. (2006) scale (items 11-14, 16-18, 21, 22, 24-26,

and 32-38) were presented with relatively high alpha scores (all higher than .75) for their

respective constructs and sub-constructs of job satisfaction, leadership, mentoring,

resources, and interaction. Case Western Reserve University items (items 19, 20, 23, and

27-31) were grouped in the original scale without presentation of alpha scores.

Once reliability was tested for the current study's newly developed survey items,

high internal reliability was found for items as subdivided into the overall categories of

organizational system type (by individual organizational level of department, college, and

university), overall job satisfaction levels (by the three individual organizational levels,

as well), and perceptions of climate (reported based on the respondent's primary

organizational unit level), though smaller sub-construct levels did not always demonstrate

high internal reliability. With an assumption that alpha levels above .70 indicate internal

consistency reliability of the items (Nunnally, 1978), major constructs were either found

to have internal reliability or were within .03 of the mark (job satisfaction) for alpha

scores and were therefore considered on the low end of internal reliability for this study.

Most sub-constructs were determined to have internal reliability, as well, though the sub-

constructs of resources/compensation and mentoring had values just under .70 for alpha

scores. See Appendix D for Cronbach's alpha scores relative to each construct and sub-construct measured for the present survey.

Validity of Constructs and Sub-constructs

Factor Analysis and Principal Component Analysis of Organizational System Type

A principal axis factor analysis with varimax rotation was performed to determine if the theoretical sub-constructs were valid for the main construct of organizational system type. As four sub-constructs were proposed by Likert and Likert (1976) for the selected items in this survey, four factors were requested to correspond to the sub-constructs of leadership, communication, interaction, and motivation. This process was conducted for each of the three organizational levels at which items 1-10 were asked. At the department level, after rotation the variance accounted for by each of the four factors was 29.0% for the first factor, 13.1% for the second factor, 12.3% for the third factor, and 11.8% for the fourth factor. At the college level, after rotation the variance accounted for by each of the four factors was 21.8% for the first factor, 18.8% for the second factor, 12.2% for the third factor, and 8.5% for the fourth factor. At the university level, after rotation the variance accounted for by each of the four factors was 31.6% for the first factor, 10.7% for the second factor, 8.6% for the third factor, and 5.1% for the fourth factor. Table 4.1 shows the items and factor loadings after rotation, with only those loadings greater than .30 shown.

Table 4.1

Factor Loadings for Confirmatory Factor Analysis of Organizational System Management Type Construct with Varimax Rotation of Organizational System Management Type Scales: Department Level, College Level, and University Level

Department Level

Scale Item	sub-construct	Forced Factor Loading			
		1	2	3	4
6. Admin demonstrate complete confidence…	Lead	**.776**		.134	
2. I feel completely comfortable talking to…	Lead	**.749**	.396		
8. Admin have an open mind…	Comm	**.719**		.342	**.400**
1. I have complete confidence in admin…	Lead	**.689**		.341	**.488**
10. R Faculty are dissatisfied…	Motiv	**.468**	**.546**		**.405**
4. From my experience serving on…	Interac	.392	**.512**		
5. R The direction of information flow…	Comm		**.462**		
3. R My ideas are seldom…	Lead	**.444**		**.665**	
7. R Admin are unaware…	Comm	.351		**.436**	.316
9. Faculty have an open mind…	Comm				**.591**

College Level

Scale Item	sub-construct	Forced Factor Loading			
		1	2	3	4
1. I have complete confidence in admin…	Lead	**.804**	.302		
2. I feel completely comfortable talking to…	Lead	**.660**	**.432**	.344	
8. Admin have an open mind…	Comm	**.627**	**.481**		
10. R Faculty are dissatisfied…	Motiv	**.521**		.304	.392
6. Admin demonstrate complete confidence…	Lead	**.433**	**.724**		
3. R My ideas are seldom…	Lead		**.633**	**.422**	
4. From my experience serving on…	Interac		**.548**	.326	
7. R Admin are unaware…	Comm			**.603**	
5. R The direction of information flow…	Comm			**.465**	
9. Faculty have an open mind…	Comm				**.597**

University Level

Scale Item	sub-construct	Forced Factor Loading			
		1	2	3	4
1. I have complete confidence in admin…	Lead	**.829**			
6. Admin demonstrate complete confidence…	Lead	**.789**			
8. Admin have an open mind…	Comm	**.739**	.309		
2. I feel completely comfortable…	Lead	**.712**		**.427**	
4. From my experience serving on…	Interac	**.614**	.330		
3. R My ideas are seldom…	Lead	**.416**			
10. R Faculty are dissatisfied…	Motiv	.318	**.682**		
7. R Admin are unaware…	Comm	.362	**.421**		
5. R The direction of information flow…	Comm			**.636**	
9. Faculty have an open mind…	Comm				**.556**

Note. Factor loadings >.40 are in bold. Only factor loadings > .30 are presented. R represents reverse-coded items. Scale items are adapted from Likert and Likert (1976). Full scale items are found in Appendix B. Sub-constructs are Leadership, Communication, Interaction, and Motivation.

The factors did not load appropriately to support the theoretical sub-constructs for any of the three organizational levels. Factors did not cluster well into sub-construct defined groupings (Table 4.1). In all three cases, most components loaded into the first factor, but there were multiple incidents of cross-loading and multiple sub-constructs represented within single factors. The literature-suggested sub-constructs for organizational system type were not upheld by the present study and were removed from consideration for the remainder of the analyses.

A principal components analysis (with varimax rotation on one level) was also conducted on items 1-10 for all three organizational levels to see if the multiple items and sub-constructs within the main construct of organization system management type could reduced to a smaller number of variables. At the departmental level, one component was extracted with that component accounting for 60.2% of the total variance. No loadings were under .30. At the college level, two components were extracted. As the first

component accounted for 52.9% of the variance, it was determined that no rotation was necessary. No factor loadings for the first component were less than .30. At the university level, three factors were extracted. The first component accounted for less than half of the total variance (46.5%), so the three components were rotated, based on eigenvalues greater than 1.0 and a scree plot. After rotation, 38.5% of the variance was accounted for by the first component, 18.2% of the variance was accounted for by the second component, and 11.2% of the variance was accounted for by the third component. Table 4.2 shows the items and factor loadings, with only those loadings greater than .30 shown.

Table 4.2

Component Loadings for Principal Components Analysis of Organizational System Type Construct: Department Level, College Level, and University Level (Varimax Rotation at University Level)

Department Level

Scale Item	Component 1
2. I feel completely comfortable talking to…	**.911**
8. Admin have an open mind…	**.908**
1. I have complete confidence in admin…	**.876**
6. Admin demonstrate complete confidence…	**.866**
10. R Faculty are dissatisfied…	**.854**
3. R My ideas are seldom…	**.764**
4. From my experience serving on…	**.740**
7. R Admin are unaware…	**.700**
9. Faculty have an open mind…	**.578**
5. R The direction of information flow…	**.405**

College Level

Scale Item	Components 1	2
3. R My ideas are seldom…	**.886**	
2. I feel completely comfortable talking to…	**.861**	
6. Admin demonstrate complete confidence…	**.841**	
8. Admin have an open mind…	**.809**	
4. From my experience serving on…	**.731**	
1. I have complete confidence in admin…	**.707**	.343
7. R Admin are unaware…	**.671**	**-.485**
5. R The direction of information flow…	**.640**	
9. Faculty have an open mind…	**.587**	
10. R Faculty are dissatisfied…	**.412**	**.754**

University Level - Rotated Matrix

	Components		
Scale Item	1	2	3
1. I have complete confidence in admin…	**.873**		
6. Admin demonstrate complete confidence…	**.838**		
8. Admin have an open mind…	**.805**		
4. From my experience serving on…	**.762**		
2. I feel completely comfortable…	**.714**	.382	
3. R My ideas are seldom…	**.482**	.399	-.347
5. R The direction of information flow…		**.882**	
10. R Faculty are dissatisfied…	**.472**	**.564**	
7. R Admin are unaware…	**.431**	**.543**	
9. Faculty have an open mind…			**.918**

Note. Factor loadings >.40 are in bold. Only factor loadings > .30 are presented. R represents reverse-coded items. Scale items are adapted from Likert and Likert (1976). Full scale items are found in Appendix B.

The results suggest that, at both the departmental level and college levels, items 1-10 form a coherent component within the main construct of organizational system type. Visual inspection of the scree plots for each also supported this conclusion. At the university level, the main construct was more complicated, with three components extracted, but there were only two items (items 5 and 9) that were not substantially related to the other items and, once removed, allowed for the remaining items to form a coherent construct aggregated within the first component. Confirming this, a second principal component analysis was performed on university level items with items 5 and 9 removed, and one component was extracted with that component accounting for 56% of the variance (Table 4.3). The scree plot for this second analysis supported the retention of one component.

Table 4.3

Component Loadings for Principal Components Analysis
of Organizational System Type Construct: University
Level (Revised)

University Level (Revised)

Scale Item	Component 1
1. I have complete confidence in admin…	**.866**
8. Admin have an open mind…	**.837**
2. I feel completely comfortable talking to…	**.800**
6. Admin demonstrate complete confidence…	**.793**
4. From my experience serving on…	**.740**
10. R Faculty are dissatisfied…	**.681**
7. R Admin are unaware…	**.629**
3. R My ideas are seldom…	**.592**

Note. Factor loadings >.40 are in bold. R represents reverse-coded items. Scale items are adapted from Likert and Likert (1976). Full scale items are found in Appendix B.

Cronbach's alpha was used at each of the three organizational levels of department, college, and university in order to determine if the data from the ten items used to represent faculty perceptions of organizational system type created a reliable scale. At the departmental level, the alpha was .92, at the college level, the alpha was .9, and at the university level, the alpha was .86 indicating a high internal reliability for the items at each of the three levels. Similar to findings from the principal component analysis, item statistics in the analysis of Cronbach's alpha demonstrated that removal of two items (items 5 and 9) would yield slightly higher alpha scores at the university level. Alpha scores were also shown to be slightly higher with removal of the same two items at the college level, and with removal of one of the same items (item 9) at the department level. Accordingly, corrected item correlation was also low (<.40) for these items.

As only one component was extracted for the departmental level and both factor loadings and inspection of the scree plot at college level indicated the presence of one coherent construct for all ten items, all items were retained for the departmental and college levels. However, at the university level, factor loadings, scree plot interpretation, and alpha values all pointed to a preference for removal of items 5 and 9, such that the decision was made to remove items 5 and 9 from the university level scale. Final alpha values are listed in Appendix D.

Principal Component Analysis of Job Satisfaction

To test the main construct validity for job satisfaction, a principal component analysis with varimax rotation was performed to determine whether items 11, 12, 16, and 17 combined and could be reduced to represent one component. As items 11 and 12 were measured at the three different levels of department, college, and university, this analysis was performed three times. Unfortunately, the four items separated into two different components. In each of the three different organizational level cases, the two components were rotated by using eigenvalues over 1.0 and the scree plot. At the department level, after rotation to show clustering of items within the various components, 42.6% of variance was explained by the first component and 37.6% of variance was explained by the second component. At the college level, after rotation, 41.5% of variance was explained by the first component and 37.6% of variance was explained by the second component. At the university level, after rotation, 42% of variance was explained by the first component and 38.5% of variance was explained by the second component. Table 4.4 shows the items and factor loadings, with only those loadings greater than .30 shown. Relatively low percentages of variance were described

by the first component in each of the three analyses, and loadings and scree plots for each

level analysis pointed to the retention of two components. The first component contained

items 11 and 12, while the second component contained items 15 and 16.

Table 4.4

Component Loadings for Principal Components Analysis of Job
Satisfaction: Department Level, College Level, and University Level
(Varimax Rotation at University Level)

Department Level

	Components	
Scale Item	1	2
11. My overall experience of collegiality…	**.928**	
12. My overall experience of being a faculty…	**.897**	
17. Time available for scholarly work		**.867**
16. Teaching responsibilities		**.838**

College Level

	Components	
Scale Item	1	2
11. My overall experience of collegiality…	**.926**	
12. My overall experience of being a faculty…	**.873**	
17. Time available for scholarly work		**.867**
16. Teaching responsibilities		**.828**

University Level

	Components	
Scale Item	1	2
11. My overall experience of collegiality…	**.937**	
12. My overall experience of being a faculty…	**.882**	
17. Time available for scholarly work		**.863**
16. Teaching responsibilities		**.849**

Note. Factor loadings >.40 are in bold. Only factor loadings > .30 are
presented. R represents reverse-coded items. Scale items are adapted from
Bilimoria et. al (2006).

To check internal reliability for job satisfaction items, Cronbach's alpha was used at each of the three organizational levels of department, college, and university in order to determine whether the data from the four items used to represent faculty perceptions of job satisfaction created a reliable scale. At department level, the alpha was .69, at the college level, the alpha was .68, and at the university level, the alpha was .67 which demonstrated only a moderate internal reliability for the items at each of the three levels. Item statistics in the analysis of Cronbach's alpha did not demonstrate that removal of any items would yield higher alpha scores at any of the three measured levels, however, so all four items were kept in the scale representative of faculty perceptions of job satisfaction.

Factor Analysis and Principal Component Analysis of Climate

A principal axis factor analysis with varimax rotation was performed to determine if the theoretical sub-constructs were valid for the main construct of climate perception. Four sub-constructs were proposed by Bilimoria et al. (2006) and an additional three sub-constructs were outlined within the original Case Western Reserve University (2008) survey for the selected items in this survey. Therefore, a total of seven factors were requested to correspond to the sub-constructs of leadership, resources, interaction, mentoring, compensation, pressure, and gender and race or ethnicity. This process was conducted for each of the three organizational levels at which items 13-15 were asked. At the department level, after rotation the variance accounted for by each of the seven factors was 23.0% for the first factor, 17.9% for the second factor, 7.7% for the third factor, 6.5% for the fourth factor, 6.2% for the fifth factor, 6.1% for the sixth factor, and 2.2% for the seventh factor. At the college level, after rotation the variance accounted for

by each of the seven factors was 19.6% for the first factor, 18.2% for the second factor, 8.7% for the third factor, 7.3% for the fourth factor, 6.8% for the fifth factor, 4.9% for the sixth factor, and 4.0% for the seventh factor. At the university level, after rotation the variance accounted for by each of the seven factors was 18.8% for the first factor, 18.4% for the second factor, 8.3% for the third factor, 7.1% for the fourth factor, 6.2% for the fifth factor, 5.4% for the sixth factor, and 4.6% for the seventh factor. Table 4.5 shows the items and factor loadings after rotation, with only those loadings greater than .30 shown.

The factors loaded in a way that supports the majority of the theoretical sub-constructs within the three organizational levels, though the presence of six and not seven sub-constructs is best supported through factor loadings, visual inspection of scree plots, and eigenvalues greater than (or very near to) 1.0. The analysis was, therefore, re-run at all three levels to extract six factors. At the departmental level, after rotation the variance accounted for by each of the now six factors was 23.4% for the first factor, 17.8% for the second factor, 7.7% for the third factor, 6.6% for the fourth factor, 6.0% for the fifth factor, and 5.9% for the sixth factor. At the college level, after rotation the variance accounted for by each of the six factors was 19.0% for the first factor, 18.6% for the second factor, 9.9% for the third factor, 7.8% for the fourth factor, 7.0% for the fifth factor, and 4.3% for the sixth factor. At the university level, after rotation the variance accounted for by each of the six factors was 19.8% for the first factor, 18.3% for the second factor, 8.4% for the third factor, 7.3% for the fourth factor, 6.8% for the fifth factor, and 5.1% for the sixth factor. Table 4.6 shows the items and factor loadings after rotation, with only those loadings greater than .30 shown.

Table 4.5

Factor Loadings for Confirmatory Factor Analysis of Climate Construct with Varimax Rotation: Department Level, College Level, and University Level - Six Factors

Department Level

Scale Item	sub-construct	Forced Factor Loading						
		1	2	3	4	5	6	7
32. Is an effective admin for the unit	Lead	**.888**						
33. Is an effective admin for me	Lead	**.882**						
34. Articulates a clear vision…	Lead	**.839**						
36. Helps me obtain the resources…	Lead	**.799**						
35. Shares resources/opportunities…	Lead	**.783**	.323					
14. My satisfaction with involvement…	Lead	**.769**	.312					
13. My access to resources…	Resour	**.542**						**.404**
15. My satisfaction with overall mentoring…	Mentor	.380	.329				.352	
22. Colleagues in my primary unit can be…	Interac	.315	**.821**					
23. I am comfortable asking my colleagues…	Interac	.366	**.748**					
21. Colleagues in my primary unit value…	Interac	.349	**.737**					
25. Colleagues in my primary unit solicit…	Intearc	**.427**	**.691**					
26. I feel professionally welcome…	Interac	.318	**.685**					
24. Colleagues in my primary unit provide…	Interac		**.679**					
28. R I have to work harder…	Press			.866				
27. R I constantly feel under…	Press		.354	**.609**				
29. R I feel pressure…	Press			**.536**				
19. Salary	Compen				**.822**			
20. Benefits	Compen				**.645**			
18. Space…	Resour				**.422**			
30. R Gender makes a difference…	Gen/Rac		.366			**.787**		
31. R Race or ethnicity makes a difference…	Gen/Rac					**.621**		
38. To what extent do you receive informal…	Mentor						**.700**	
37. To what extent do you receive formal…	Mentor						**.623**	

(continued)

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College Level

Scale Item	sub-construct	1	2	3	4	5	6	7
		Forced Factor Loading						
22. Colleagues in my primary unit can be…	Interac	**.807**	.317					
21. Colleagues in my primary unit value…	Interac	**.761**	.318					
23. I am comfortable asking my colleagues…	Interac	**.751**	.330					
26. I feel professionally welcome…	Intearc	**.705**	.370					
25. Colleagues in my primary unit solicit…	Interac	**.674**						
24. Colleagues in my primary unit provide…	Interac	**.650**		.335				
30. R Gender makes a difference…	Gen/Rac	**.541**						
14. My satisfaction with involvement…	Lead	**.429**		.383				
32. Is an effective admin for the unit	Lead		**.897**					
33. Is an effective admin for me	Lead	.321	**.860**					
34. Articulates a clear vision…	Lead		**.802**					
35. Shares resources/opportunities…	Lead	.333	**.765**					
36. Helps me obtain the resources…	Lead	.326	**.747**					
38. To what extent do you receive informal…	Mentor			**.642**				
15. My satisfaction with overall mentoring…	Mentor	.323		**.625**				
37. To what extent do you receive formal…	Mentor			**.592**				
28. R I have to work harder…	Press				**.928**			
27. R I constantly feel under…	Press	.396			**.537**			
19. Salary	Compen					**.810**		
20. Benefits	Compen					**.598**		
18. Space…	Resour					.381		
31. R Race or ethnicity makes a difference…	Gen/Rac	.361					**.679**	
29. R I feel pressure…	Press				**.441**		**.457**	
13. My access to resources…	Resour					.317		**.629**

(continued)

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University Level

Scale Item	sub-construct	Forced Factor Loading						
		1	2	3	4	5	6	7
22. Colleagues in my primary unit can be…	Interac	**.846**						
23. I am comfortable asking my colleagues…	Interac	**.772**	.307					
21. Colleagues in my primary unit value…	Interac	**.755**	.301					
25. Colleagues in my primary unit solicit…	Intearc	**.723**						
26. I feel professionally welcome…	Interac	**.701**	.379					
24. Colleagues in my primary unit provide…	Interac	**.681**		.349				
32. Is an effective admin for the unit	Lead		**.889**					
33. Is an effective admin for me	Lead	.302	**.872**					
34. Articulates a clear vision…	Lead		**.838**					
35. Shares resources/opportunities…	Lead	.339	**.821**					
36. Helps me obtain the resources…	Lead	.308	**.805**					
13. My access to resources…	Resour			**.758**				
15. My satisfaction with overall mentoring…	Mentor			**.749**				
14. My satisfaction with involvement…	Lead			**.580**				
28. R I have to work harder…	Press				**.760**			
27. R I constantly feel under…	Press	**.423**			**.641**			
29. R I feel pressure…	Press				**.571**			
19. Salary	Compen					**.822**		
20. Benefits	Compen					**.567**		
18. Space…	Resour					.390		
37. To what extent do you receive formal…	Mentor						**.684**	
38. To what extent do you receive informal…	Mentor						**.630**	
31. R Race or ethnicity makes a difference…	Gen/Rac							**.593**
30. R Gender makes a difference…	Gen/Rac	**.478**						**.541**

Note. Factor loadings >.40 are in bold. Only factor loadings > .30 are presented. R represents reverse-coded items. Scale items are adapted from Bilimoria et. al (2006) and Case Western Reserve (2008). Full scale items are found in Appendix B. Sub-constructs are Leadership, Interaction, Resources, Compensation, Mentoring, Gender & Race, and Pressure.

Table 4.6

Factor Loadings for Confirmatory Factor Analysis of Climate Construct with Varimax Rotation: Department Level, College Level, and University Level - Six Factors

Department Level

Scale Item	sub-construct	Forced Factor Loading 1	2	3	4	5	6
33. Is an effective admin for me	Lead	**.888**					
32. Is an effective admin for the unit	Lead	**.864**					
34. Articulates a clear vision…	Lead	**.837**					
36. Helps me obtain the resources…	Lead	**.813**					
35. Shares resources/opportunities…	Lead	**.791**	.317				
14. My satisfaction with involvement…	Lead	**.773**	.303				
13. My access to resources…	Res/Com	**.562**					
15. My satisfaction with overall mentoring…	Mentor	.389	.328			.344	.308
22. Colleagues in my primary unit can be…	Interac	.314	**.819**				
21. Colleagues in my primary unit value…	Interac	.348	**.747**				
23. I am comfortable asking my colleagues…	Interac	.387	**.727**				
26. I feel professionally welcome…	Intearc	**.430**	**.694**				
25. Colleagues in my primary unit solicit…	Interac		**.688**				
24. Colleagues in my primary unit provide…	Interac	.341	**.662**				
28. R I have to work harder…	Press			**.857**			
27. R I constantly feel under…	Press		.354	**.614**			
29. R I feel pressure…	Press			**.521**			
19. Salary	Res/Com				**.815**		
20. Benefits	Res/Com				**.663**		
18. Space…	Res/Com				.399		
38. To what extent do you receive informal…	Mentor					**.704**	
37. To what extent do you receive formal…	Mentor					**.618**	
31. R Race or ethnicity makes a difference…	Gen/Rac						**.743**
30. R Gender makes a difference…	Gen/Rac						**.596**

(continued)

College Level

Scale Item	sub-construct	1	2	3	4	5	6
			Forced	Factor	Loading		
22. Colleagues in my primary unit can be…	Interac	**.799**	.317				
23. I am comfortable asking my colleagues…	Interac	**.753**	.350				
21. Colleagues in my primary unit value…	Interac	**.732**	.313				
26. I feel professionally welcome…	Intearc	**.685**	.368				
25. Colleagues in my primary unit solicit…	Interac	**.670**		.310			
24. Colleagues in my primary unit provide…	Interac	**.651**	.302	.397			
30. R Gender makes a difference…	Gen/Rac	**.495**					**.494**
32. Is an effective admin for the unit	Lead		**.880**				
33. Is an effective admin for me	Lead	.320	**.872**				
34. Articulates a clear vision…	Lead		.799				
35. Shares resources/opportunities…	Lead	.327	**.778**				
36. Helps me obtain the resources…	Lead	.328	**.758**				
15. My satisfaction with overall mentoring…	Mentor	.311		**.692**			
38. To what extent do you receive informal…	Mentor			**.592**			
37. To what extent do you receive formal…	Mentor			**.576**			
14. My satisfaction with involvement…	Lead	**.451**		**.472**		.322	
28. R I have to work harder…	Press				**.797**		
27. R I constantly feel under…	Press	**.403**			**.605**		
29. R I feel pressure…	Press				**.531**		.334
19. Salary	Res/Com					**.740**	
20. Benefits	Res/Com					**.649**	
18. Space…	Res/Com			.307	.396		
13. My access to resources…	Res/Com			.362	.364		
31. R Race or ethnicity makes a difference…	Gen/Rac	.332					**.565**

(continued)

University Level

Scale Item	sub-construct	Forced Factor Loading 1	2	3	4	5	6
22. Colleagues in my primary unit can be…	Interac	**.824**					
21. Colleagues in my primary unit value…	Interac	**.773**					
23. I am comfortable asking my colleagues…	Interac	**.768**	.318				
25. Colleagues in my primary unit solicit…	Intearc	**.748**					
26. I feel professionally welcome…	Interac	**.723**	.369				
24. Colleagues in my primary unit provide…	Interac	**.703**		.339			
30. R Gender makes a difference…	Gen/Rac	**.548**					.381
32. Is an effective admin for the unit	Lead		**.899**				
33. Is an effective admin for me	Lead	.314	**.875**				
34. Articulates a clear vision…	Lead		**.838**				
35. Shares resources/opportunities…	Lead	.343	**.822**				
36. Helps me obtain the resources…	Lead	.341	**.778**				
13. My access to resources…	Res/Com			**.780**			
15. My satisfaction with overall mentoring…	Mentor			**.717**			
14. My satisfaction with involvement…	Lead			**.593**			
28. R I have to work harder…	Press				**.705**		
29. R I feel pressure…	Press				**.646**		
27. R I constantly feel under…	Press	**.412**			**.565**		
19. Salary	Res/Com					**.642**	
20. Benefits	Res/Com					**.622**	
18. Space…	Res/Com					**.477**	
38. To what extent do you receive informal…	Mentor						**.562**
31. R Race or ethnicity makes a difference…	Gen/Rac	.377			.321		**.425**
37. To what extent do you receive formal…	Mentor					.340	**.423**

Note. Factor loadings >.40 are in bold. Only factor loadings > .30 are presented. R represents reverse-coded items. Scale items are adapted from Bilimoria et. al (2006) and Case Western Reserve (2008). Full scale items are found in Appendix B. Sub-constructs are Leadership, Interaction, Resources/Compensation, Mentoring, Gender & Race, and Pressure.

In all three cases (for all three organizational levels), there were multiple incidents of cross-loading, but the secondary (or occasionally tertiary) loadings tended to be weak ($< .40$). These loadings supported five of the seven predicted sub-constructs, with a combination of the remaining two sub-constructs comprising an additional factor. Therefore, based upon the principal axis factor analysis, six constructs were extracted to correspond with the five original climate sub-constructs of leadership, interaction, pressure, mentoring, resources and compensation, and gender and race or ethnicity. The original sub-constructs of resources and compensation were combined based upon their frequent loading within the same factors.

Cronbach's alpha was performed to test for internal reliability of the various climate sub-construct items. For the sub-construct of interaction, items had an alpha value of .94, for the sub-construct of pressure the alpha was .76, and for the sub-construct of gender and race or ethnicity the alpha was .72. Items within the sub-constructs of leadership, resources and compensation, and mentoring were measured at all three organizational levels, such that those sub-constructs have three alpha values. The sub-construct of leadership yielded an alpha of .96 at department level, .93 at college level, and .91 at university level. Items within the sub-construct of resources and compensation had an alpha of .63 at department level, .70 at college level, and .65 at university level. Items within the sub-construct of mentoring presented an alpha of .67 at the department level, .74 at college level, and .69 at university level.

A principal components analysis with varimax rotation was also conducted on the climate items 13-15 and 18-38 to see if the multiple items and sub-constructs within the main construct of climate perception could be reduced into a smaller number of variables.

As items 13-15 were measured at the three different levels of department, college, and university, this analysis was performed three times. At the departmental level, five components were extracted with the first component accounting for 45.6% of the total variance. Even though this value is below 50%, nearly all items loaded into the first factor (the only exceptions were items 19 and 20) and a visual inspection of the scree plot indicated that the climate items formed a coherent construct aggregated within the first component. At the college level, five components were extracted with the first component accounting for 45.3% of the total variance. Even though this value is below 50%, nearly all items loaded into the first component (the only exception was item 20) and a visual inspection of the scree plot indicated that the climate items formed a coherent construct aggregated within the first component. At the university level, six components were extracted with the first component accounting for 40.4% of the total variance. Nearly all items loaded into the first component (exceptions were found with items 13 and 20), however, visual inspection of the scree plot indicated that at least two components should be retained and after extraction and rotation for two components, the first component accounted for 34.3% of the total variance and the second component accounted for 17.3% of the total variance. Table 4.7 shows the items and component loadings for the rotated components, with loadings less than .3 omitted for clarity.

Table 4.7

Component Loadings for Principal Components Analysis of Climate Construct: Department Level, College Level, and University Level

Department Level

Scale Item	Components				
	1	2	3	4	5
33. Is an effective admin for me	**.894**				
32. Is an effective admin for the unit	**.873**				
34. Articulates a clear vision…	**.862**				
36. Helps me obtain the resources…	**.827**	.327			
14. My satisfaction with involvement…	**.816**				
35. Shares resources/opportunities…	**.816**	.324			
13. My access to resources…	**.631**				
21. Colleagues in my primary unit value…	.372	**.789**			
22. Colleagues in my primary unit can be…	.354	**.788**			
25. Colleagues in my primary unit solicit…		**.767**			
26. I feel professionally welcome…	**.455**	**.741**			
23. I am comfortable asking my colleagues…	**.420**	**.737**			
30. R Gender makes a difference…		**.694**			
24. Colleagues in my primary unit provide…	.368	**.690**			
31. R Race or ethnicity makes a difference…		**.500**			.398
15. My satisfaction with overall mentoring…	.392	**.447**			**.440**
28. R I have to work harder…			**.791**		
29. R I feel pressure…			**.786**		
27. R I constantly feel under…		.345	**.683**		
20. Benefits				**.813**	
19. Salary				**.787**	
18. Space…				**.561**	
38. To what extent do you receive informal…					**.743**
37. To what extent do you receive formal…					**.725**

(continued)

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College Level

Scale Item	Components				
	1	2	3	4	5
21. Colleagues in my primary unit value…	**.770**	.330			
30. R Gender makes a difference…	**.751**				
22. Colleagues in my primary unit can be…	**.747**	.354	.352		
23. I am comfortable asking my colleagues…	**.740**	.388			
26. I feel professionally welcome…	**.731**	.393			
25. Colleagues in my primary unit solicit…	**.730**				
24. Colleagues in my primary unit provide…	**.666**	.341	.331		
31. R Race or ethnicity makes a difference…	**.595**				
33. Is an effective admin for me	.315	**.887**			
32. Is an effective admin for the unit		**.883**			
34. Articulates a clear vision…		**.840**			
35. Shares resources/opportunities…	.351	**.799**			
36. Helps me obtain the resources…	.378	**.786**			
20. Benefits			**.724**		
19. Salary			**.666**		
13. My access to resources…		.338	**.651**		
14. My satisfaction with involvement…	.359	.371	**.576**		
18. Space…			**.534**		.303
29. R I feel pressure…				**.790**	
28. R I have to work harder…				**.779**	
27. R I constantly feel under…	.337			**.603**	-.353
38. To what extent do you receive informal…					**.734**
37. To what extent do you receive formal…					**.711**
15. My satisfaction with overall mentoring…	.391		.356		**.576**

(continued)

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University Level

Scale Item	Components 1	2	3	4	5	6
22. Colleagues in my primary unit can be…	.831					
21. Colleagues in my primary unit value…	.805					
23. I am comfortable asking my colleagues…	.795	.318				
25. Colleagues in my primary unit solicit…	.792					
26. I feel professionally welcome…	.757	.379				
24. Colleagues in my primary unit provide…	.734		.318			
30. R Gender makes a difference…	.643					.369
32. Is an effective admin for the unit		.899				
33. Is an effective admin for me	.318	.880				
34. Articulates a clear vision…		.872				
35. Shares resources/opportunities…	.340	.844				
36. Helps me obtain the resources…	.343	.807				
13. My access to resources…			.843			
15. My satisfaction with overall mentoring…			.755			
14. My satisfaction with involvement…			.730			
29. R I feel pressure…				.837		
28. R I have to work harder…	.315			.750		
27. R I constantly feel under…	.437			.589		-.314
19. Salary					.747	
20. Benefits					.743	
18. Space…					.676	
38. To what extent do you receive informal…						.736
37. To what extent do you receive formal…					.329	.635
31. R Race or ethnicity makes a difference…	.433			.373		.494

Note. Factor loadings >.40 are in bold. Only factor loadings > .30 are presented. R represents reverse-coded items. Scale items are adapted from Bilimoria et. al (2006) and Case Western Reserve (2008). Full scale items are found in Appendix B.

Cronbach's alpha was used at each of the three organizational levels of department, college, and university to determine if data from the multiple items used to represent faculty perceptions of climate created a reliable scale. At the departmental level, the alpha was .94, at the college level, the alpha was .94, and at the university level, the alpha was .93. Although alpha levels were shown to improve very slightly with removal of several items at each level (items 18, 19, 20, and 29 at both the department and college levels and those same items with the addition of item 13 at the university level), the alpha improvement was <.01 in each case. As all items were also important for the representation of the various climate sub-constructs, all items were retained. At all three organizational levels, alpha values indicated high internal reliability. However, a large number of items lends itself to higher alpha values; the best use of alpha is to describe items that aggregate into only one component (Cortina, 1993), such that the alpha values for the construct of climate perception may not accurately represent the high item, multi-dimensional construct of climate for this study.

Based on the findings from the confirmatory factor analyses, a revised diagram for hypothesized relationships for a variable framework was created to indicate the factor analysis driven lack of evidence for the previously included sub-constructs of organization system type (Figure 4.1).
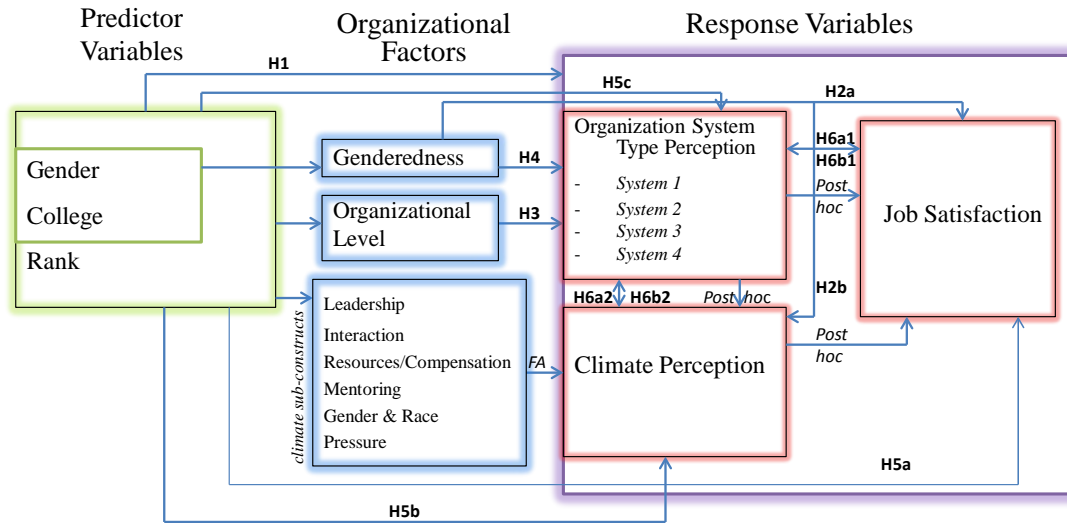
Figure 4.1. Revised hypothesized relationships for a variable framework. "*FA*" is factor analysis.

Hypothesis 1

For testing of the hypothesis: H_1 Female and male faculty differ in their perceptions of the combined constructs measuring organizational system type, climate, and job satisfaction, a Mann-Whitney U test was performed. Prior to the Mann-Whitney test, it was necessary to reduce the three constructs into a smaller number of variables at each of the three measured organizational levels (department, college, and university), such that a principal component analysis was performed for each of the levels. Seven components were extracted at the department level, eight at the college level, and nine at the university level. After rotation, general agreement was found among components and major constructs and sub-constructs. However, there was some cross-loading between individual items within constructs, demonstrating some potential for cross-construct overlap. This was particularly true of items related to job satisfaction, already mentioned to have moderate internal reliability (Table 4.8).

Table 4.8

Component Loadings for Principal Components Analysis of Constructs
Combined: Department Level, College Level, and University Level

Department Level

Scale Item	Components						
	1	2	3	4	5	6	7
33. Is an effective admin for me	**.917**						
32. Is an effective admin for the unit	**.892**						
1. I have complete confidence in admin…	**.891**						
34. Articulates a clear vision…	**.888**						
8. Admin have an open mind…	**.860**						
2. I feel completely comfortable talking to…	**.851**	.384					
6. Admin demonstrate complete confidence…	**.850**						
35. Shares resources/opportunities…	**.821**	.310					
14. My satisfaction with involvement…	**.812**	.321					
36. Helps me obtain the resources…	**.808**	.347					
10. R Faculty are dissatisfied…	**.690**	**.422**					
12. My overall experience of being a faculty…	**.665**	**.466**					
3. R My ideas are seldom…	**.636**	.336					
7. R Admin are unaware…	**.626**		**.453**				
13. My access to resources…	**.591**	**.432**					
9. Faculty have an open mind…	**.510**						**.645**
22. Colleagues in my primary unit can be…	.368	**.819**					
25. Colleagues in my primary unit solicit…		**.776**					
23. I am comfortable asking my colleagues…	**.414**	**.769**					
26. I feel professionally welcome…	**.450**	**.765**					
21. Colleagues in my primary unit value…	.380	**.764**					
24. Colleagues in my primary unit provide…	.388	**.692**					
11. My overall experience of collegiality…	**.476**	**.688**					

(continued)

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Department Level (cont.)

Scale Item	1	2	3	4	5	6	7
				Components			
4. From my experience serving on…	**.542**	**.592**					
30. R Gender makes a difference…		**.577**	.397				
15. My satisfaction with overall mentoring…	**.417**	**.446**	.302			.338	
29. R I feel pressure…			**.740**				
31. R Race or ethnicity makes a difference…		.336	**.603**				
28. R I have to work harder…		**.442**	**.531**		.322		
20. Benefits				**.779**			
18. Space…				**.745**			.332
19. Salary				**.727**			
16. Teaching responsibilities					**.831**		
17. Time available for scholarly work					**.800**		
38. To what extent do you receive informal…						**.726**	
37. To what extent do you receive formal…					.348	**.560**	**.410**
27. R I constantly feel under…		**.498**				**-.499**	
5. R The direction of information flow…							**.682**

College Level

Scale Item	1	2	3	4	5	6	7	8
				Components				
22. Colleagues in my primary unit can be…	**.787**	.312						
26. I feel professionally welcome…	**.764**	.371						
21. Colleagues in my primary unit value…	**.741**	.350						
25. Colleagues in my primary unit solicit…	**.732**							
23. I am comfortable asking my colleagues…	**.725**	.350	.351					
30. R Gender makes a difference…	**.640**						.311	
24. Colleagues in my primary unit provide…	**.605**		.321					
28. R I have to work harder…	**.414**			.311		.339	.394	**-.409**
33. Is an effective admin for me	.331	**.885**						

(continued)

Scale Item	Components							
	1	2	3	4	5	6	7	8
32. Is an effective admin for the unit		**.870**						
34. Articulates a clear vision…		**.852**						
35. Shares resources/opportunities…	.303	**.829**						
36. Helps me obtain the resources…	.351	**.783**						
9. Faculty have an open mind…			**.770**					
11. My overall experience of collegiality…	**.439**		**.683**					
1. I have complete confidence in admin…			**.613**	.349		.323		
10. R Faculty are dissatisfied…	.331		**.572**				**.438**	
8. Admin have an open mind…			**.564**	**.431**				
2. I feel completely comfortable talking to…	.358		**.547**	**.431**				
12. My overall experience of being a faculty…	**.406**	.315	**.532**					
3. R My ideas are seldom…				**.746**				
7. R Admin are unaware…				**.677**			**.403**	
4. From my experience serving on…	.347		.314	**.566**				
6. Admin demonstrate complete confidence…	.316	.366	**.498**	**.503**				
14. My satisfaction with involvement…	.354		.492	**.501**	.322			
15. My satisfaction with overall mentoring…				**.495**		.361	.300	
20. Benefits					**.813**			
19. Salary					**.808**			
18. Space…				.305	.584			
16. Teaching responsibilities						**.789**		
17. Time available for scholarly work						**.778**		
13. My access to resources…			**.431**			**.470**		
29. R I feel pressure…							**.812**	
31. R Race or ethnicity makes a difference…	**.415**	.314					**.514**	
5. R The direction of information flow…			**.419**	.302			**.456**	
38. To what extent do you receive informal…								**.687**
27. R I constantly feel under…	**.549**							**-.586**
37. To what extent do you receive formal…						.327		**.540**

University Level

	Components								
	1	2	3	4	5	6	7	8	9
1. I have complete confidence in admin…	**.842**								
12. My overall experience of being a faculty…	**.833**								
11. My overall experience of collegiality…	**.832**								
6. Admin demonstrate complete confidence…	**.784**					.347			
14. My satisfaction with involvement…	**.780**								
8. Admin have an open mind…	**.751**								
4. From my experience serving on…	**.751**								
13. My access to resources…	**.679**								
15. My satisfaction with overall mentoring…	**.641**								.333
2. I feel completely comfortable talking to…	**.609**						**.479**		
10. R Faculty are dissatisfied…	**.497**					-.360	**.410**		
22. Colleagues in my primary unit can be…		**.986**							
26. I feel professionally welcome…		**.837**	.311						
21. Colleagues in my primary unit value…		**.818**							
25. Colleagues in my primary unit solicit…		**.815**							
23. I am comfortable asking my colleagues…		**.787**							
24. Colleagues in my primary unit provide…		**.726**							
27. R I constantly feel under…		**.625**		.398					
30. R Gender makes a difference…		**.608**							
33. Is an effective admin for me			**.915**						
32. Is an effective admin for the unit			**.905**						
34. Articulates a clear vision…			**.903**						
35. Shares resources/opportunities…		.359	**.836**						
36. Helps me obtain the resources…		.351	**.829**						
29. R I feel pressure…				**.764**					
28. R I have to work harder…		**.448**		**.660**					

(continued)

	Components								
	1	2	3	4	5	6	7	8	9
31. R Race or ethnicity makes a difference…		.338		**.503**					
38. To what extent do you receive informal…					**.795**				
37. To what extent do you receive formal…					**.706**			.323	
18. Space…		.316				**.651**			
9. Faculty have an open mind…				-.379		**-.578**			
20. Benefits	.321				**.426**	**.486**			
5. R The direction of information flow…							**.753**		
3. R My ideas are seldom…	.314					.376	**.519**		
16. Teaching responsibilities								**.849**	
17. Time available for scholarly work								**.721**	
7. R Admin are unaware…	.322						.363		**.657**
19. Salary						**.484**			**.490**

Note. Factor loadings >.40 are in bold. Only factor loadings > .30 are presented. R represents reverse-coded items. Scale items are adapted from Likert & Likert (1976), Bilimoria et. al (2006) and Case Western Reserve (2008). Full scale items are found in Appendix B.

The first principal component variable that was extracted for each of the three organizational levels was the used to test H_1 via use of the Mann-Whitney U test to determine if there were differences between male and female faculty on perceptions of a combination of the constructs organizational system type, climate, and job satisfaction. No statistically significant difference in perception was found between males and females, $U = 1133$, $z = .786$, $p = .432$ (department level); $U = 666$, $z = -1.109$, $p = .268$ (college level); and $U = 557$, $z = -.050$, $p = .960$ (university level). For descriptive purposes, an average variable was also created to represent the average for all items as responded by each participant. Based on these average values, the median results for female and male faculty perceptions on all three constructs combined were gathered and are presented in Figure 4.2.

The second principal components were also analyzed at each level for differences between male and female faculty, but no significant differences were found within the second components either.

Faculty Perceptions of Combined Constructs, by Gender
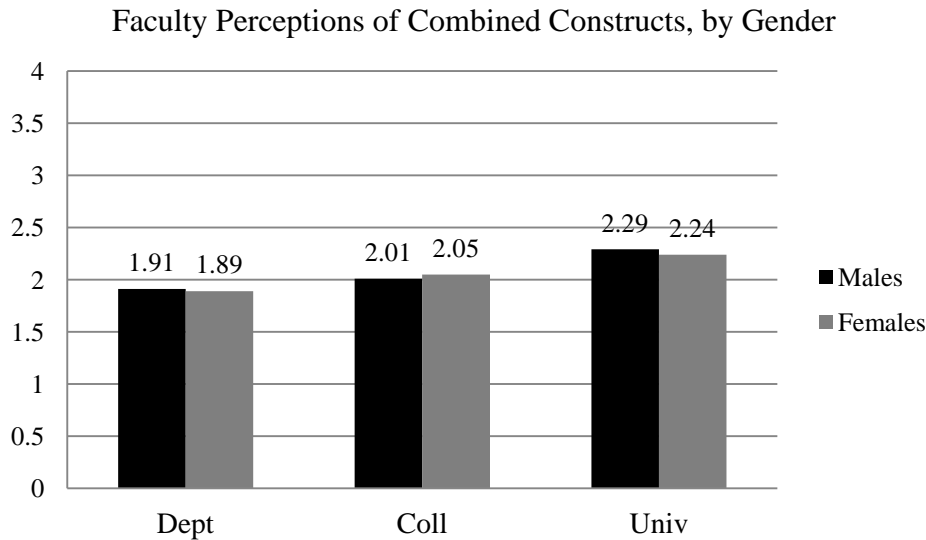
Figure 4.2. Median values for faculty perceptions of combined constructs. Possible values range from 1.0 to 4.0 for all constructs. The range represents (1-4): participatory – authoritarian, for organizational system type; satisfied – dissatisfied, for job satisfaction; and positive perception – negative perception, for climate. H_1 analyses performed on first principal component variable extracted for each organizational level.

Hypotheses 2a and 2b

This section will focus on results for the following hypotheses of the study:

H_{2a} Female faculty in male-dominated colleges (gendered colleges) report lower job satisfaction than their male colleagues.

H_{2b} Female faculty in male-dominated colleges (gendered colleges) report more negative climate perception than their male colleagues.

Principal component variables were created during the different PCAs to represent each of the major constructs (organizational system type, job satisfaction, and climate perception) at each of the three organizational levels (department, college, and

university). In cases where multiple components were extracted, the first principal component of the construct was utilized. The non-parametric statistical test Mann-Whitney U test was used to perform an analysis of the validity of both hypotheses 2a and 2b. For H_{2a}, the job satisfaction of female faculty members was not statistically significantly lower than male satisfaction in gendered colleges at any of the three measured organizational levels, $U = 195$, $z = .244$, $p = .404$ (department level); $U = 220$, $z = 1.421$, $p = .078$ (college level); and $U = 215$, $z = .976$, $p = .165$ (university level). For descriptive purposes median values for average female and male job satisfaction are presented in Figure 4.3.

Faculty Job Satisfaction, by Gender

Figure 4.3. Median values for faculty job satisfaction. Possible values range from 1.0 to 4.0. The range represents (1-4): satisfied – dissatisfied. H_{2a} analyses performed on first principal component variable extracted for each organizational level.

For H_{2b}, female faculty perceptions of climate were not statistically significantly more negative than male perceptions in gendered colleges at any of the three measured

organizational levels, $U = 88$, $z = .000$, $p = .250$ (department level); $U = 59$, $z = .127$, $p =$

.225 (college level); and $U = 72$, $z = .318$, $p = .188$ (university level). In terms of positive

or negative climate perception descriptive, median values for average female and male

perceptions of climate are presented in Figure 4.4.

Faculty Perceptions of Climate, by Gender

Figure 4.4. Median values for faculty perceptions of climate. Possible values range
from 1.0 to 4.0. The range represents (1-4): positive perception – negative perception.
H_{2b} analyses performed on first principal component variable extracted for each
organizational level.

Hypothesis 3

To test the hypothesis: H_3 Faculty perceptions of organizational system type differ

at the three organizational levels (department, college, and university), a series of

Wilcoxon Signed-Rank tests were run to determine if there were statistically different

faculty perceptions of organizational system type between each pairing of the three

organizational levels (department – college, department – university, college –university).

In order to perform this analysis, new data variables were calculated to represent the

average values of an individual participant's responses to the major construct of

organizational system type at each of the three measured organizational levels. All ten

items were used in these average value calculations, so as to compare all three

organizational levels on an identical grouping of items. Although it is arguably

inappropriate to use average values to combine the scores of categorical data for analysis,

it has been suggested that when scale items have high reliability within single constructs

and originate from previously developed and researched constructs, the use of average

values may produce meaningful results (McCall, 2001; Slater & Garau, 2007). Using

average value variables, faculty reported higher values (toward the System 1 or

authoritarian end of the scale choices) at university level than college level, and at both

university and college level over department level for faculty perception of organization

system type (Figure 4.5). The difference between university and college level was

statistically significant (z = -6.928, p < .0005), as were the differences between university

and department level (z = -6.838, p < .000), and between college and department level (z

= 5.047, p < .0005).

Faculty Perceptions of Organizational System Type

Figure 4.5. Mean values for faculty perceptions of organization system type. Possible values range from 1.0 to 4.0. The range represents (1-4): participatory – authoritarian. H$_3$ analyses performed on mean values for each organizational level. An asterisk indicates significant differences between values for all level pairings.

As an interesting follow-up to hypothesis 3, two more series of Wilcoxon Signed-Rank tests were performed in order to determine if faculty also reported differences in job satisfaction and climate perception as measured at the three organizational levels. Statistical significance was found between all level pairings. For job satisfaction, the significance values were: department – college (p = .005), department – university (p < .0005), and college – university (p < .0005). For climate perception, the values were: department – college (p =.002), department – university (p < .0005), and college – university (p < .0005). In all cases, faculty were more dissatisfied/more negative regarding their responses to the university level system than to the departmental level system.

Faculty Job Satisfaction
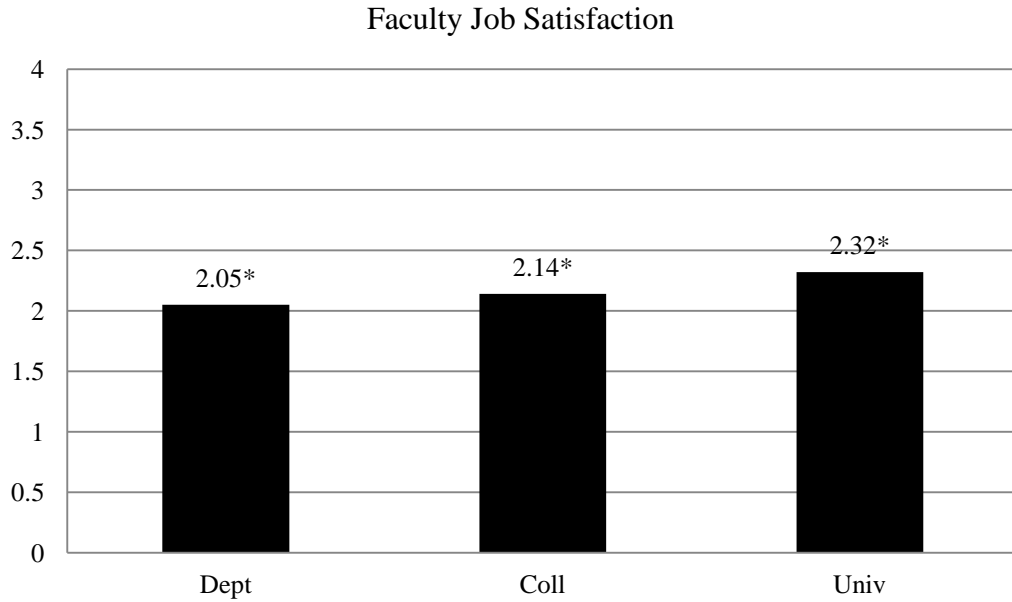
Figure 4.6. Mean values for faculty job satisfaction. Possible values range from 1.0 to 4.0. The range represents (1-4): satisfied – dissatisfied. H_3 follow-up analyses performed on mean values for each organizational level. An asterisk indicates significant differences between values for all level pairings.

Faculty Perceptions of Climate
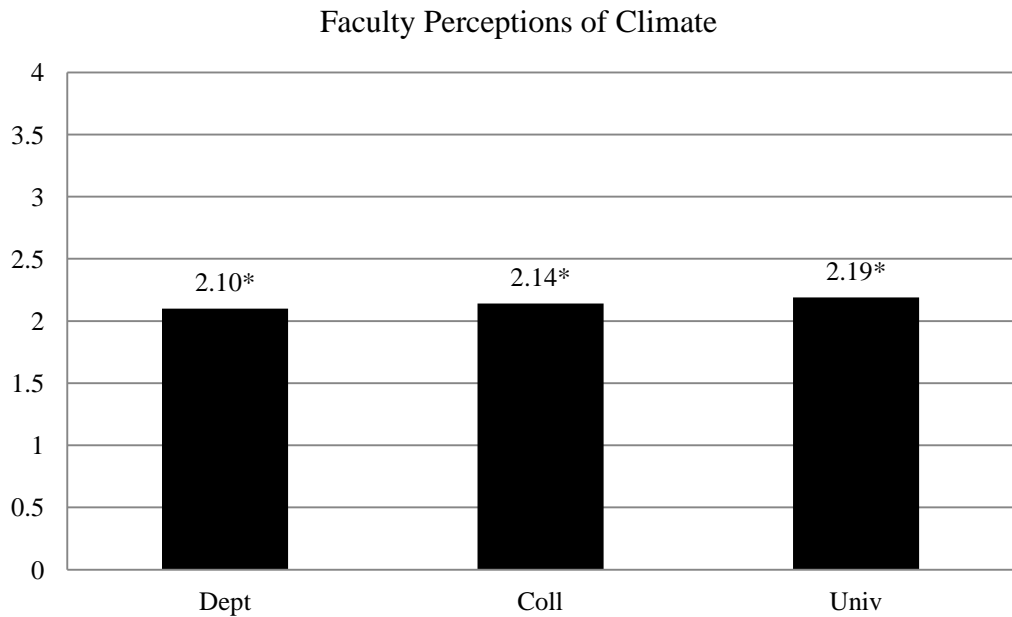
Figure 4.7. Mean values for faculty perceptions of climate. Possible values range from 1.0 to 4.0. The range represents (1-4): positive perception – negative perception. H_3 follow-up analyses performed on mean values for each organizational level. H_3 follow-up analyses performed on mean values for each organizational level. An asterisk

indicates significant differences between values for all level pairings.

Hypothesis 4

In order to test the hypothesis: H_4 Faculty perceptions of organizational system type are more authoritarian in gendered colleges than in non-gendered colleges, the first principal components of the organizational system type construct were utilized at all three organizational levels of department, college, and university. The principal components analysis included all ten organizational system type scale items for both department and college levels and the eight previously chosen scale items for university level (based on the principal components and reliability analyses performed earlier). A Mann-Whitney U test was then performed to test the hypothesis. Faculty perceptions of organizational system type were not statistically significantly more authoritarian for masculine gendered than non-masculine gendered colleges at department level ($U = 1648$, $z = -1.365$, $p = .086$) or university level ($U = 1114$, $z = -.298$, $p = .383$), but were found to significantly differ, with faculty perception of more authoritarian style organizational management type in gendered colleges over non-gendered colleges at the college level, $U = 1146$, $z = -1.754$, $p = .040$. For organization system type descriptive purposes, medians based on calculations of average values from participant responses at each organizational level are presented in Figure 4.8.

Faculty Perceptions of Organization System Type
by College Genderedness
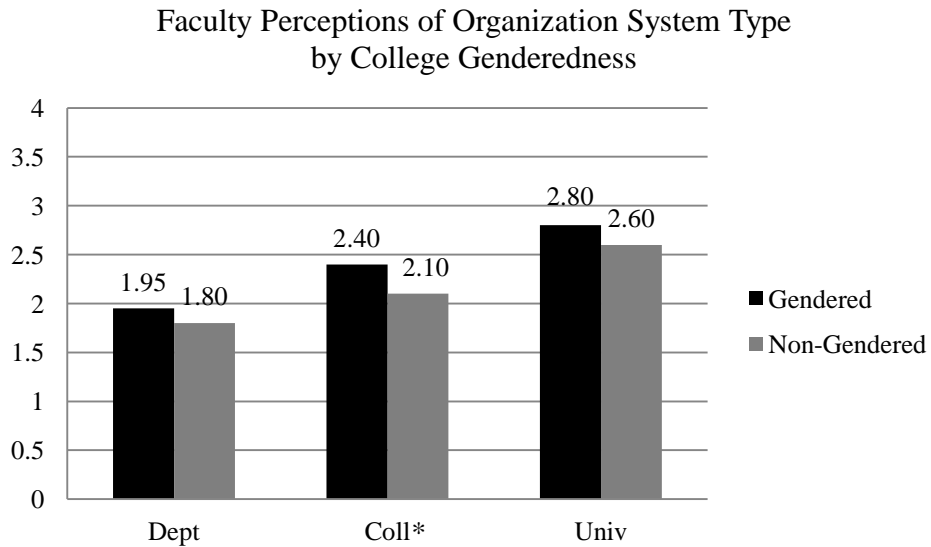
Figure 4.8. Median values for faculty perceptions of organization system type by college genderedness. Possible values range from 1.0 to 4.0. The range represents (1-4): participatory – authoritarian. H_4 analyses performed on first principal component variable extracted for each organizational level. An asterisk indicates significant difference in variables.

To investigate this finding further, both genders within masculine gendered and non-masculine gendered colleges were compared (in-gender and across gendered-type) for variance at the college level. For females, no statistically significant finding of more authoritarian perception of organizational system type was found between masculine and non-masculine gendered colleges ($U = 241$, $z = -.179$, $p = .429$). For males, however, faculty perceptions of organizational system type were statistically significantly more authoritarian for masculine gendered than non-masculine gendered colleges ($U = 237$, $z = -1.817$, $p = .035$). See Figure 4.9 for median values.

Faculty Perceptions of Organization System Type
(College Level Only)
by College Genderedness and Gender
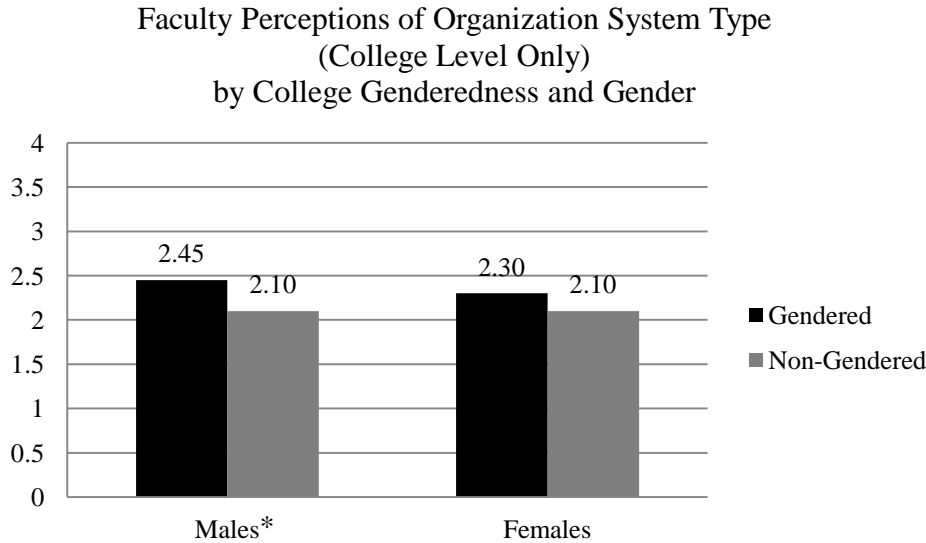
Figure 4.9. Median values for faculty perceptions of college level organization system type by college genderedness and gender. Possible values range from 1.0 to 4.0. The range represents (1-4): participatory – authoritarian. H_4 follow-up analyses performed on first principal component variable extracted for the college level. An asterisk indicates significant difference in variables.

Hypotheses 5a, 5b, and 5c

In order to test the hypotheses: H_{5a} Faculty differ by hierarchical ranks in their reports of job satisfaction, H_{5b} Faculty differ by hierarchical ranks in their perceptions of climate, and H_{5c} Faculty differ by hierarchical ranks in their perceptions of organizational system type, the previously created principal components for an individual participant's responses to the major constructs of job satisfaction and climate at all three organizational levels of department, college, and university were utilized. The first principal component was used as the dependent variable in each case. A Kruskal-Wallis H test was performed to test H_{5a} and faculty job satisfaction was not statistically significantly different between hierarchical ranks of instructor, assistant professor, associate professor, or professor at any of the three measured organizational levels, $X^2(3)$ = 3.023, p = .388 (department level); $X^2(3)$ = 3.511, p = .319 (college level); and $X^2(3)$ =

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2.011, p = .570 (university level).

For descriptive purposes median values for average faculty rank job satisfaction are presented in Figure 4.10. Numbers for faculty who declined to answer were included for descriptive purposes, as those respondents totaled nearly 10% of the valid responses to the rank demographic item, and it was considered possible that some faculty might decline to answer based on some perceived risk of loss of anonymity, though anonymity was assured to respondents.

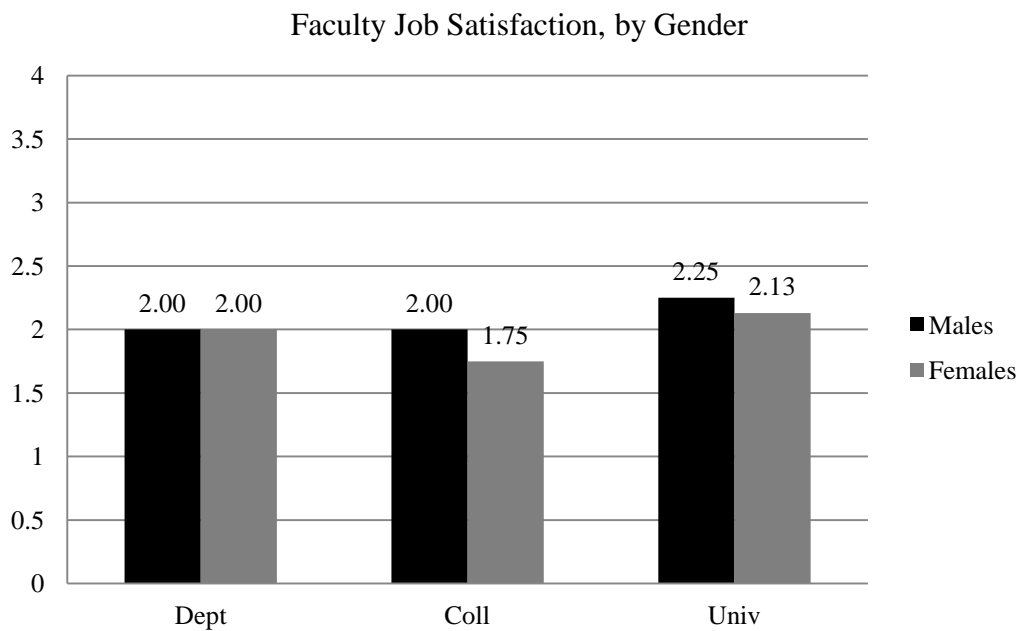Faculty Job Satisfaction
by Rank
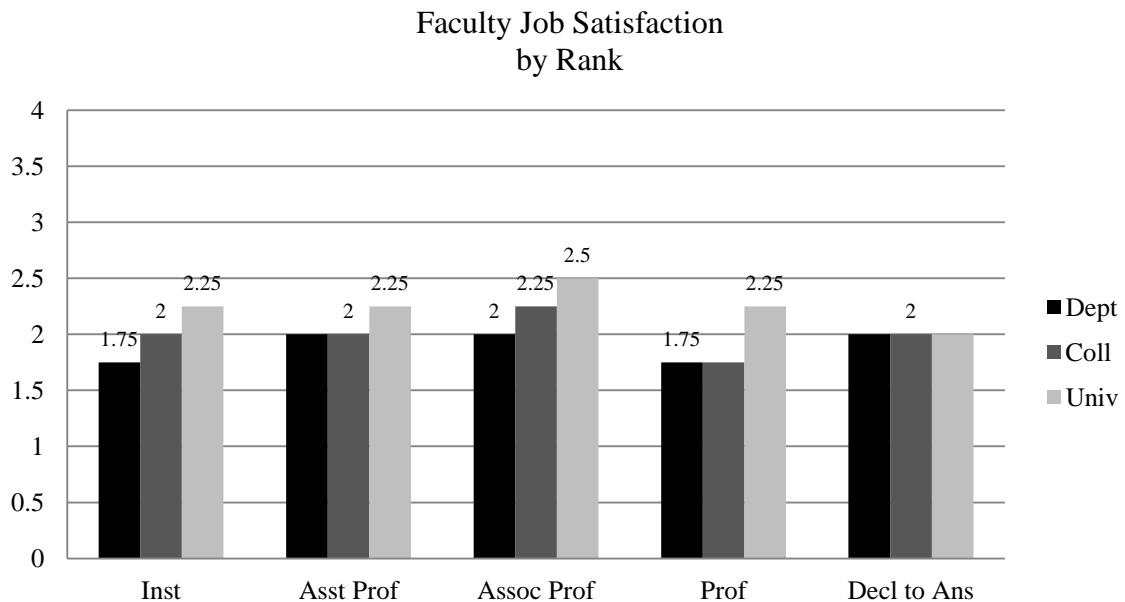
Figure 4.10. Median values for faculty job satisfaction by rank. Possible values range from 1.0 to 4.0. The range represents (1-4): satisfied – dissatisfied. H_{5a} analyses performed on first principal component variable extracted for all levels. Faculty who selected "decline to answer" were not included in the initial analyses.

For H_{5b}, faculty perceptions of climate were statistically significantly different between hierarchical ranks of instructor, assistant professor, associate professor, and professor at two of the three measured organizational levels: department level, $X^2(3)$ = 8.944, p = .030 and college level, $X^2(3)$ = 8.900, p = .031. Significant difference was not

found at the university level $X^2(3) = 5.847$, $p = .119$ (university level). When pairwise comparisons were performed at the department and college levels using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons, statistical significance was found only between professor and associate professor ranks at both the department level, $p = .037$ and college level, $p = .031$.

For descriptive purposes median values for average faculty rank perceptions of climate are presented in Figure 4.11.
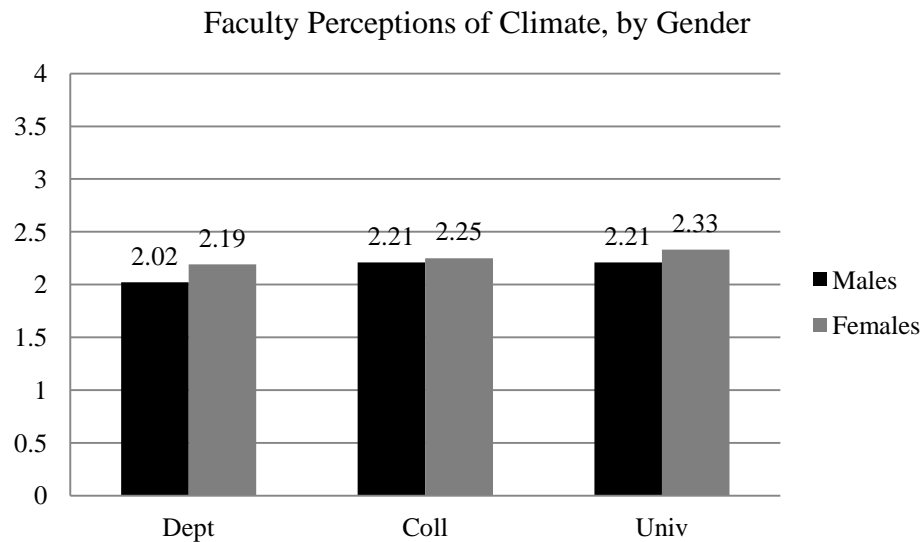

Faculty Perceptions of Climate
by Rank
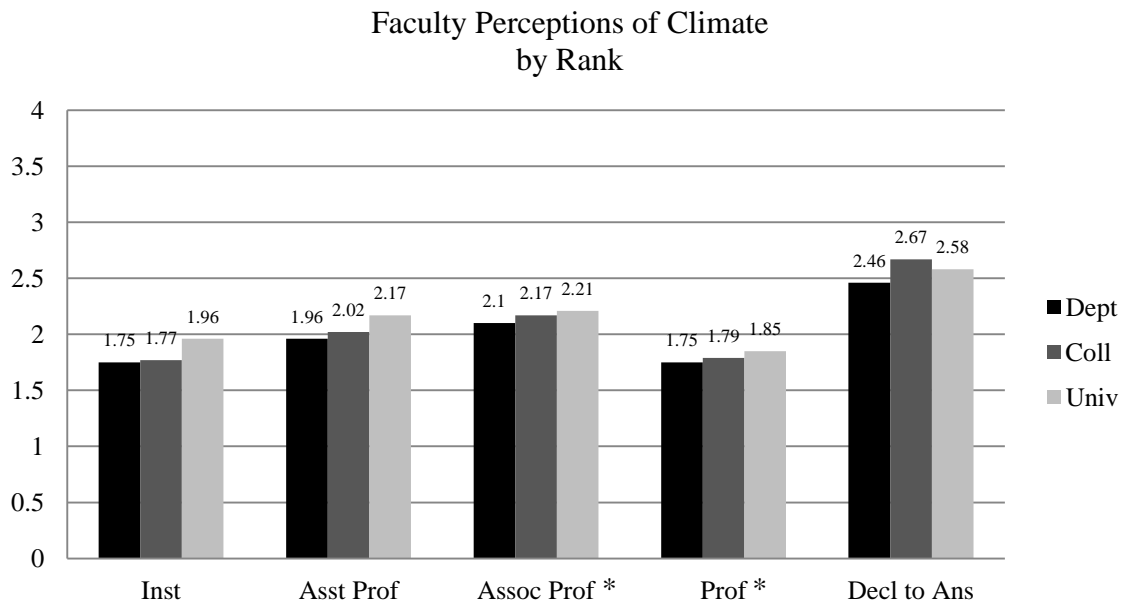
Figure 4.11. Median values for faculty perceptions of climate by rank. Possible values range from 1.0 to 4.0. The range represents (1-4): positive perception – negative perception. H_{5b} analyses performed on first principal component variable extracted for all levels. An asterisk indicates significant difference between variables (at department and college levels). Faculty who selected "decline to answer" were not included in the initial analyses.

A follow-up investigation was conducted for H_{5b} to determine if there was a difference between the climate perceptions of ranks of associate professor and professor at the department and college levels in either masculine gendered colleges or non-

masculine gendered colleges. A Kruskal-Wallis H test was performed and no significant difference was found within these smaller subsets of either gendered or non-gendered colleges between different faculty ranks of climate perceptions, though near significance was found between non-gendered college associate professor and professor climate perceptions at the department level ($p = .055$).

For H_{5c}, faculty perceptions of organizational system type were not statistically significantly different between hierarchical ranks of instructor, assistant professor, associate professor, or professor at any of the three measured organizational levels: department level, $X^2(3) = 5.740$, $p = .125$ and college level, $X^2(3) = 3.226$, $p = .358$, but not for university level, $X^2(3) = 4.089$, $p = .252$.

For descriptive purposes median values for average faculty rank perceptions of organization system type are presented in Figure 4.12.

In each of the cases for the three hypotheses, the analyses were run to only compare those faculty whose rank could be determined (i.e, faculty who gave a specific rank answer for the demographic item on rank). However, when descriptive information was gathered the number of faculty who chose "decline to answer" for the rank item was nearly 10% of the total full-time faculty complete responses. Descriptive data also indicated trends of generally higher value responses for the constructs of climate and organizational system type (toward more negative and authoritarian ends of the scale) for those faculty who declined to answer rank than for those faculty who did give their rank.

As a follow up, an investigation was conducted to determine if a difference existed between faculty who provided rank and those who did not (selected "decline to answer") within the separate constructs of climate and organizational system type. A

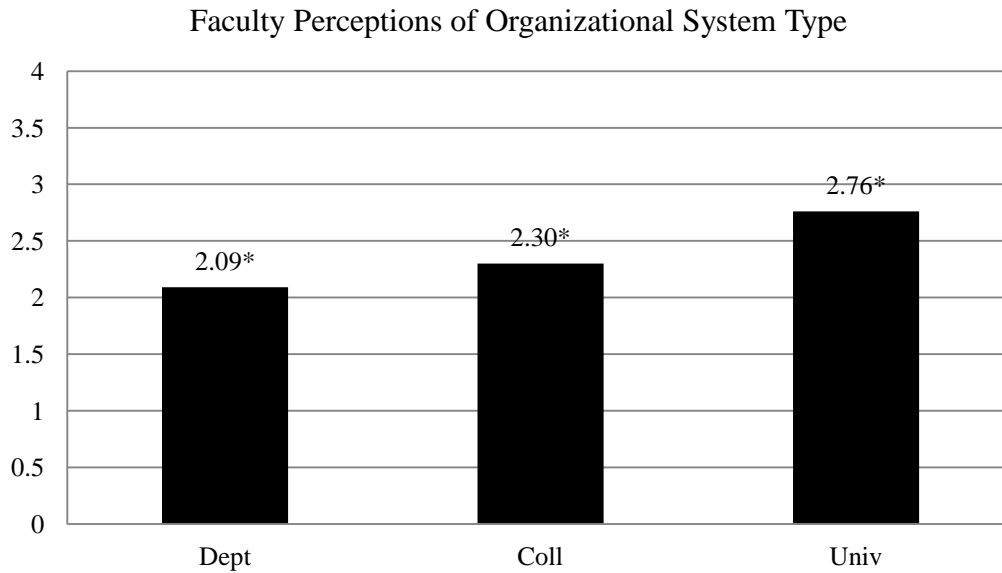Faculty Perceptions of Organization System Type
by Rank
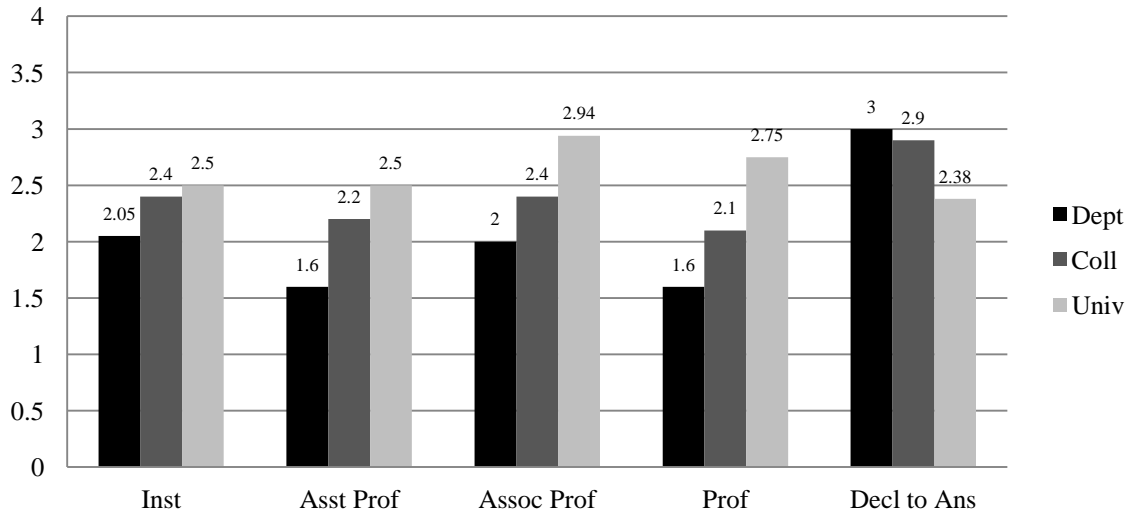
Figure 4.12. Median values for faculty perceptions of organization system type by rank. Possible values range from 1.0 to 4.0. The range represents (1-4): participatory – authoritarian. H_{5c} analyses performed on first principal component variable extracted for all levels. Faculty who selected "decline to answer" were not included in the initial analyses.

Mann-Whitney U test was conducted and significant difference was found between faculty providing rank and faculty choosing "decline to answer" within the construct of climate at all three organizational levels ($U = 599$, $z = 2.334$, $p = .020$ at department level and $U = 502$, $z = 2.531$, $p = .011$ at college level, and $U = 325$, $z = 1.982$, $p = .048$ at university level). Significant difference was also found between faculty providing rank and faculty choosing "decline to answer" in the construct of organizational system type at both department and college level ($U = 1190$, $z = 2.938$, $p = .003$ at department level and $U = 893$, $z = 2.894$, $p = .004$ at college level), but not at university level ($U = 316$, $z = -1.100$, $p = .271$). It should be noted, however, that the n value for faculty choosing "decline to answer" was relatively low in comparison with the full sample size, especially as rank response numbers were measured in conjunction with response numbers for full

construct item completion in each case.

Hierarchical rank differences were not considered between gendered and non-gendered colleges, as when these additional filters were applied to the data, n values were prohibitively low in some categories.

Hypotheses 6a1, 6a2, 6b1, and 6b2

To test the hypotheses: H_{6a1} Lower job satisfaction ratings by female faculty are correlated with perceptions of more authoritarian type organizational systems, H_{6a2} Negative perceptions of climate by female faculty are correlated with perceptions of more authoritarian type organizational systems, H_{6b1} Lower job satisfaction ratings by male faculty are correlated with perceptions of more authoritarian type organizational systems, and H_{6b2} Negative perceptions of climate by male faculty are correlated with perceptions of more authoritarian type organizational systems, four separate Pearson product-moment correlations were run at each of the three organizational levels. The previously created principal components for an individual participant's responses to the major constructs of organizational system type, job satisfaction, and climate at all three organizational levels of department, college, and university were utilized. Results are displayed in Table 4.9.

Based on the guidelines from Cohen (1988), there was a strong, positive and statistically significant correlation between female and male faculty reports of lower job satisfaction and perceptions of more authoritarian type organizational systems at all three organizational levels, supporting both H_{6a1} and H_{6b1}. For H_{6a2} and H_{6b2} there was also a strong, positive and statistically significant correlation between female and male faculty negative perceptions of climate with perceptions of more authoritarian type organizational systems at all three organizational levels.

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Table 4.9

Faculty Reports of More Negative Job Satisfaction and Climate, as Correlated
with More Authoritarian Organizational System Type

	Female Faculty		Male Faculty	
Job Satisfaction	*r*	*p*	*r*	*p*
Department	.723	< .0005	.571	< .0005
College	.740	< .0005	.604	< .0005
University	.722	< .0005	.666	< .0005
	Female Faculty		Male Faculty	
Climate	*r*	*p*	*r*	*p*
Department	.919	< .0005	.828	< .0005
College	.826	< .0005	.774	< .0005
University	.397	.015	.600	< .0005

Note. Pearson's product-moment correlations.

As an expansion of the various hypotheses 6, correlation was also sought between genderedness and organizational system type, with the idea that the more masculine gendered the college, the more authoritative the faculty perception of organizational system type will be. The level of genderedness for any particular college was considered on a continuum from masculine-gendered (the traditional definition of gendered) to neutral-gendered to feminine-gendered. For most parts of this study, both feminine and neutral-gendered colleges were considered non-gendered (from the perspective that neither type falls under the definition for traditionally masculine-gendered organizations). For evidence of correlation between level of genderedness and level of perception of organizational system type, the gendered nature of a college was broken down into sections by percentage of females with the masculine-gendered end of the spectrum toward 0% females and the feminine-gendered end of the spectrum toward 100% females. The six colleges used for comparison in this study were ranked in order from

more feminine-gendered to more masculine-gendered, with the colleges ranking (and associated % females) in the following manner: 1) Health (71%); 2) Interdisciplinary (67%); 3) Education (59%); 4) Arts and Humanities (48%); 5) STEM (25%); and 6) Business (22%). Two of these colleges were considered masculine-gendered (Business, STEM), two were considered neutral-gender (Arts and Humanities, Education), and two were considered feminine-gendered (Education, Interdisciplinary).

A Spearman's Rank Order was performed to assess the relationship between the level of genderedness of a college and faculty perception of organizational system type. A relatively weak, but statistically significant positive correlation between genderedness (masculine) and faculty perception of more authoritative organizational systems was found at the college level, $r_s = .213$, $p = .011$. No statistical significance was found for correlation at either the department or university levels.

Further Investigation

To investigate the hypothesized model relationship among the major constructs of organizational system type, climate perception, and job satisfaction, linear regressions were performed at each of the three organizational levels between each construct pairing (organizational system type and job satisfaction, organizational system type and climate perception, and climate perception and job satisfaction). This same process was completed for both female and male faculty separately and for gendered and non-gendered colleges separately. The previously created data variables representing averages of an individual participant's responses to the major constructs of job satisfaction, organizational system type, and climate perception at all three organizational levels of department, college, and university were utilized.

Female Relationships Between Constructs

For a general model of the relationship between organizational system type and job satisfaction at the departmental level, a linear regression established that female faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 71) = 68.100$, $p < .0005$ and that system management type accounted for 48.2% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = $0.874 + 0.598 \times$ (organization system type score).

At the college level, a linear regression established that female faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 59) = 53.571$, $p < .0005$ and that system management type accounted for 46.7% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = $0.658 + 0.669 \times$ (organization system type score).

At the university level, a linear regression established that female faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 51) = 44.244$, $p < .0005$ and that system management type accounted for 45.4% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = $0.773 + 0.607 \times$ (organization system type score).

For a general model of the relationship between organizational system type and climate perception, at the departmental level a linear regression established that female faculty perception of organization system management type could significantly predict climate perception, $F(1, 47) = 205.959$, $p < .0005$ and that system management type

accounted for 81.0% of the explained variability in climate perception. The regression equation was: predicted climate perception = 0.475 + 0.794 × (organization system type score).

At the college level, a linear regression established that female faculty perception of organization system management type could significantly predict climate perception levels, $F(1, 42) = 87.388$, $p < .0005$ and that system management type accounted for 66.8% of the explained variability in climate perception. The regression equation was: predicted climate perception = 0.141 + 0.860 × (organization system type score).

At the university level, a linear regression established that female faculty perception of organization system management type could significantly predict climate perception levels, $F(1, 35) = 9.049$, $p = .005$ and that system management type accounted for 18.3% of the explained variability in climate perception. The regression equation was: predicted climate perception = 1.071 + 0.405 × (organization system type score).

For a general model of the relationship between climate perception and job satisfaction, at the departmental level a linear regression established that female faculty perception of climate could significantly predict job satisfaction, $F(1, 51) = 91.161$, $p < .0005$ and that system management type accounted for 63.5% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = 0.346 + 0.838 × (climate perception score).

At the college level, a linear regression established that female faculty perception of climate could significantly predict job satisfaction levels, $F(1, 44) = 47.256$, $p < .0005$ and that climate perception accounted for 50.7% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = 0.773 + 0.647 ×

(climate perception score).

At the university level, a linear regression established that female faculty perception of climate could significantly predict job satisfaction levels, $F(1, 41) = 13.740$, $p = .001$ and that climate perception accounted for 23.3% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 1.320 + 0.475$ $\times$ (climate perception score).

Male Relationships Between Constructs

For a general model of the relationship between organizational system type and job satisfaction at the departmental level, a linear regression established that male faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 56) = 21.549$, $p < .0005$ and that system management type accounted for 26.5% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 0.856 + 0.615 \times$ (organization system type score).

At the college level, a linear regression established that male faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 50) = 22.360$, $p < .0005$ and that system management type accounted for 29.5% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 1.050 + 0.588 \times$ (organization system type score).

At the university level, a linear regression established that male faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 47) = 28.154$, $p < .0005$ and that system management type accounted for 36.1% of the explained variability in job satisfaction. The regression equation was:

predicted job satisfaction $= 1.135 + 0.690 \times$ (organization system type score).

For a general model of the relationship between organizational system type and climate perception, at the departmental level a linear regression established that male faculty perception of organization system management type could significantly predict climate perception, $F(1, 42) = 63.679$, $p < .0005$ and that system management type accounted for 59.3% of the explained variability in climate perception. The regression equation was: predicted climate perception $= 0.887 + 0.557 \times$ (organization system type score).

At the college level, a linear regression established that male faculty perception of organization system management type could significantly predict climate perception levels, $F(1, 36) = 53.916$, $p < .0005$ and that system management type accounted for 58.9% of the explained variability in climate perception. The regression equation was: predicted climate perception $= 0.249 + 0.951 \times$ (organization system type score).

At the university level, a linear regression established that male faculty perception of organization system management type could significantly predict climate perception levels, $F(1, 32) = 22.139$, $p < .0005$ and that system management type accounted for 39.0% of the explained variability in climate perception. The regression equation was: predicted climate perception $= 0.720 + 0.539 \times$ (organization system type score).

For a general model of the relationship between climate perception and job satisfaction, at the departmental level a linear regression established that male faculty perception of climate could significantly predict job satisfaction, $F(1, 47) = 33.396$, $p < .0005$ and that system management type accounted for 40.3% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 0.388 +$

0.769 × (climate perception score).

At the college level, a linear regression established that male faculty perception of climate could significantly predict job satisfaction levels, $F(1, 44) = 23.591$, $p < .0005$ and that climate perception accounted for 33.4% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = 0.677 + 0.679 × (climate perception score).

At the university level, a linear regression established that male faculty perception of climate could significantly predict job satisfaction levels, $F(1, 39) = 17.810$, $p < .0005$ and that climate perception accounted for 29.6% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = 0.832 + 0.682 × (climate perception score).

Gendered College Faculty Relationships Between Constructs

For a general model of the relationship between organizational system type and job satisfaction at the departmental level, a linear regression established that masculine gendered college faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 37) = 24.643$, $p < .0005$ and that system management type accounted for 38.4% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = 0.921 + 0.518 × (organization system type score).

At the college level, a linear regression established that masculine gendered college faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 32) = 30.775$, $p < .0005$ and that system management type accounted for 47.4% of the explained variability in job satisfaction. The regression

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equation was: predicted job satisfaction = 0.550 + 0.625 × (organization system type score).

At the university level, a linear regression established that masculine gendered college faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 30) = 22.257$, $p < .0005$ and that system management type accounted for 40.7% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = 0.872 + 0.487 × (organization system type score).

For a general model of the relationship between organizational system type and climate perception, at the departmental level a linear regression established that masculine gendered college faculty perception of organization system management type could significantly predict climate perception, $F(1, 27) = 37.709$, $p < .0005$ and that system management type accounted for 56.7% of the explained variability in climate perception. The regression equation was: predicted climate perception = 0.947 + 0.573 × (organization system type score).

At the college level, a linear regression established that masculine gendered college faculty perception of organization system management type could significantly predict climate perception levels, $F(1, 22) = 21.606$, $p < .0005$ and that system management type accounted for 47.3% of the explained variability in climate perception. The regression equation was: predicted climate perception = 0.609 + 0.704 × (organization system type score).

At the university level, a linear regression established that masculine gendered college faculty perception of organization system management type could significantly

predict climate perception levels, $F(1, 20) = 21.938$, $p < .0005$ and that system management type accounted for 49.9% of the explained variability in climate perception. The regression equation was: predicted climate perception $= 0.906 + 0.496 \times$ (organization system type score).

For a general model of the relationship between climate perception and job satisfaction, at the departmental level a linear regression established that masculine gendered college faculty perception of climate could significantly predict job satisfaction, $F(1, 29) = 26.839$, $p < .0005$ and that system management type accounted for 46.3% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 0.198 + 0.851 \times$ (climate perception score).

At the college level, a linear regression established that masculine gendered college faculty perception of climate could significantly predict job satisfaction levels, $F(1, 24) = 12.045$, $p = .002$ and that climate perception accounted for 30.6% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 0.877 + 0.549 \times$ (climate perception score).

At the university level, a linear regression established that masculine gendered college faculty perception of climate could significantly predict job satisfaction levels, $F(1, 25) = 10.042$, $p = .004$ and that climate perception accounted for 25.8% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 0.966 + 0.577 \times$ (climate perception score).

Non-Gendered College Faculty Relationships Between Constructs

For a general model of the relationship between organizational system type and job satisfaction at the departmental level, a linear regression established that non-

gendered college faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 85) = 46.862$, $p < .0005$ and that system management type accounted for 34.8% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 0.995 + 0.529 \times$ (organization system type score).

At the college level, a linear regression established that non-gendered college faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 74) = 44.793$, $p < .0005$ and that system management type accounted for 36.9% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 0.881 + 0.597 \times$ (organization system type score).

At the university level, a linear regression established that non-gendered college faculty perception of organization system management type could significantly predict job satisfaction levels, $F(1, 63) = 35.827$, $p < .0005$ and that system management type accounted for 35.2% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 0.883 + 0.568 \times$ (organization system type score).

For a general model of the relationship between organizational system type and climate perception, at the departmental level a linear regression established that non-gendered college faculty perception of organization system management type could significantly predict climate perception, $F(1, 57) = 174.777$, $p < .0005$ and that system management type accounted for 75.0% of the explained variability in climate perception. The regression equation was: predicted climate perception $= 0.577 + 0.722 \times$

(organization system type score).

At the college level, a linear regression established that non-gendered college faculty perception of organization system management type could significantly predict climate perception levels, $F(1, 52) = 113.884$, $p < .0005$ and that system management type accounted for 68.1% of the explained variability in climate perception. The regression equation was: predicted climate perception $= 0.335 + 0.767 \times$ (organization system type score).

At the university level, a linear regression established that non-gendered college faculty perception of organization system management type could significantly predict climate perception levels, $F(1, 43) = 7.640$, $p = .008$ and that system management type accounted for 13.1% of the explained variability in climate perception. The regression equation was: predicted climate perception $= 1.150 + 0.353 \times$ (organization system type score).

For a general model of the relationship between climate perception and job satisfaction, at the departmental level a linear regression established that non-gendered college faculty perception of climate could significantly predict job satisfaction, $F(1, 64) = 75.890$, $p < .0005$ and that system management type accounted for 53.5% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $= 0.420 + 0.795 \times$ (climate perception score).

At the college level, a linear regression established that non-gendered college faculty perception of climate could significantly predict job satisfaction levels, $F(1, 59) = 46.938$, $p < .0005$ and that climate perception accounted for 43.4% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction $=$

$0.783 + 0.660 \times$ (climate perception score).

At the university level, a linear regression established that non-gendered college faculty perception of climate could significantly predict job satisfaction levels, $F(1, 51) = 13.650$, $p = .001$ and that climate perception accounted for 19.6% of the explained variability in job satisfaction. The regression equation was: predicted job satisfaction = $1.301 + 0.493 \times$ (climate perception score).

Summary

Based on the data collected from a survey of faculty at a medium-sized, public comprehensive university, analyses were completed to test the various study hypotheses. Of the 761 total full-time faculty employed by the University, 172 completed the online survey, or 22.6% of the faculty. The faculty respondent numbers were distributed across six different colleges, one of which is considered a STEM college.

Principal axis factor analyses and principal components analyses were conducted to determine the validity of the constructs and sub-constructs and to reduce the number of variables by extraction of individual component variables. Mann-Whitney U tests were conducted to test H_1, H_{2a}, H_{2b}, and H_4; Wilcoxon Signed-Rank tests were conducted to test H_3; Kruskal-Wallis H tests were conducted to test H_{5a}, H_{5b}, and H_{5c}; and Pearson product-moment correlations were conducted to test H_{6a1}, H_{6a2}, H_{6b1}, and H_{6b2}.

No statistical significance was found through testing of H_1, H_{2a} and H_{2b}, H_{5a}, or H_{5c}. H_1 analyses revealed no statistical significance between male and female faculty on perceptions of a combination of the constructs of organizational system type, climate, and job satisfaction. H_{2a} and H_{2b} results found that: 1) the perceptions of climate by male-dominated college female faculty were not significantly lower (or more negative) than the

perceptions of male faculty, and 2) reports of job satisfaction by male-dominated college female faculty were not significantly lower than those of male faculty. H_{5a} and H_{5c} findings discovered no statistically significant differences between hierarchical ranks in faculty perceptions of job satisfaction or organizational system type.

Statistically significant differences were found as H_3, H_4, H_{5b}, H_{6a1}, H_{6a2}, H_{6b1}, and H_{6b2} were independently tested.

H_3 conclusions showed a statistically significant difference existed between faculty perceptions of organizational system type as measured at the three organizational levels (department, college, and university), with faculty perceiving more authoritarian system management types associated with higher hierarchical levels of the organization. Additional investigative analyses found statistically significant differences in faculty perceptions of both climate and job satisfaction at each of the three organizational levels, as well.

H_4 results found that faculty perceptions of organizational system type were more authoritarian in nature for gendered colleges than for non-gendered colleges, but only when measured at the college level (significance was not found at either the department or university levels). On further analysis, it was found that at the college level, males in gendered colleges perceived statistically significantly more authoritarian style management systems than did their male colleagues in non-gendered colleges. No statistically significant difference was found between female faculty in gendered versus non-gendered colleges for perceptions of organizational system type.

H_{5b} findings were that a statistically significant difference existed between hierarchical ranks of faculty in perceptions of climate at both the department level and

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college level (but not at the university level). Further investigation revealed statistical

significance between the climate perceptions of professors and associate professors (but

not between other parings of hierarchical ranks) at both the department level and college

level. Additional layers of analysis on the various H_5 hypotheses discovered significant

climate perception differences (for all three levels) in faculty providing rank answers and

those faculty selecting "decline to answer" for their rank. "Decline to answer" faculty

also had significantly different perceptions of organizational system type at department

and college levels than rank-providing faculty.

H_{6a1}, H_{6a2}, H_{6b1}, and H_{6b2} conclusions demonstrated that both female and male

faculty reports of both lower job satisfaction and perceptions of a more negative climate

were statistically significantly correlated with perceptions of more authoritarian type

organizational systems. A follow-up analysis found that increasing levels of

genderedness for a college had statistically significant positive correlation with increasing

levels of perception of authoritative style organizational systems, when measured at the

college level.

Results are discussed in detail in the following chapter.

CHAPTER V: DISCUSSION

Introduction

The main purpose of this study was to determine whether faculty perceptions of more authoritative organizational systems within individual university levels corresponded to greater dissatisfaction for female faculty. It was proposed that a more masculine gendered organization would present a more authoritative organizational system and that women would report greater dissatisfaction than men under this perceived system type. As women are generally found in lower numbers in STEM disciplines (National Center for Education Statistics, 2004), it was thought that the genderedness, and therefore the potentially more authoritative organizational systems, of faculty work environments in those disciplines (due to both the stereotyped nature of the discipline itself and the male to female faculty ratio at the study university) might negatively impact female faculty perceptions in terms of climate and job satisfaction.

The hypotheses investigated were:

H_1 Female and male faculty differ in their perceptions of the combined constructs measuring organizational system type, climate, and job satisfaction.

H_{2a} Female faculty in male-dominated colleges (gendered colleges) report lower job satisfaction than their male colleagues.

H_{2b} Female faculty in male-dominated colleges (gendered colleges) report more negative climate perception than their male colleagues.

H_3 Faculty perceptions of organizational system type differ at the three organizational levels (department, college, and university).

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H_4 Faculty perceptions of organizational system type are more authoritarian in gendered colleges than in non-gendered colleges.

H_{5a} Faculty differ by hierarchical ranks in their reports of job satisfaction.

H_{5b} Faculty differ by hierarchical ranks in their perceptions of climate.

H_{5c} Faculty differ by hierarchical ranks in their perceptions of organizational system type.

H_{6a1} Lower job satisfaction ratings by female faculty are correlated with perceptions of more authoritarian type organizational systems.

H_{6a2} Negative perceptions of climate by female faculty are correlated with perceptions of more authoritarian type organizational systems.

H_{6b1} Lower job satisfaction ratings by male faculty are correlated with perceptions of more authoritarian type organizational systems.

H_{6b2} Negative perceptions of climate by male faculty are correlated with perceptions of more authoritarian type organizational systems.

The significant findings for the study hypotheses were incorporated into an updated variable diagram (Figure 5.1), which shows significant hypothesis results highlighted in larger font with heavier-weight relationship arrows and non-significant results in smaller font with dashed relationship arrows.
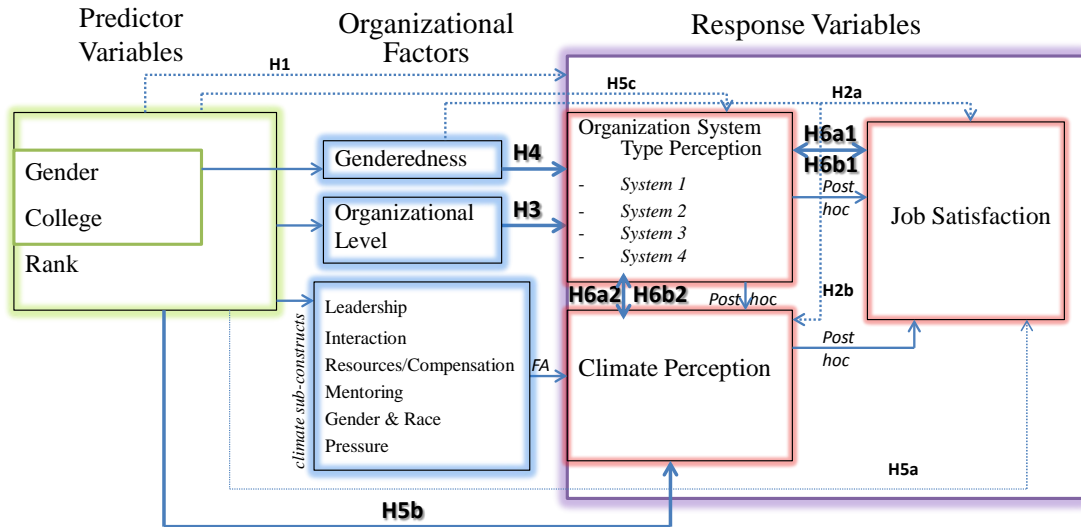
Figure 5.1. Final variable framework relationships displaying significant hypotheses. "FA" is factor analysis.

Discussion of Findings

Reliability and Validity of Constructs and Sub-Constructs

While internal reliability was moderate to high for the individual constructs and sub-constructs for the study, validity was only as strong as its theoretical basis. Though on the outset, validity was a reasonable assumption for each construct and the majority of sub-constructs as based on the literature (Bilimoria et al., 2006; Likert & Likert, 1976), it is not entirely clear that the scale items strictly measure the intended constructs. After analysis of items via both principal axis factor analysis, for the organizational system type items in particular, there was a significant breakdown of the literature theorized sub-constructs (motivation, communication, leadership, and interaction). This was accounted for in the study, in part, by a revised interpretation of the organizational system scale as solely a single construct of one component as derived from a principal components analysis (at each of the three organizational levels) for statistical purposes. For derivation of a single component at the university level, two items (items 5 and 9) were removed

from the PCA. Those two items are related in that they were both part of the original

sub-construct for communication, however, this study found no clear reason why those

two items separated themselves from the others specifically at university level. For

overall consideration of the sub-constructs, it is possible that simply not enough of the

original items from Likert and Likert (1976) were utilized in this particular study to

effectively define the individual sub-constructs, as only ten items out of the original 32

that comprised those sub-constructs were chosen. It is also possible that the revisions of

those items for this study (see Chapter 3) played some role in the breakdown of sub-

constructs.

For the climate items, the sub-constructs (leadership, interaction, resources,

compensation, mentoring, pressure, and gender and race/ethnicity) were reasonably

supported through a principal axis factor analysis, though two of the theorized sub-

constructs (resources and compensation) ended up being combined into one factor. As

the concepts of resources and compensation are related, it makes sense that they could

combine into a single factor. For general analysis purposes, all sub-constructs were

combined into a principal components analysis and the first component (for each of the

three organizational levels) was extracted to represent the main climate construct. As the

data for this study supported the literature, it is considered that the sub-constructs for

climate are reasonably validated.

Within the scale items for job satisfaction, lower alpha values were found,

indicating lower internal reliability for these items. All four items were taken from the

same source and were reported to have high alpha values in the original study (Bilimoria

et al., 2006), so it was curious why the same items would show lower reliability for this

study. When a principal component analysis was conducted, the four items split into two separate components (items 11 and 12 describing collegiality and overall experience of being a faculty member in one and items 16 and 17 describing teaching responsibilities and time available for scholarly work in the second). Although all items were retained for the scale, the first component (at each of the three organizational levels) was extracted to represent the main job satisfaction construct. The reason for the different loading of items on the job satisfaction scale may be related to the presentation of the items in different ways from each other on the scale in the present study. Items 11 and 12 were measured at all three organizational levels, while items 16 and 17 were not. The items were also in different sections and different pages on the survey, as presented in its online format.

Discussion of Hypothesis 1

From the results of the analyses conducted for the following hypothesis: H_1 Female and male faculty differ in their perceptions of the combined constructs measuring organizational system type, climate, and job satisfaction, the three constructs together showed no difference in perception between males and females at any of the three organizational levels. This was true when both the first and second extracted components (from a principal components analysis) for all items combined were analyzed. Even an inspection of means yielded no trends of differences between the perceptions of male and female faculty, with the greatest difference in means only .05 between male and female faculty at the university level. It would appear that the scale as a whole did not elicit different responses from female faculty than male faculty.

Discussion of Hypotheses 2a and 2b

When the following hypotheses were analyzed: H_{2a} Female faculty in male-dominated colleges (gendered colleges) report lower job satisfaction than their male colleagues and H_{2b} Female faculty in male-dominated colleges (gendered colleges) report more negative climate perception than their male colleagues, no statistical significance was found in the differences between reported job satisfaction levels of males and females in gendered colleges at any of the three organizational levels. By looking at the median values for job satisfaction, a one-quarter scale difference (.25) was found between males and females at the college level. The direction of this difference was opposite that of the proposed hypothesis, as female faculty in gendered colleges reported slightly higher satisfaction levels than their male counterparts. Though this was not a significant difference, it is worth noting, especially as it goes against the hypothesized directionality. It is unknown whether social desirability bias (in this case, females answering in a more positive fashion than would indicate their true perceptions) played a role in any of the items, but if it did the effect would be seen across multiple items and it is doubtful that bias would display itself in only this one item. As female faculty had more negative perceptions of climate, it would be expected that reports of job satisfaction would follow the same pattern. It is possible that the factors contributing to female job satisfaction were not accurately measured by the climate construct presented in this study and that factors not included by this study's items were more significant in determining gendered college female faculty job satisfaction.

For H_{2b}, no statistically significant differences were found between gendered college male and female faculty perceptions of climate at any of the three organizational

levels; however, by investigation of median values, it was found that female faculty perceptions of climate were slightly more negative than male faculty perceptions at all three organizational levels. Though not statistically significant, this difference does align with the direction of the hypothesis and the findings from supporting literature showing that female faculty in STEM disciplines are more likely to have lower satisfaction and more negative climate perceptions than their male counterparts (Bilimoria et al., 2008; Callister, 2006).

Discussion of Hypothesis 3

Through investigation of the following hypothesis: H_3 Faculty perceptions of organizational system type differ at the three organizational levels (department, college, and university), statistically significant differences were found between faculty perceptions of different levels of organizational system type. While none of the organizational levels were perceived by faculty to be at the far ends of the scale (either exploitative authoritative, which corresponded to the coded value of 4, or participative group, which corresponded to the coded value of 1), the university level was perceived to be closest to the high end of the scale, with a perceived type close to benevolent authoritative, or Likert's (1961) System 2, the college level between benevolent authoritative and consultative, but nearest to consultative (Likert's System 3), and the department level just between consultative and participative group (very near consultative). This finding makes sense based on the nature of a university as a hierarchical organizational system. It would be expected that the university level is the most hierarchical and has the most potential for the authoritative system type, whereas the department level has the most potential for a participatory system.

During the follow-up tests, it was also discovered that the faculty perceived lower satisfaction and more negative climate at the university level than either the department or college levels. This aligns with the previous results on organizational system type (analyzed for correlation in hypothesis 6a1, 6a2, 6b1, and 6b2) and is perhaps indicative of a university system that is more distant and less interactive with individual faculty members than the college or department systems. Certainly more faculty are involved in a greater number of interactions, decisions, and day-to-day routines within their own departments or colleges than they are in the larger university system. This does not mean that those interactions automatically create more satisfaction for faculty, but in this case, it does seem that the interactions and perceptions of the job environments within the department and college levels are more satisfactory for faculty than those that are occurring within the university level.

Discussion of Hypothesis 4

The findings from the hypothesis: H_4 Faculty perceptions of organizational system type are more authoritarian in gendered colleges than in non-gendered colleges, found a significant difference between gendered college and non-gendered college faculty perceptions of organizational system type at the college level, with gendered college faculty perceptions leaning toward more authoritative systems and non-gendered college faculty perceptions leaning toward more participative systems. The results aligned with the hypothesis and when comparing median values, the data show that gendered college faculty perceived more authoritative systems than their non-gendered college counterparts not just at the college level, but at both the department and university levels, as well (just not in significant difference at department and university

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levels). This finding supported literature that indicated in organizations where more men

are present, more authoritarian styles of leadership are used (Druskat, 1994).

Interestingly, as a more in-depth investigation of this finding was conducted, it

was discovered that female faculty perceived no statistically significant difference in

system type between gendered and non-gendered colleges. It was only when male faculty

were compared across college type that a statistically significant difference was

discovered. Males in gendered colleges perceived significantly more authoritative style

systems than males in non-gendered colleges (when measured at the college level).

Males in gendered colleges perceived a college-level system type as midway between

benevolent authoritative and consultative, while males in non-gendered colleges

perceived a college level system type as very near to consultative.

One interpretation of these outcomes is that females, who are more likely to

engage in participatory styles of leadership and interaction, may be instigating democratic

styles in their own interactions, which might then cause them to perceive more

participatory systems. This assumption would apply to both women in gendered colleges

and women in non-gendered colleges. Males, however, are more likely to lead in

authoritarian ways and may not be as likely as females to instigate participatory behavior.

If those males are in a gendered environment, they are unlikely to be on the receiving end

of participatory behaviors, as most other faculty are also males. But, if male faculty are

in a non-gendered environment, they may be exposed to more participatory styles just by

virtue having more numerous interactions with female faculty.

Discussion of Hypotheses 5a, 5b, and 5c

Results from the hypotheses: H_{5a} Faculty differ by hierarchical ranks in their

reports of job satisfaction, H_{5b} Faculty differ by hierarchical ranks in their perceptions of climate, and H_{5c} Faculty differ by hierarchical ranks in their perceptions of organizational system type found no statistical difference between ranks for perceptions of job satisfaction or organizational system type, but did find a statistical significance between rank perceptions of climate at both the department and college levels. When this result was investigated further, the difference was found to be between the professor and associate professor ranks, with associate professors reporting a more negative overall climate perception than professors. An even more detailed investigation of this found a similar trend within non-gendered college faculty at the ranks of associate professor and professor, but no statistical significance within gendered or non-gendered college faculty at those ranks. This result is curious and might indicate a difference between rank level interactions in non-gendered colleges versus gendered colleges. Further investigation of that nearly significant difference between rank perceptions in non-gendered colleges but not in gendered colleges is beyond the scope of this study. A more complete explanation was thought perhaps to be found in a gender comparison of ranks, but unfortunately, it was not possible to break ranks down into gender for gendered and non-gendered colleges, as a very low number of cases prohibited analysis at that level.

Interesting trends were found among ranks for all three major constructs. In terms of overall job satisfaction, each rank perceived more satisfaction at the department level with less satisfaction at college levels (with the exception of assistant professor and professor ranks that reported the same median satisfaction levels at both department and college levels) and even less satisfaction at the university level. For all four ranks, the university level represented the lowest levels of overall job satisfaction. As the university

level also corresponded with the most authoritative perceptions of organizational system type (hypothesis 3), and individual rank perceptions of organizational system type yielded numbers that demonstrated more authoritative system type perceptions with progressively higher organizational levels. The results aligned with literature assertions regarding greater employee dissatisfaction associated with authoritative styles of management (Kushell & Newton, 1986).

Overall, climate perceptions for the individual ranks also became more negative as hierarchical organizational level increased. All four ranks displayed more negative climate perceptions at the university level than the department level. Again, this finding aligns well with the general hypothesis that faculty perception of more authoritative system types would correspond with more dissatisfaction.

Another trend was found between the individual ranks, as both instructors and professors tended toward higher levels of satisfaction than either assistant professors or associate professors, both in terms of job satisfaction and climate perception. This could be due to the non-tenure track nature of instructor positions and subsequent possible lower levels of job stress for instructors than the tenure-track faculty. For those who have attained the highest rank of professor, the stress levels might be lower than the tenure-track and tenured-but-still-seeking-higher-rank faculty.

As descriptive numbers were obtained for rank, it was noted that faculty who chose "decline to answer" for rank tended toward more negative climate perceptions and more authoritative system type perceptions than those faculty who provided their rank. When faculty who chose "decline to answer" for rank were considered for comparison with rank-providing faculty in terms of the constructs for perceptions of climate and

organizational system type, statistical significance was found between those groups of faculty for all three organizational levels in climate perception and for both the department and college levels for organizational system type. As the "decline to answer" faculty had significantly more negative or authoritative perceptions, it is possible that they declined to give their academic rank based on some perceived possibility of loss of anonymity and subsequent potential retribution for expressing their more negative perceptions.

Discussion of Hypotheses 6a1, 6a2, 6b1, and 6b2

Hypothesis 6 had four different parts: H_{6a1} Lower job satisfaction ratings by female faculty are correlated with perceptions of more authoritarian type organizational systems, H_{6a2} Negative perceptions of climate by female faculty are correlated with perceptions of more authoritarian type organizational systems, H_{6b1} Lower job satisfaction ratings by male faculty are correlated with perceptions of more authoritarian type organizational systems, and H_{6b2} Negative perceptions of climate by male faculty are correlated with perceptions of more authoritarian type organizational systems. When the various hypotheses were tested, the results indicated statistically significant, strong and positive correlations between both female and male faculty perceptions of organizational system type and the separate constructs of climate and job satisfaction. Both lower job satisfaction and more negative climate perceptions for both female and male faculty groups were correlated with the perception of more authoritative system types.

These results correspond with investigations of median values for the main constructs and support the central research question of this study: Does the identification of a more authoritative organizational system within individual units or levels correspond

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to a higher level of dissatisfaction for female faculty? The same relationship was also found to be true for male faculty. Both results follow from previous research demonstrating both males and females prefer to work under transformational leadership (Druskat, 1994), a style highly likely to involve democratic/participatory methods, and report greater dissatisfaction with autocratic or authoritative leadership (Kushell & Newton, 1986).

This same result was also supported by the further investigation that found significant positive correlation between overall faculty perception of more authoritative organizational systems and the genderedness of that system. Faculty in more gendered (masculine) colleges were more likely to perceive more authoritative types of organizational management systems than those faculty in less gendered (either neutral or feminine) colleges. This was an important finding, as one of the original goals of this study was to find a potentially new way of defining gendered organizations. The results from this study indicate that it may be possible to add authoritative (or at least, less participative) organizational system perception by employees as an additional defining characteristic of gendered organizations.

Discussion of Post Hoc Analyses

The relationships between the main constructs were proposed through the right half of the figure for hypothesized relationships for a variable framework (Figure 1.1). The relevant portion of that figure is presented as Figure 5.2.
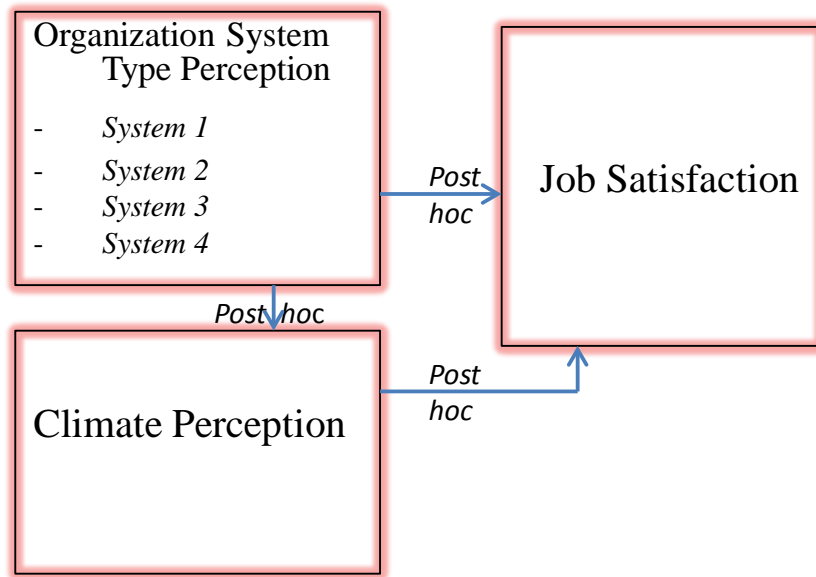
Figure 5.2. Hypothesized relationships between dependent variables.

Through linear regressions, the predictive ability of one variable for another was calculated, as was the effect size which corresponded to the proportion of variance in the dependent variable able to be explained by the independent variable. Variable diagrams with effect size (expressed as percentage of variance explained) are shown in Figures 5.3-5.6.
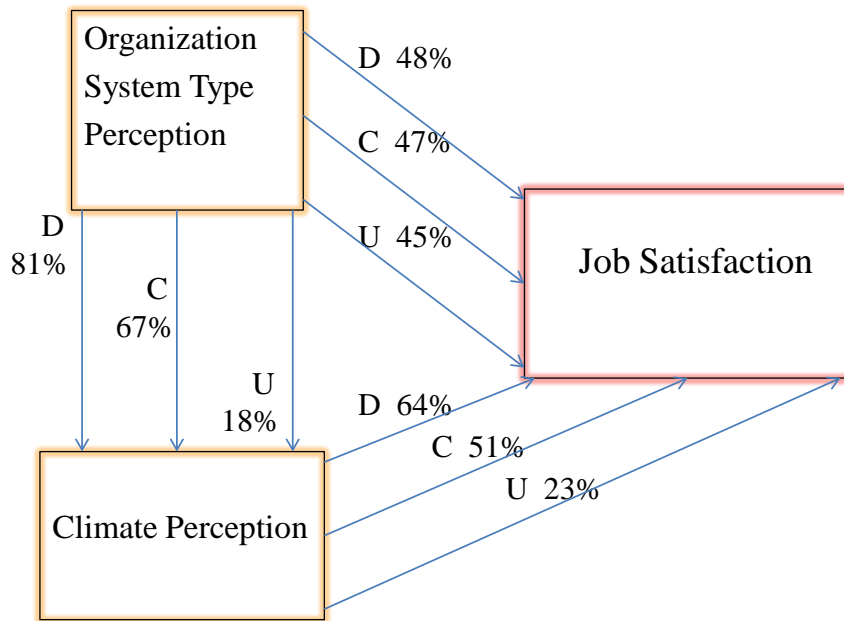
Figure 5.3. Female faculty, strengths of relationships between variables (each level). Relationships are expressed as percentage of variation explained.
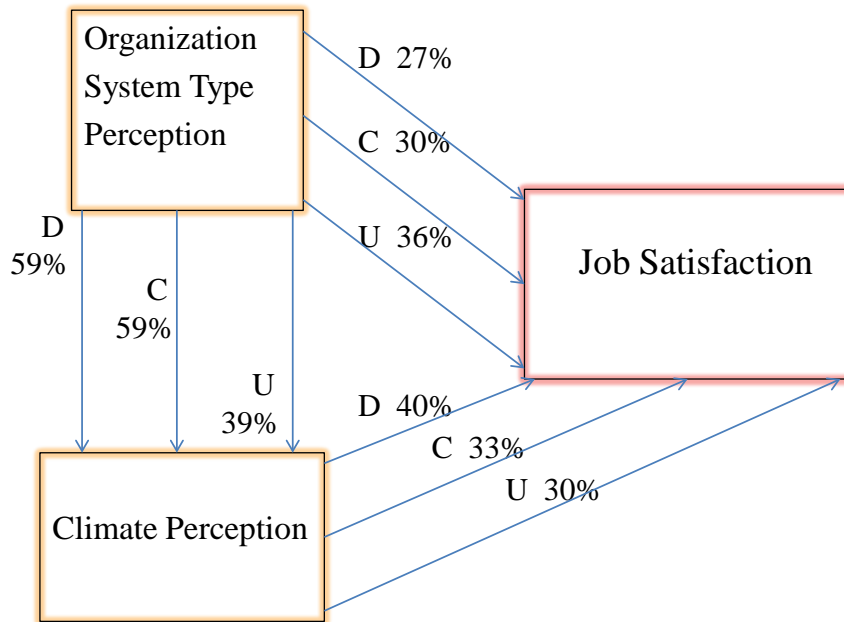
Figure 5.4. Male faculty, strengths of relationships between variables (each level). Relationships are expressed as percentage of variation explained.
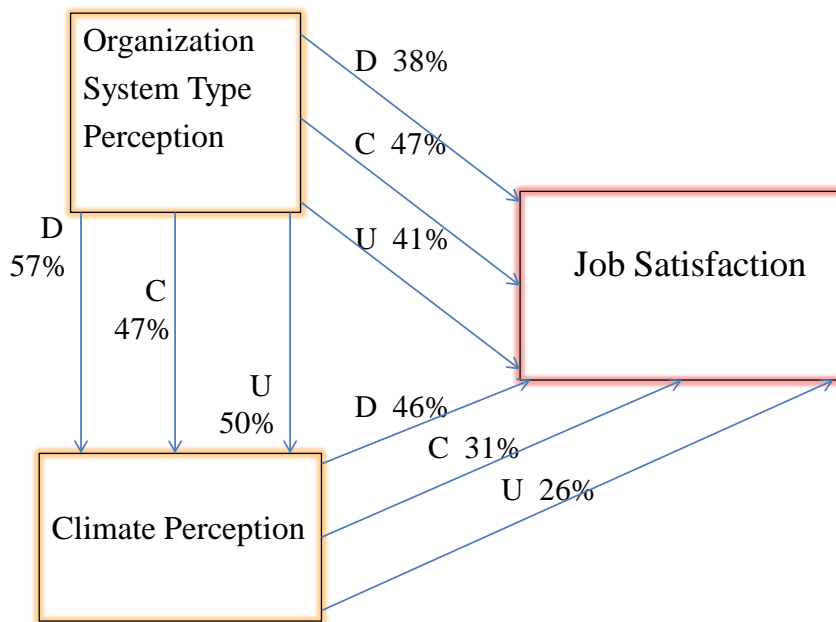
Figure 5.5. Gendered colleges, strengths of relationships between variables (each level). Relationships are expressed as percentage of variation explained.
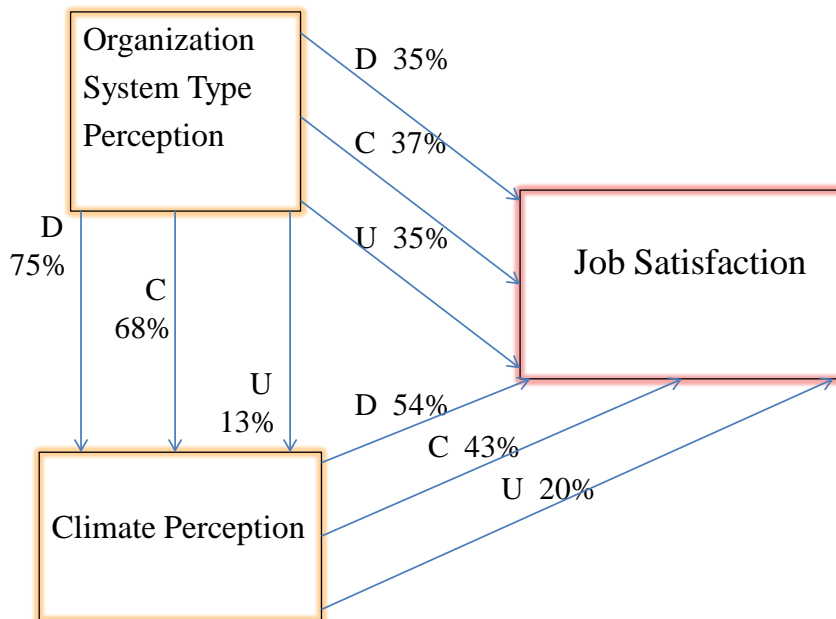
Figure 5.6. Non-gendered colleges, strengths of relationships between variables (each level). Relationships are expressed as percentage of variation explained.

From these relationships, several patterns are seen. One pattern is that, in general, climate perception is a better predictor than is organizational system type for job satisfaction. This pattern does not hold true at the university level for either females, males, gendered, or non-gendered colleges. This pattern also breaks down for the college level of gendered colleges. In those cases (university level through all groups, and college level for gendered colleges), organizational system type perception is a better predictor than climate of job satisfaction. One possible reason for this finding is that the organizational system type at the university level could be more important than the system types perceived at either the college level or department level in terms of how it affects job satisfaction (if it does actually affect satisfaction at all). As more authoritative organizational system types were perceived at university levels, it is conceivable that those perceptions are more highly influential on faculty satisfaction levels than are the more participative system types perceived at the department and college levels.

For the different gender groups, female faculty perception relationships demonstrated greater predictive abilities than those for male faculty at all levels and in all relationships (with the exception of university level between both organizational system type and climate and climate and job satisfaction). This may support the literature showing females more highly value climate and interactions (August & Waltman, 2004; Bilimoria et al., 2006; Callister, 2006) as factors of job satisfaction.

For gendered colleges, organizational system type was a better predictor of job satisfaction than it was for non-gendered colleges (at all levels). Gendered colleges also saw the highest university level predictor of climate by organizational system type (of all relationships indicated in this portion of the study), whereas non-gendered colleges saw

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higher levels of prediction of climate by organizational system type at both the department and college levels. It is possible that the more authoritative organizational systems of gendered colleges (measured with significance at the college level, though more authoritative as shown by median values at all levels) have a greater impact on overall faculty job satisfaction than the more participatory styles found in non-gendered colleges.

As for the relationships between organizational system type and climate (and even between climate and job satisfaction), it could be that gendered colleges (with few female faculty survey respondents – 27%) show less distinct relationships with the climate construct, as climate perceptions are less important satisfaction criteria for male faculty than they are for female faculty.

Another pattern found in the relationships between the various dependent variables for the study is that the highest predictive numbers, overall, were found between organizational system type and climate. This holds true for nearly all grouped relationships, with only the university level showing any break with this pattern. From the original hypothesized variable relationship diagram (Figure 1.1), overlap is shown between sub-constructs of organizational system type and climate. Even though the theorized sub-constructs for organizational system type did not hold up to factor analysis, it is conceivable that a muted presence of sub-constructs from organizational system type that overlapped climate sub-constructs (leadership and interaction) was enough to increase the relationship between the two main constructs of organizational system type and climate.

One additional pattern seen in the relationships is the trend for higher values of predictive capability at the department level than at either the college or university levels (in most paired relationships). This is especially true for the organizational system type and climate relationships in both the female group and the non-gendered college group. As the non-gendered college group was made of a high number of female respondents (68%), it is expected that those groups would demonstrate similar relationships (just as the male group and gendered-college group). For climate interactions, greater relationships are expected at the department level due to the high number of climate items in which participants were asked to respond based on their "primary unit" (or department level) only.

Study Limitations

One limitation to the study was the nature of the study itself as a cross-sectional design. The perceptions of faculty as measured in one snapshot of time may not be indicative of their overall feelings for any particular construct or item. The study was also hindered by a relatively low response rate (22.6% of full-time faculty) to the voluntary participation online survey. An additional layer of response issues was related to response rates for individual colleges. Only 5.9% of the faculty in the business college completed the survey, such that the business college could not be considered on its own to determine if differences existed between measures for the STEM and business colleges, which were the only two gendered colleges in the study.

Additional limitations were found within the responses themselves, as respondents did not answer all survey questions, even for those surveys that were completed. As faculty were given the option of skipping questions and of answering

"N/A" or "decline to answer" for various questions, the response rates varied from item to item. Faculty may have also responded in ways they expected were more socially desirable, or have responded in ways they felt would avoid a perceived possibility for negative retribution. Both of these response issues could have resulted in more positive perceptions of climate and job satisfaction than would have otherwise been the case.

A limitation of the survey itself is that each item was not measured at all three organizational levels. As every item within the organizational system type construct was measured at all three organizational levels (department, college, and university), the distinction of the three levels was well defined for analytic purposes. That distinction was not as clear for the construct of climate and job satisfaction, as only a limited number of items (two in satisfaction and three in climate) were measured at all three organizational levels. It was important for the study to have a portion of each construct measured at each level for separate level analyses to be conducted. However, it would have made the scale overly cumbersome to include the three levels for each of the measured items and three levels of measurement are not applicable for all items, such as items 19 and 20 regarding salary and benefits. It is possible that having only some items in both the constructs of climate and job satisfaction measured at all three levels caused a dampened effect of any variation in organizational level perceptions to be seen for those constructs.

Another limitation of the survey is its construct validity. Validity can be difficult to establish for social science scales (Spector, 1992). Although care was taken to choose items that were already present in the literature (Bilimoria et al., 2006; Likert & Likert, 1976), to conduct factor analyses on validity for each construct, and though the internal

reliability was reasonably high for the constructs as a whole, items may not actually measure what they are designed to measure. Validity becomes especially complicated to obtain within the areas of climate and job satisfaction, as female and male faculty have been shown to place differing levels of importance on the various sub-components (such as collegiality and resources) that influence those areas (Bilimoria et al., 2006).

Future Research

As the introduction of multiple organizational levels into university research on faculty climate and job satisfaction appears to be new, future research should look into the different levels to determine if the differences in faculty perceptions exist in other types of institutions, such as different sizes and types of universities. Of particular interest would be colleges with very high numbers of women (such as most women's colleges), to determine if the same hierarchical levels are as distinct within institutions where women make up a vast majority of both the faculty and administration. Future research could expand this concept into industry to see if increasing hierarchical organizational level differences yield similar differences in employee perceptions.

It would also be interesting to look at the gender breakdown of leadership in order to determine if there is a greater percentage of male leaders in gendered colleges and also if there is a greater percentage of male leaders at the progressively higher hierarchical organizational levels of the institution. A greater number of male leaders might correspond to a higher likelihood of authoritative types of management which then could translate into more authoritative faculty perceptions of organizational system type. As the higher levels of the institution (university over college and college over department) were perceived with more authoritative-leaning system types, it would be interesting to

see if a greater percentage of male leaders was found associated with those more authoritative system types.

Another focus for future research would be to obtain individual department level information for a similar study. Unfortunately, department data were not collected within demographics for this study, as it was determined that the particularly low numbers of female faculty within certain departments would allow for identification of specific individuals.

Concluding Implications of This Study: Central Research Question and Goals

The central research question for this study was: "Does the identification of a more authoritative organizational management system within individual university units or levels correspond to a higher level of dissatisfaction for associated female faculty?" The associated null hypothesis for the central research question was: H_0 For female faculty, no relationship exists between perceptions of organizational system type and reports of job satisfaction.

The results of the study supported rejection of the null hypothesis: faculty perception of more authoritative organizational systems (or less participative systems) within individual organizational levels (department, college, and university) did correlate to a higher level of dissatisfaction for female faculty. Additionally, this result did not just apply to female faculty, but to male faculty. Although causation cannot be determined by this study, it is possible that more authoritative styles of management yield lower employee satisfaction levels.

One goal of the study was to determine if the definition of gendered organizations could be expanded to include those with more authoritative management systems. The

study found that the more relatively gendered an organization (measured at the college level for this study), the more authoritative its faculty's perceptions of organizational system. This did yield another possible characteristic to help define gendered organizations

Another goal of the study was to test the various organizational layers within a university system to determine if differences could be found between department, college, and university levels. Research did not yield previous studies on climate or job satisfaction that considered organizational layering, but the current study did find generally statistically significant differences in faculty perceptions of the three organizational levels. Faculty tended to be more dissatisfied and have more negative perceptions of higher hierarchical levels (university) than lower ones (department and college). Higher hierarchical levels were also associated with more authoritative styles of organizational systems. This result adds layers of complexity into climate research, not just in university systems, but also in other organizations in which various hierarchical levels exist. Employee satisfaction at one level may be offset by dissatisfaction at another. This creates difficulties for those researchers who would seek ways to improve employee satisfaction, productivity, and retention rates and needs further investigation.

One final goal of the study was to determine if a gendered organization's more authoritative system type would more negatively affect the satisfaction levels of females than males. In gendered colleges, where more authoritative perceptions of system type were found at the college level, female faculty did have generally lower job satisfaction and more negative climate perception levels than did male faculty. However, those perception values were not significantly lower. Results of this study do not make the

case for organizational system type and associated job or climate dissatisfaction as main

factors behind lower numbers of women in STEM disciplines in academia.

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Appendix A: Faculty Survey Notification and Implied Voluntary Consent

Dear (University) faculty member:

You are being asked to participate in the (University) Organizational Characterization study. The purpose of this project is to collect data regarding faculty perceptions of (University) organizational characteristics, climate, and satisfaction. This study will be used to complete a dissertation toward fulfilling the requirements of a Doctorate in Educational Leadership. This important survey is open online starting today, Monday, April 16, 2012 and will end on Friday, April 27, 2012.

The (University) Organizational Characterization study is an online survey administered to individual participants using Qualtrics**.** The survey will take approximately 10-15 minutes to complete. The survey was reviewed and approved by the (University) Institutional Review Board (IRB) and participation is voluntary. Should you choose to participate, you may withdraw at any point in the survey with no penalty.

No information connecting individual participants with collected data will be gathered.

There are no known discomforts or risks associated with participation in this survey research process. There are no anticipated benefits to individuals participating in this survey research, other than the potential to add to the knowledge base for research in any associated areas.

The following link will take you to the survey. Following this link constitutes your implied voluntary consent to complete the survey:

https://wku.qualtrics.com/SE/?SID=SV_0upH73oyVq0Zm28

Questions regarding this study may be answered by principle investigator Margaret Crowder, Instructor, Department of Geography and Geology at 270-745-5973.

Thank you very much for your contribution and for your support.

THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY
THE WESTERN KENTUCKY UNIVERSITY INSTITUTIONAL REVIEW BOARD
Paul Mooney, Human Protections Administrator
TELEPHONE: (270) 745-6733


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Please mark the response that describes YOUR experience/opinion for the unit indicated. If your appointment is in multiple departments/colleges, please use the department/college of your primary appointment. If you do not identify with any department/college, answer "N/A."

1	*I* have <u>complete confidence</u> in administrators.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					
2	*I* feel <u>completely comfortable</u> talking to administrators about important unit issues.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					
3	*My* ideas are <u>seldom</u> sought and used in solving unit problems.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					

4	From my experience serving on committees, workgroups, etc., a <u>substantial amount</u> of *cooperative teamwork* is demonstrated in the unit.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					
5	The direction of *information flow* within the unit is "<u>top-down</u>."	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					
6	*Administrators* demonstrate <u>complete confidence</u> in me.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					
7	*Administrators* are <u>unaware</u> of problems faced by faculty such as myself.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					

8	*Administrators* have an <u>open mind</u> when receiving communications from faculty.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					
9	*Faculty* have an <u>open mind</u> when receiving communications from administrators.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					
10	*Faculty* are <u>dissatisfied</u> with regard to membership in the unit.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					

Please indicate how satisfied YOU are with each of the following dimensions of your professional life

11	*My* overall experience of <u>collegiality</u> in the unit.	**Strongly satisfied**	**Somewhat satisfied**	**Somewhat dissatisfied**	**Strongly dissatisfied**	**N/A**
	Department level:					
	College level:					
	University level:					
12	*My* overall experience of <u>being a faculty member</u> in the unit.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					
13	*My* <u>access to resources</u> provided within the unit for research/securing grants.	**Strongly satisfied**	**Somewhat satisfied**	**Somewhat dissatisfied**	**Strongly dissatisfied**	**N/A**
	Department level:					
	College level:					
	University level:					

14	*My* satisfaction with <u>involvement in important decision-making</u> processes in the unit.	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					
15	*My* satisfaction with <u>overall mentoring</u> received in the unit. (Mentoring is defined as advice or counsel on scholarly or career issues, or sponsorship or advocacy on your behalf)	**Strongly agree**	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**	**N/A**
	Department level:					
	College level:					
	University level:					

Please indicate how satisfied YOU are with each of the following dimensions of your professional life

		Strongly satisfied	Somewhat satisfied	Somewhat dissatisfied	Strongly dissatisfied	N/A
16	Teaching responsibilities					
17	Time available for scholarly work					
18	Space (office and lab/research space)					
19	Salary					
20	Benefits					

Please indicate YOUR level of agreement with the following statements. For all of the following: "primary unit" = department level (or your most immediate sphere of work within the University)

		Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	N/A
21	Colleagues in my primary unit value my work					
22	Colleagues in my primary unit can be trusted					
23	I am comfortable asking my colleagues about performance expectations					
24	Colleagues in my primary unit provide me feedback on research/scholarly issues					
25	Colleagues in my primary unit solicit my opinions about scholarly issues					

		Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	N/A
26	I feel professionally welcome and included by colleagues in my primary unit					
27	I constantly feel under scrutiny by my colleagues in my primary unit					
28	I have to work harder than my colleagues to be perceived as a legitimate scholar					
29	I feel pressure to change my work interests in order to affect my tenure/promotion/evaluation					
30	Gender makes a difference in everyday interactions with my colleagues in my primary unit					
31	Race or ethnicity makes a difference in everyday interactions with colleagues in my primary unit					

Please rate the following statements regarding YOUR experience with the head (chair) of your primary unit; if you are an administrator of department chair level or higher, consider your immediate supervisor and the larger unit for the following

		Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	N/A
32	Is an effective administrator for *the unit*					
33	Is an effective administrator for *me*					
		Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	N/A
34	Articulates a clear vision for the unit					
35	Shares resources/opportunities fairly within the unit					
36	Helps me obtain the resources *I* need					

Please rate the following items regarding YOUR experience with mentoring (Mentoring is defined as advice or counsel on scholarly or career issues, or sponsorship or advocacy on your behalf)

		Extensive	Moderate	Minimal	Not at all	N/A
37	To what extent do you receive *formal* mentoring within the University?					
38	To what extent do you receive *informal* mentoring within the University?					

Please provide the following information. Remember, any personally identifying information will be kept completely confidential.

| 39 | What is your gender? | **Female** | **Male** | **Decline to Answer** |

| 40 | In which college is your primary appointment? | **Gordon Ford College of Business** |

College of Education and Behavioral Sciences

College of Health and Human Services

Ogden College of Science and Engineering

Potter College of Arts and Letters

University College

Decline to Answer

Other _____

| 41 | What type of appointment do you hold? | **Part-time** |

Tenured

Tenure track

Non-tenure track

Transitional faculty (optional retirement)

Decline to Answer

Other _____

42	Do you have administrative duties?	**Yes**	**No**	**Decline to Answer**

42a	If "Yes" on above, what percentage of your appointment is administrative in nature?	**025%**
		26-50%
		51-75%
		76-100%
		Decline to Answer

43	What is your current rank?	**Instructor**
		Assistant Professor
		Associate Professor
		Professor
		Other _____

44	Do you identify yourself as a member of a racial or ethnic minority?	**Yes**	**No**

44a	If "Yes" on above, With what race/ethnicity to you most identify? (May choose up to two)	**Black**
		American Indian or Alaska Native
		Native Hawaiian or other Pacific Islander
		Hispanic or Latino
		Decline to answer
		Other _____

45 If you would like to add any additional comments, please feel free to do so here: _____

Item 1

I have complete confidence in administrators.-Department level:

		Frequency	Percent	Valid Percent
	Strongly agree	72	41.9	42.1
	Somewhat agree	50	29.1	29.2
Valid	Somewhat disagree	26	15.1	15.2
	Strongly disagree	23	13.4	13.5
	Total	171	99.4	100.0
Missing	N/A	1	.6	
Total		172	100.0	

I have complete confidence in administrators.-College level:

		Frequency	Percent	Valid Percent
	Strongly agree	41	23.8	24.1
	Somewhat agree	78	45.3	45.9
Valid	Somewhat disagree	33	19.2	19.4
	Strongly disagree	18	10.5	10.6
	Total	170	98.8	100.0
	N/A	1	.6	
Missing	System	1	.6	
	Total	2	1.2	
Total		172	100.0	

I have complete confidence in administrators.-University level:

		Frequency	Percent	Valid Percent
	Strongly agree	5	2.9	2.9
	Somewhat agree	71	41.3	41.8
Valid	Somewhat disagree	56	32.6	32.9
	Strongly disagree	38	22.1	22.4
	Total	170	98.8	100.0
	N/A	1	.6	
Missing	System	1	.6	
	Total	2	1.2	
Total		172	100.0	

Item 2

**I feel completely comfortable talking to administrators about important unit issues.-
Department level:**

		Frequency	Percent	Valid Percent
Valid	Strongly agree	91	52.9	53.8
	Somewhat agree	34	19.8	20.1
	Somewhat disagree	23	13.4	13.6
	Strongly disagree	21	12.2	12.4
	Total	169	98.3	100.0
Missing	N/A	2	1.2	
	System	1	.6	
	Total	3	1.7	
Total		172	100.0	

**I feel completely comfortable talking to administrators about important unit issues.-
College level:**

		Frequency	Percent	Valid Percent
Valid	Strongly agree	45	26.2	26.9
	Somewhat agree	73	42.4	43.7
	Somewhat disagree	28	16.3	16.8
	Strongly disagree	21	12.2	12.6
	Total	167	97.1	100.0
Missing	N/A	3	1.7	
	System	2	1.2	
	Total	5	2.9	
Total		172	100.0	

**I feel completely comfortable talking to administrators about important unit issues.-
University level:**

		Frequency	Percent	Valid Percent
Valid	Strongly agree	17	9.9	10.6
	Somewhat agree	53	30.8	33.1
	Somewhat disagree	49	28.5	30.6
	Strongly disagree	41	23.8	25.6
	Total	160	93.0	100.0
Missing	N/A	10	5.8	
	System	2	1.2	
	Total	12	7.0	
Total		172	100.0	

Item 3

My ideas are seldom sought and used in solving unit problems.-Department level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	35	20.3	21.0
	Somewhat agree	30	17.4	18.0
	Somewhat disagree	40	23.3	24.0
	Strongly disagree	62	36.0	37.1
	Total	167	97.1	100.0
Missing	N/A	4	2.3	
	System	1	.6	
	Total	5	2.9	
Total		172	100.0	

My ideas are seldom sought and used in solving unit problems.-College level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	41	23.8	26.1
	Somewhat agree	47	27.3	29.9
	Somewhat disagree	44	25.6	28.0
	Strongly disagree	25	14.5	15.9
	Total	157	91.3	100.0
Missing	N/A	12	7.0	
	System	3	1.7	
	Total	15	8.7	
Total		172	100.0	

My ideas are seldom sought and used in solving unit problems.-University level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	67	39.0	43.8
	Somewhat agree	44	25.6	28.8
	Somewhat disagree	31	18.0	20.3
	Strongly disagree	11	6.4	7.2
	Total	153	89.0	100.0
Missing	N/A	17	9.9	
	System	2	1.2	
	Total	19	11.0	
Total		172	100.0	

Item 4

From my experience serving on committees, workgroups, etc., a substantial amount of cooperative teamwork is demonstrated in the unit.-Department level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	65	37.8	38.2
	Somewhat agree	67	39.0	39.4
	Somewhat disagree	22	12.8	12.9
	Strongly disagree	16	9.3	9.4
	Total	170	98.8	100.0
Missing	N/A	2	1.2	
Total		172	100.0	

From my experience serving on committees, workgroups, etc., a substantial amount of cooperative teamwork is demonstrated in the unit.-College level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	31	18.0	20.4
	Somewhat agree	73	42.4	48.0
	Somewhat disagree	33	19.2	21.7
	Strongly disagree	15	8.7	9.9
	Total	152	88.4	100.0
Missing	N/A	19	11.0	
	System	1	.6	
	Total	20	11.6	
Total		172	100.0	

From my experience serving on committees, workgroups, etc., a substantial amount of cooperative teamwork is demonstrated in the unit.-University level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	16	9.3	11.3
	Somewhat agree	53	30.8	37.3
	Somewhat disagree	48	27.9	33.8
	Strongly disagree	25	14.5	17.6
	Total	142	82.6	100.0
Missing	N/A	29	16.9	
	System	1	.6	
	Total	30	17.4	
Total		172	100.0	

Item 5

The direction of information flow within the unit is top-down. -Department level:

		Frequency	Percent	Valid Percent
	Strongly agree	60	34.9	35.5
	Somewhat agree	59	34.3	34.9
Valid	Somewhat disagree	30	17.4	17.8
	Strongly disagree	20	11.6	11.8
	Total	169	98.3	100.0
Missing	N/A	3	1.7	
Total		172	100.0	

The direction of information flow within the unit is top-down. -College level:

		Frequency	Percent	Valid Percent
	Strongly agree	75	43.6	45.7
	Somewhat agree	63	36.6	38.4
Valid	Somewhat disagree	19	11.0	11.6
	Strongly disagree	7	4.1	4.3
	Total	164	95.3	100.0
	N/A	6	3.5	
Missing	System	2	1.2	
	Total	8	4.7	
Total		172	100.0	

The direction of information flow within the unit is top-down. -University level:

		Frequency	Percent	Valid Percent
	Strongly agree	115	66.9	70.1
	Somewhat agree	43	25.0	26.2
Valid	Somewhat disagree	3	1.7	1.8
	Strongly disagree	3	1.7	1.8
	Total	164	95.3	100.0
	N/A	7	4.1	
Missing	System	1	.6	
	Total	8	4.7	
Total		172	100.0	

Item 6

Administrators demonstrate complete confidence in me.-Department level:

		Frequency	Percent	Valid Percent
	Strongly agree	83	48.3	50.0
	Somewhat agree	48	27.9	28.9
Valid	Somewhat disagree	17	9.9	10.2
	Strongly disagree	18	10.5	10.8
	Total	166	96.5	100.0
Missing	N/A	6	3.5	
Total		172	100.0	

Administrators demonstrate complete confidence in me.-College level:

		Frequency	Percent	Valid Percent
	Strongly agree	54	31.4	34.4
	Somewhat agree	71	41.3	45.2
Valid	Somewhat disagree	20	11.6	12.7
	Strongly disagree	12	7.0	7.6
	Total	157	91.3	100.0
	N/A	14	8.1	
Missing	System	1	.6	
	Total	15	8.7	
Total		172	100.0	

Administrators demonstrate complete confidence in me.-University level:

		Frequency	Percent	Valid Percent
	Strongly agree	27	15.7	19.4
	Somewhat agree	59	34.3	42.4
Valid	Somewhat disagree	33	19.2	23.7
	Strongly disagree	20	11.6	14.4
	Total	139	80.8	100.0
	N/A	32	18.6	
Missing	System	1	.6	
	Total	33	19.2	
Total		172	100.0	

Item 7

Administrators are unaware of problems faced by faculty such as myself.-
Department level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	23	13.4	13.6
	Somewhat agree	40	23.3	23.7
	Somewhat disagree	32	18.6	18.9
	Strongly disagree	74	43.0	43.8
	Total	169	98.3	100.0
Missing	N/A	3	1.7	
Total		172	100.0	

Administrators are unaware of problems faced by faculty such as myself.-
College level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	34	19.8	20.4
	Somewhat agree	51	29.7	30.5
	Somewhat disagree	50	29.1	29.9
	Strongly disagree	32	18.6	19.2
	Total	167	97.1	100.0
Missing	N/A	4	2.3	
	System	1	.6	
	Total	5	2.9	
Total		172	100.0	

Administrators are unaware of problems faced by faculty such as myself.-
University level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	73	42.4	44.0
	Somewhat agree	56	32.6	33.7
	Somewhat disagree	21	12.2	12.7
	Strongly disagree	16	9.3	9.6
	Total	166	96.5	100.0
Missing	N/A	5	2.9	
	System	1	.6	
	Total	6	3.5	
Total		172	100.0	

Item 8

Administrators have an open mind when receiving communications from faculty.-
Department level:

		Frequency	Percent	Valid Percent
	Strongly agree	71	41.3	42.3
	Somewhat agree	51	29.7	30.4
Valid	Somewhat disagree	24	14.0	14.3
	Strongly disagree	22	12.8	13.1
	Total	168	97.7	100.0
Missing	N/A	4	2.3	
Total		172	100.0	

Administrators have an open mind when receiving communications from faculty.-
College level:

		Frequency	Percent	Valid Percent
	Strongly agree	34	19.8	20.6
	Somewhat agree	80	46.5	48.5
Valid	Somewhat disagree	31	18.0	18.8
	Strongly disagree	20	11.6	12.1
	Total	165	95.9	100.0
	N/A	6	3.5	
Missing	System	1	.6	
	Total	7	4.1	
Total		172	100.0	

Administrators have an open mind when receiving communications from faculty.-
University level:

		Frequency	Percent	Valid Percent
	Strongly agree	9	5.2	5.8
	Somewhat agree	49	28.5	31.4
Valid	Somewhat disagree	54	31.4	34.6
	Strongly disagree	44	25.6	28.2
	Total	156	90.7	100.0
	N/A	15	8.7	
Missing	System	1	.6	
	Total	16	9.3	
Total		172	100.0	

Item 9

Faculty have an open mind when receiving communications from administrators.- Department level:

		Frequency	Percent	Valid Percent
	Strongly agree	36	20.9	21.4
	Somewhat agree	95	55.2	56.5
Valid	Somewhat disagree	33	19.2	19.6
	Strongly disagree	4	2.3	2.4
	Total	168	97.7	100.0
	N/A	3	1.7	
Missing	System	1	.6	
	Total	4	2.3	
Total		172	100.0	

Faculty have an open mind when receiving communications from administrators.- College level:

		Frequency	Percent	Valid Percent
	Strongly agree	21	12.2	12.5
	Somewhat agree	108	62.8	64.3
Valid	Somewhat disagree	34	19.8	20.2
	Strongly disagree	5	2.9	3.0
	Total	168	97.7	100.0
	N/A	3	1.7	
Missing	System	1	.6	
	Total	4	2.3	
Total		172	100.0	

Faculty have an open mind when receiving communications from administrators.- University level:

		Frequency	Percent	Valid Percent
	Strongly agree	11	6.4	6.6
	Somewhat agree	70	40.7	41.9
Valid	Somewhat disagree	69	40.1	41.3
	Strongly disagree	17	9.9	10.2
	Total	167	97.1	100.0
	N/A	4	2.3	
Missing	System	1	.6	
	Total	5	2.9	
Total		172	100.0	

Item 10

Faculty are dissatisfied with regard to membership in the unit.-Department level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	18	10.5	11.5
	Somewhat agree	40	23.3	25.5
	Somewhat disagree	34	19.8	21.7
	Strongly disagree	65	37.8	41.4
	Total	157	91.3	100.0
Missing	N/A	15	8.7	
Total		172	100.0	

Faculty are dissatisfied with regard to membership in the unit.-College level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	12	7.0	8.1
	Somewhat agree	36	20.9	24.2
	Somewhat disagree	58	33.7	38.9
	Strongly disagree	43	25.0	28.9
	Total	149	86.6	100.0
Missing	N/A	22	12.8	
	System	1	.6	
	Total	23	13.4	
Total		172	100.0	

Faculty are dissatisfied with regard to membership in the unit.-University level:

		Frequency	Percent	Valid Percent
Valid	Strongly agree	24	14.0	16.4
	Somewhat agree	62	36.0	42.5
	Somewhat disagree	37	21.5	25.3
	Strongly disagree	23	13.4	15.8
	Total	146	84.9	100.0
Missing	N/A	25	14.5	
	System	1	.6	
	Total	26	15.1	
Total		172	100.0	

Item 11

My overall experience of collegiality in the unit.-Department level:

		Frequency	Percent	Valid Percent
	Strongly satisfied	80	46.5	46.5
	Somewhat satisfied	61	35.5	35.5
Valid	Somewhat dissatisfied	15	8.7	8.7
	Strongly dissatisfied	16	9.3	9.3
	Total	172	100.0	100.0

My overall experience of collegiality in the unit.-College level:

		Frequency	Percent	Valid Percent
	Strongly satisfied	37	21.5	22.2
	Somewhat satisfied	91	52.9	54.5
Valid	Somewhat dissatisfied	25	14.5	15.0
	Strongly dissatisfied	14	8.1	8.4
	Total	167	97.1	100.0
	N/A	4	2.3	
Missing	System	1	.6	
	Total	5	2.9	
Total		172	100.0	

My overall experience of collegiality in the unit.-University level:

		Frequency	Percent	Valid Percent
	Strongly satisfied	18	10.5	11.0
	Somewhat satisfied	83	48.3	50.6
Valid	Somewhat dissatisfied	44	25.6	26.8
	Strongly dissatisfied	19	11.0	11.6
	Total	164	95.3	100.0
	N/A	7	4.1	
Missing	System	1	.6	
	Total	8	4.7	
Total		172	100.0	

Item 12

My overall experience of being a faculty member in the unit.-Department level:

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	84	48.8	48.8
	Somewhat satisfied	51	29.7	29.7
	Somewhat dissatisfied	20	11.6	11.6
	Strongly dissatisfied	17	9.9	9.9
	Total	172	100.0	100.0

My overall experience of being a faculty member in the unit.-College level:

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	57	33.1	34.5
	Somewhat satisfied	72	41.9	43.6
	Somewhat dissatisfied	26	15.1	15.8
	Strongly dissatisfied	10	5.8	6.1
	Total	165	95.9	100.0
Missing	N/A	2	1.2	
	System	5	2.9	
	Total	7	4.1	
Total		172	100.0	

My overall experience of being a faculty member in the unit.-University level:

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	24	14.0	14.6
	Somewhat satisfied	77	44.8	47.0
	Somewhat dissatisfied	49	28.5	29.9
	Strongly dissatisfied	14	8.1	8.5
	Total	164	95.3	100.0
Missing	N/A	4	2.3	
	System	4	2.3	
	Total	8	4.7	
Total		172	100.0	

Item 13

My access to resources provided within the unit for research/securing grants.-

Department level:

		Frequency	Percent	Valid Percent
	Strongly satisfied	52	30.2	33.8
	Somewhat satisfied	61	35.5	39.6
Valid	Somewhat dissatisfied	23	13.4	14.9
	Strongly dissatisfied	18	10.5	11.7
	Total	154	89.5	100.0
Missing	N/A	18	10.5	
Total		172	100.0	

My access to resources provided within the unit for research/securing grants.-

College level:

		Frequency	Percent	Valid Percent
	Strongly satisfied	44	25.6	29.7
	Somewhat satisfied	60	34.9	40.5
Valid	Somewhat dissatisfied	29	16.9	19.6
	Strongly dissatisfied	15	8.7	10.1
	Total	148	86.0	100.0
	N/A	22	12.8	
Missing	System	2	1.2	
	Total	24	14.0	
Total		172	100.0	

My access to resources provided within the unit for research/securing grants.-

University level:

		Frequency	Percent	Valid Percent
	Strongly satisfied	23	13.4	16.1
	Somewhat satisfied	54	31.4	37.8
Valid	Somewhat dissatisfied	37	21.5	25.9
	Strongly dissatisfied	29	16.9	20.3
	Total	143	83.1	100.0
	N/A	26	15.1	
Missing	System	3	1.7	
	Total	29	16.9	
Total		172	100.0	

Item 14

My satisfaction with involvement in important decision-making processes in the unit.-
Department level:

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	66	38.4	39.3
	Somewhat satisfied	42	24.4	25.0
	Somewhat dissatisfied	29	16.9	17.3
	Strongly dissatisfied	31	18.0	18.5
	Total	168	97.7	100.0
Missing	N/A	3	1.7	
	System	1	.6	
	Total	4	2.3	
Total		172	100.0	

My satisfaction with involvement in important decision-making processes in the unit.-
College level:

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	20	11.6	13.0
	Somewhat satisfied	62	36.0	40.3
	Somewhat dissatisfied	43	25.0	27.9
	Strongly dissatisfied	29	16.9	18.8
	Total	154	89.5	100.0
Missing	N/A	14	8.1	
	System	4	2.3	
	Total	18	10.5	
Total		172	100.0	

My satisfaction with involvement in important decision-making processes in the unit.-
University level:

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	4	2.3	2.6
	Somewhat satisfied	41	23.8	27.2
	Somewhat dissatisfied	53	30.8	35.1
	Strongly dissatisfied	53	30.8	35.1
	Total	151	87.8	100.0
Missing	N/A	18	10.5	
	System	3	1.7	
	Total	21	12.2	
Total		172	100.0	

Item 15

My satisfaction with overall mentoring received in the unit.-Department level:

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	60	34.9	37.0
	Somewhat satisfied	44	25.6	27.2
	Somewhat dissatisfied	27	15.7	16.7
	Strongly dissatisfied	31	18.0	19.1
	Total	162	94.2	100.0
Missing	N/A	8	4.7	
	System	2	1.2	
	Total	10	5.8	
Total		172	100.0	

My satisfaction with overall mentoring received in the unit.-College level:

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	31	18.0	20.3
	Somewhat satisfied	54	31.4	35.3
	Somewhat dissatisfied	36	20.9	23.5
	Strongly dissatisfied	32	18.6	20.9
	Total	153	89.0	100.0
Missing	N/A	15	8.7	
	System	4	2.3	
	Total	19	11.0	
Total		172	100.0	

My satisfaction with overall mentoring received in the unit.-University level:

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	14	8.1	9.9
	Somewhat satisfied	42	24.4	29.6
	Somewhat dissatisfied	35	20.3	24.6
	Strongly dissatisfied	51	29.7	35.9
	Total	142	82.6	100.0
Missing	N/A	25	14.5	
	System	5	2.9	
	Total	30	17.4	
Total		172	100.0	

Item 16

Teaching responsibilities

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	66	38.4	39.1
	Somewhat satisfied	74	43.0	43.8
	Somewhat dissatisfied	22	12.8	13.0
	Strongly dissatisfied	7	4.1	4.1
	Total	169	98.3	100.0
Missing	N/A	2	1.2	
	System	1	.6	
	Total	3	1.7	
Total		172	100.0	

Item 17

Time available for scholarly work

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	17	9.9	10.5
	Somewhat satisfied	47	27.3	29.0
	Somewhat dissatisfied	58	33.7	35.8
	Strongly dissatisfied	40	23.3	24.7
	Total	162	94.2	100.0
Missing	N/A	9	5.2	
	System	1	.6	
	Total	10	5.8	
Total		172	100.0	

Item 18

Space (office and lab/research space)

		Frequency	Percent	Valid Percent
Valid	Strongly satisfied	67	39.0	39.4
	Somewhat satisfied	55	32.0	32.4
	Somewhat dissatisfied	28	16.3	16.5
	Strongly dissatisfied	20	11.6	11.8
	Total	170	98.8	100.0
Missing	N/A	2	1.2	
Total		172	100.0	

Item 19

Salary

		Frequency	Percent	Valid Percent
	Strongly satisfied	12	7.0	7.0
	Somewhat satisfied	40	23.3	23.3
Valid	Somewhat dissatisfied	48	27.9	27.9
	Strongly dissatisfied	72	41.9	41.9
	Total	172	100.0	100.0

Item 20

Benefits

		Frequency	Percent	Valid Percent
	Strongly satisfied	45	26.2	26.3
	Somewhat satisfied	79	45.9	46.2
Valid	Somewhat dissatisfied	36	20.9	21.1
	Strongly dissatisfied	11	6.4	6.4
	Total	171	99.4	100.0
Missing	System	1	.6	
Total		172	100.0	

Item 21

Colleagues in my primary unit value my work

		Frequency	Percent	Valid Percent
	Strongly agree	63	36.6	36.6
	Somewhat agree	82	47.7	47.7
Valid	Somewhat disagree	16	9.3	9.3
	Strongly disagree	11	6.4	6.4
	Total	172	100.0	100.0

Item 22

Colleagues in my primary unit can be trusted

		Frequency	Percent	Valid Percent
Valid	Strongly agree	55	32.0	32.2
	Somewhat agree	74	43.0	43.3
	Somewhat disagree	29	16.9	17.0
	Strongly disagree	13	7.6	7.6
	Total	171	99.4	100.0
Missing	N/A	1	.6	
Total		172	100.0	

Item 23

I am comfortable asking my colleagues about performance expectations

		Frequency	Percent	Valid Percent
Valid	Strongly agree	69	40.1	41.3
	Somewhat agree	65	37.8	38.9
	Somewhat disagree	20	11.6	12.0
	Strongly disagree	13	7.6	7.8
	Total	167	97.1	100.0
Missing	N/A	5	2.9	
Total		172	100.0	

Item 24

Colleagues in my primary unit provide me feedback on research/scholarly issues

		Frequency	Percent	Valid Percent
Valid	Strongly agree	46	26.7	29.3
	Somewhat agree	52	30.2	33.1
	Somewhat disagree	36	20.9	22.9
	Strongly disagree	23	13.4	14.6
	Total	157	91.3	100.0
Missing	N/A	14	8.1	
	System	1	.6	
	Total	15	8.7	
Total		172	100.0	

Item 25

Colleagues in my primary unit solicit my opinions about scholarly issues

		Frequency	Percent	Valid Percent
Valid	Strongly agree	46	26.7	28.4
	Somewhat agree	64	37.2	39.5
	Somewhat disagree	29	16.9	17.9
	Strongly disagree	23	13.4	14.2
	Total	162	94.2	100.0
Missing	N/A	9	5.2	
	System	1	.6	
	Total	10	5.8	
Total		172	100.0	

Item 26

I feel professionally welcome and included by colleagues in my primary unit

		Frequency	Percent	Valid Percent
Valid	Strongly agree	78	45.3	45.6
	Somewhat agree	53	30.8	31.0
	Somewhat disagree	27	15.7	15.8
	Strongly disagree	13	7.6	7.6
	Total	171	99.4	100.0
Missing	System	1	.6	
Total		172	100.0	

Item 27

I constantly feel under scrutiny by my colleagues in my primary unit

		Frequency	Percent	Valid Percent
Valid	Strongly agree	10	5.8	5.9
	Somewhat agree	28	16.3	16.6
	Somewhat disagree	52	30.2	30.8
	Strongly disagree	79	45.9	46.7
	Total	169	98.3	100.0
Missing	N/A	2	1.2	
	System	1	.6	
	Total	3	1.7	
Total		172	100.0	

Item 28

I have to work harder than my colleagues to be perceived as a legitimate scholar

		Frequency	Percent	Valid Percent
Valid	Strongly agree	22	12.8	13.4
	Somewhat agree	45	26.2	27.4
	Somewhat disagree	37	21.5	22.6
	Strongly disagree	60	34.9	36.6
	Total	164	95.3	100.0
Missing	N/A	7	4.1	
	System	1	.6	
	Total	8	4.7	
Total		172	100.0	

Item 29

I feel pressure to change my work interests in order to affect my tenure/promotion/evaluation

		Frequency	Percent	Valid Percent
Valid	Strongly agree	32	18.6	21.5
	Somewhat agree	38	22.1	25.5
	Somewhat disagree	27	15.7	18.1
	Strongly disagree	52	30.2	34.9
	Total	149	86.6	100.0
Missing	N/A	21	12.2	
	System	2	1.2	
	Total	23	13.4	
Total		172	100.0	

Item 30

Gender makes a difference in everyday interactions with my colleagues in my primary unit

		Frequency	Percent	Valid Percent
	Strongly agree	17	9.9	10.7
	Somewhat agree	28	16.3	17.6
Valid	Somewhat disagree	37	21.5	23.3
	Strongly disagree	77	44.8	48.4
	Total	159	92.4	100.0
	N/A	12	7.0	
Missing	System	1	.6	
	Total	13	7.6	
Total		172	100.0	

Item 31

Race or ethnicity makes a difference in everyday interactions with colleagues in my primary unit

		Frequency	Percent	Valid Percent
	Strongly agree	9	5.2	5.9
	Somewhat agree	12	7.0	7.8
Valid	Somewhat disagree	35	20.3	22.9
	Strongly disagree	97	56.4	63.4
	Total	153	89.0	100.0
	N/A	17	9.9	
Missing	System	2	1.2	
	Total	19	11.0	
Total		172	100.0	

Item 32

Is an effective administrator for the unit

		Frequency	Percent	Valid Percent
Valid	Strongly agree	74	43.0	43.8
	Somewhat agree	46	26.7	27.2
	Somewhat disagree	23	13.4	13.6
	Strongly disagree	26	15.1	15.4
	Total	169	98.3	100.0
Missing	N/A	2	1.2	
	System	1	.6	
	Total	3	1.7	
Total		172	100.0	

Item 33

Is an effective administrator for me

		Frequency	Percent	Valid Percent
Valid	Strongly agree	78	45.3	45.9
	Somewhat agree	43	25.0	25.3
	Somewhat disagree	25	14.5	14.7
	Strongly disagree	24	14.0	14.1
	Total	170	98.8	100.0
Missing	N/A	2	1.2	
Total		172	100.0	

Item 34

Articulates a clear vision for the unit

		Frequency	Percent	Valid Percent
Valid	Strongly agree	63	36.6	37.1
	Somewhat agree	57	33.1	33.5
	Somewhat disagree	21	12.2	12.4
	Strongly disagree	29	16.9	17.1
	Total	170	98.8	100.0
Missing	N/A	2	1.2	
Total		172	100.0	

Item 35

Shares resources/opportunities fairly within the unit

		Frequency	Percent	Valid Percent
	Strongly agree	79	45.9	47.3
	Somewhat agree	43	25.0	25.7
Valid	Somewhat disagree	22	12.8	13.2
	Strongly disagree	23	13.4	13.8
	Total	167	97.1	100.0
Missing	N/A	5	2.9	
Total		172	100.0	

Item 36

Helps me obtain the resources I need

		Frequency	Percent	Valid Percent
	Strongly agree	69	40.1	41.3
	Somewhat agree	61	35.5	36.5
Valid	Somewhat disagree	18	10.5	10.8
	Strongly disagree	19	11.0	11.4
	Total	167	97.1	100.0
	N/A	4	2.3	
Missing	System	1	.6	
	Total	5	2.9	
Total		172	100.0	

Item 37

To what extent do you receive formal mentoring within the University?

		Frequency	Percent	Valid Percent
	Extensive	1	.6	.6
	Moderate	23	13.4	13.9
Valid	Minimal	65	37.8	39.2
	Not at all	77	44.8	46.4
	Total	166	96.5	100.0
Missing	N/A	6	3.5	
Total		172	100.0	

Item 38

To what extent do you receive informal mentoring within the University?

		Frequency	Percent	Valid Percent
	Extensive	13	7.6	7.7
	Moderate	68	39.5	40.5
Valid	Minimal	66	38.4	39.3
	Not at all	21	12.2	12.5
	Total	168	97.7	100.0
Missing	N/A	4	2.3	
Total		172	100.0	

Item 39

What is your gender?

		Frequency	Percent	Valid Percent
	Female	91	52.9	55.5
Valid	Male	73	42.4	44.5
	Total	164	95.3	100.0
Missing	Decline to answer	8	4.7	
Total		172	100.0	

Item 40

In which college is your primary appointment?

		Frequency	Percent	Valid Percent
Valid	Business	4	2.3	2.4
	Education and Behavioral Sciences	27	15.7	15.9
	Health	35	20.3	20.6
	STEM	44	25.6	25.9
	Arts and Humanities	36	20.9	21.2
	Interdisciplinary	10	5.8	5.9
	Decline to answer	9	5.2	5.3
	Other (please specify):	5	2.9	2.9
	Total	170	98.8	100.0
Missing	System	2	1.2	
Total		172	100.0	

Item 41

What type of appointment do you hold?

		Frequency	Percent	Valid Percent
Valid	Tenured	79	45.9	45.9
	Tenure track	55	32.0	32.0
	Non-tenure track	38	22.1	22.1
	Total	172	100.0	100.0

Item 42

Do you have administrative duties?

		Frequency	Percent	Valid Percent
Valid	Yes	49	28.5	28.7
	No	112	65.1	65.5
	Decline to answer	10	5.8	5.8
	Total	171	99.4	100.0
Missing	System	1	.6	
Total		172	100.0	

Item 42a

What percentage of your appointment is administrative in nature?

		Frequency	Percent	Valid Percent
	0-25%	18	10.5	36.7
	26-50%	16	9.3	32.7
Valid	51-75%	8	4.7	16.3
	76-100%	6	3.5	12.2
	Decline to answer	1	.6	2.0
	Total	49	28.5	100.0
Missing	System	123	71.5	
Total		172	100.0	

Item 43

What is your current rank?

		Frequency	Percent	Valid Percent
	Instructor	31	18.0	18.0
	Assistant Professor	41	23.8	23.8
	Associate Professor	44	25.6	25.6
Valid	Professor	36	20.9	20.9
	Decline to answer	17	9.9	9.9
	Other (please specify):	3	1.7	1.7
	Total	172	100.0	100.0

Item 44

Do you identify yourself as a member of a racial or ethnic minority?

		Frequency	Percent	Valid Percent
	Yes	11	6.4	6.4
Valid	No	140	81.4	81.9
	Decline to answer	20	11.6	11.7
	Total	171	99.4	100.0
Missing	System	1	.6	
Total		172	100.0	

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Appendix D: Survey Items, by Construct, with Cronbach's Alpha Values

Survey Items, by Construct, with Cronbach's Alpha Values

Construct and Items	Cronbach's Alpha
Org System Mgmt Type	
Department Level	**α = 0.92**
College Level	**α = 0.90**
University Level	**α = 0.86**

Please mark the response that describes YOUR experience/opinion for the unit indicated. If your appointment is in multiple departments/colleges, please use the department/college of your primary appointment. If you do not identify with any department/college, answer "N/A."
(Strongly agree, Somewhat agree, Somewhat disagree, Strongly disagree, N/A)
*I have complete confidence in administrators.
*I feel completely comfortable talking to administrators about important unit issues.
*My ideas are seldom sought and used in solving unit problems.
*From my experience serving on committees, workgroups, etc., a substantial amount of cooperative teamwork is demonstrated in the unit.
*The direction of information flow within the unit is "top-down."
*Administrators demonstrate complete confidence in me.
*Administrators are unaware of problems faced by faculty such as myself.
*Administrators have an open mind when receiving communications from faculty.
*Faculty have an open mind when receiving communications from administrators.
*Faculty are dissatisfied with regard to membership in the unit.

Job Satisfaction	
Department Level	**α = 0.69**
College Level	**α = 0.68**
University Level	**α = 0.67**

Please indicate how satisfied YOU are with each of the following dimensions of your professional life.
(Strongly satisfied, Somewhat satisfied, Somewhat dissatisfied, Strongly dissatisfied, N/A)
*My overall experience of collegiality in the unit.
*My overall experience of being a faculty member in the unit.
Teaching responsibilities
Time available for scholarly work

Climate Perception
    Department Level   **α = 0.94**
    College Level   **α = 0.94**
    University Level   **α = 0.93**

Resources/Compensation
    Department Level   **α = 0.63**
    College Level   **α = 0.70**
    University Level   **α = 0.65**

Please indicate how satisfied YOU are with each of the following dimensions of your professional life.
(Strongly satisfied, Somewhat satisfied, Somewhat dissatisfied, Strongly dissatisfied, N/A)
*My access to resources provided within the unit for research/securing grants.
Space (office and lab/research space)
Salary
Benefits

Collegial Interaction   **α = 0.94**
Please indicate YOUR level of agreement with the following statements. For all of the following: "primary unit" = department level (or your most immediate sphere of work within the University)
(Strongly agree, Somewhat agree, Somewhat disagree, Strongly disagree, N/A)
Colleagues in my primary unit value my work
Colleagues in my primary unit can be trusted
I am comfortable asking my colleagues about performance expectations
Colleagues in my primary unit provide me feedback on research/scholarly issues
Colleagues in my primary unit solicit my opinions about scholarly issues
I feel professionally welcome and included by colleagues in my primary unit

Pressure   **α = 0.76**
Please indicate YOUR level of agreement with the following statements. For all of the following: "primary unit" = department level (or your most immediate sphere of work within the University)
(Strongly agree, Somewhat agree, Somewhat disagree, Strongly disagree, N/A)
I constantly feel under scrutiny by my colleagues in my primary unit
I have to work harder than my colleagues to be perceived as a legitimate scholar
I feel pressure to change my work interests in order to affect my tenure/promotion/evaluation

Gender and Ethnicity   **α = 0.72**
Please indicate YOUR level of agreement with the following statements. For all of the following: "primary unit" = department level (or your most immediate sphere of work within the University)
(Strongly agree, Somewhat agree, Somewhat disagree, Strongly disagree, N/A)
Gender makes a difference in everyday interactions with my colleagues in my primary unit
Race or ethnicity makes a difference in everyday interactions with colleagues in my primary unit

Leadership

Department Level	**α = 0.96**
College Level	**α = 0.93**
University Level	**α = 0.91**

Please rate the following statements regarding YOUR experience with the head (chair) of your primary unit; if you are an administrator of department chair level or higher, consider your immediate supervisor and the larger unit for the following
(Strongly agree, Somewhat agree, Somewhat disagree, Strongly disagree, N/A)
*My satisfaction with involvement in important decision-making processes in the unit.
Is an effective administrator for the unit
Is an effective administrator for me
Articulates a clear vision for the unit
Shares resources/opportunities fairly within the unit
Helps me obtain the resources I need

Mentoring

Department Level	**α = 0.67**
College Level	**α = 0.74**
University Level	**α = 0.69**

Please rate the following items regarding YOUR experience with mentoring
(Mentoring is defined as advice or counsel on scholarly or career issues, or sponsorship or advocacy on your behalf)
(Extensive, Moderate, Minimal, Not at all, N/A)
*My satisfaction with overall mentoring received in the unit.
To what extent do you receive formal mentoring within the University?
To what extent do you receive informal mentoring within the University?

Note. Constructs and climate sub-constructs (plus alpha scores) measured with internal reliability are in bold. "*" designates items that were measured for each of the three organizational levels (department, college, and university).