THE INFLUENCE OF COLLEGIAL COMMUNICATION ON FACULTY PERCEPTIONS OF DEPARTMENTAL CLIMATE

By

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Abstract

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To date, very little research on task-oriented groups has focused on relational communication, the verbal and non-verbal messages that members exchange in negotiating their interrelationships within a group. The purpose of the present study was to test a new, interdisciplinary model of how relational messages that faculty members receive from colleagues predict their global assessment of departmental support. A new Relational Message scale was employed in an online survey completed by 262 faculty members at the University of Arizona. Results of multilevel modeling analyses show that positive and negative relational messages received in collegial interaction were associated with 1) individuals' sense of relative competence and belongingness in their departments, 2) the extent to which gender is salient in their interactions with colleagues, 3) their level of identification with their departments, and 4) perceived departmental support. Female faculty members reported receipt of more negative messages about their professional competence, more negative feelings associated with interaction, more awareness of gender in interaction, and perceptions of lower departmental support than males. It was also found that both male and female respondents associated positive relational messages significantly more with male colleagues than expected, based on gender representation in their departments. No inter-departmental differences in relational communication experiences were found. Implications and limitations of the study, as well as future directions for research, are discussed.

CHAPTER I

INTRODUCTION

> Every inflection of voice denoting respect or contempt, condescension, or dependency, is a statement about the relationship between (interactants). Such messages are carried on the stream of verbal communication, and all these messages and their codification determine such matters as role and status, whose truth and stability depend upon implicit or explicit agreement between the persons that the relationship is as indicated" (Bateson, 1951, p. 213).

If we consider Bateson's description of relational messages in an evolutionary sense, it is more accurate to say that verbal messages are carried on the stream of relational communication, rather than vice versa. Long before the arrival of the prefrontal cortex and verbal communication, interactants have communicated their sense of relative power and their cooperative or competitive intent toward each other—information that the present study considers to be the two key dimensions of relational communication. For example, single-celled slime molds send and respond to chemical messages that regulate when they compete as individual agents and when it is more efficient to behave as a collective in their search for food (Waldrop, 1992). Although we as humans may be more sophisticated in our interactions, our survival, too, depends upon the quality of our relationship with the environment—including each other—and an accurate, moment-to-moment assessment of that relationship.

Brewer (2000) and others have argued that humans are first and foremost group members, not artificially isolated individuals. So it is of particular interest how patterns of relational communication affect group members' sense of the person-environment relationship within a work group, department, or organization. In the context of working

groups, Keyton defined relational communication as "the verbal and nonverbal messages that create the social fabric of a group by promoting relationships between and among group members" (1999, 192). In the present study, relational messages refer to the verbal and nonverbal, explicit and implicit messages that interactants exchange to define themselves and each other in context of their relationship. The literature review will argue that work group members use relational messages to position themselves vis a vis their colleagues in terms of competence, implicating status or power, and warmth, encompassing cooperative vs. competitive intent, what Bales referred to as "ingroup solidarity" (Bales, 1999). From the relational messages that members receive in interaction, they conceptualize their "place" in any group and whether, from their perspective, the group climate feels supportive or hostile.

Importantly, individuals' perceptions of climate occur as a function of their position within the group as well as personal preferences, motivations, and values (James, James, & Ashe, 1990). Position involves members' rank, job function, and, in some groups, their "insider" versus "outsider" status based on sub-group memberships such as gender or ethnicity (Hurtado, Milem, Clayton-Pedersen, & Allen, 1998; Bales, 1999). For example, considerable research in the context of higher education has described a "chilly climate" for women faculty and students in departments of science, technology, engineering, and mathematics, referring to a work environment that is not fully supportive of women's success and satisfaction (Sandler, 1991; Riger, Stokes, Raja, & Sullivan, 1997, Valian, 1998). Female faculty in the sciences have reported experiencing more social isolation, more disrespect, more discrimination, and less opportunity for

scholarly collaboration than their male colleagues (Akin-Little, Bray, Eckert, & Kehle, 2004; Hult, 2005; Hult, Callister, & Sullivan, 2005; Kemelgor & Etzkowitz, 2001; Sonnert & Holton, 1996). Although these perceptions are generalized from patterns of messages exchanged in intradepartmental interaction, no research as yet exists on how specific types of relational messages influence faculty members' appraisals of the supportiveness of their collegial relationships and workplace climate.

The purpose of the present study was to build and test an interdisciplinary model of the effects of relational messages exchanged in workplace interactions, specifically in academic departments in higher education. To date, most research on relational communication has involved couples, families, and relationship-oriented groups such as counseling groups, rather than task-oriented work groups. According to Keyton (1999), research on relational communication in work groups is in its formative stage. Most research on intragroup communication has focused on task-related rather than socio-emotional communication, and has often involved zero-history experimental groups. Summarizing the existing research on relational communication in groups, Keyton offered the model shown in Figure 1:

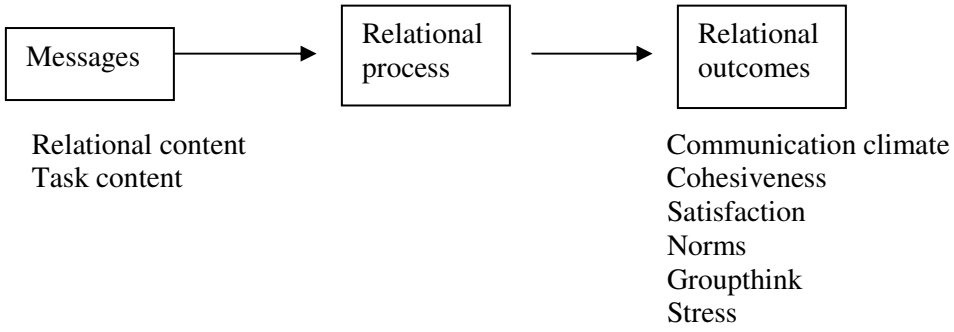

Figure 1. Keyton's (1999) Model of Relational Communication in Groups.

The present study focused on adding detail to Keyton's model in terms of relational content and relational process in context of one relational outcome only, the communication climate variable, operationalized in the present study as *perceived departmental support*, a construct based on Eisenberger, Huntington, Hutchison, & Sowa's (1986) *perceived organizational support*. Five objectives drove the conceptualization of a more detailed model that would apply to intradepartmental interactions among university faculty: 1) to delineate the specific types of relational messages that individuals experience during interactions with department colleagues, and understand their effects on perceived departmental support, 2) to show the extent to which individuals appraise different types of relational messages as supportive versus threatening in primary appraisal, and to what extent these appraisals are related to individuals' sense of competence and belongingness in the group, 3) to demonstrate the cognitive effects of relational messages in terms of identification with department and gender salience in interaction, and determine whether they are mediated by primary

appraisal, 4) to explore gender differences in the model, and 5) to explore possible cross-level moderation effects involving gender and type of academic department. The present study also sought to answer one research question, whether respondents associate different types of positive and negative relational messages more with male or female colleagues.

To establish the theoretical framework to accomplish these objectives, the literature review incorporated existing theory and findings from several previously disparate areas of communication, emotion, and social-psychological research. First, to delineate specific types of relational messages that faculty members experience in collegial interaction, I relied on two systems theories of communication, social-interaction systems theory (SYMLOG, Bales 1950, 1999; Bales & Cohen, 1979) and relational communication theory (Watzlawick, Beavin, & Jackson, 1967; Keyton, 1999). Bales and colleagues demonstrated that work group members infer each other's values from patterns of task-oriented and socio-emotional communication behaviors that they offer in interaction. Using survey data from all group members, Bales statistically constructed a Field Diagram to map each member's value positions on the dimensions of dominance-submissiveness and friendliness-unfriendliness in relation to all other members. Extending this line of inquiry, the present study employed relational communication theory to discern the specific types of relational messages that position members on these two key dimensions. Following Judd, James-Hawkins, and Yzerbyt's (2005) review of the social judgment literature and Fiske, Cuddy, Glick, and Xu's stereotype content model (2002), I used the unifying terminology *competence* and

warmth to delineate the dominance and friendliness dimensions of a typology of relational content. The competence dimension represents social status and the ability to achieve personal goals, while the warmth or socio-emotional dimension represents individuals' belongingness and fit in a particular social context.

Based on this typology, I developed, pre-tested, and employed a new 22-item Relational Message (RM) scale for the present study. Items were constructed in terms of positive and negative messages related to competence and warmth, representing four separate dimensions within the scale. However, while factor analyses established a two-factor solution for negative-warmth and negative-competence messages, the positive-warmth and positive-competence scales were shown to be unidimensional (See Tables 3A, 3B, and 3C for component matrices). Therefore, the present study tested a three-dimensional scale comprised of positive, negative-warmth, and negative-competence sub-scales. To my knowledge, this is the first typology of relational content developed for the study of intragroup communication. Multilevel modeling analyses provided strong evidence that the three types of relational message significantly influenced faculty members' perceptions of departmental support in the predicted direction.

Figure 2 presents the typology of relational messages developed in the present study.

	Positive Relational Messages
Bolstering	Praises your work and your ability to others
Collaborative	Agrees to collaborate on research or a professional project
Collegial	Treats you as an equal, values your professional opinion
Constructive critic	Gives well-meaning suggestions to help you improve
Encouraging	Expects you to succeed, encourages you to "go for it"
Friendly	Communicates a genuine liking for you
Helpful	Offers assistance gladly when asked
Inclusive	Makes an effort to include you in informal discussions
Informative	Shares information that helps you with research, teaching, etc.
Light-hearted	Jokes with you, makes working together fun
Like-minded	Voices agreement with you in discussions and meetings
Social	Joins you in meals, sports, or social activities
	Negative-warmth Relational Messages
Insulting	Jokes or makes rude comments about you or your group (sex, race, research interest, politics, etc.)
Undermining	Talks behind your back, puts down your work or your ability when you are not present
Unfriendly	Communicates dislike or animosity
Withdrawn	Avoids communicating with you, e.g., does not acknowledge your presence in the copy room
	Negative-competence Relational Messages
Condescending superior	Talks down to you as if you have less ability or intelligence; acts
Controlling	Tries to "boss you around"; interrupts, tries to control the conversation
Distancing	Directs talk "over your head" with jargon or unfamiliar topics
Patronizing	Helpful in a way that emphasizes your lower ability or status
Renders you invisible	Ignores your contributions in discussions and/or meetings
	Analyzed Separately
Inappropriate	Sexualizes conversation or makes unwanted advances

Figure 2. Typology of Relational Messages Developed in the Present Study.

The second goal of the present study was to illuminate the "black box" of relational process in Keyton's original model. The appraisal process, in which

individuals evaluate the person-environment relationship, was posited and tested as a key relational process. Figure 3 models the appraisal process as a mediator of the effects of relational messages on perceived departmental support.

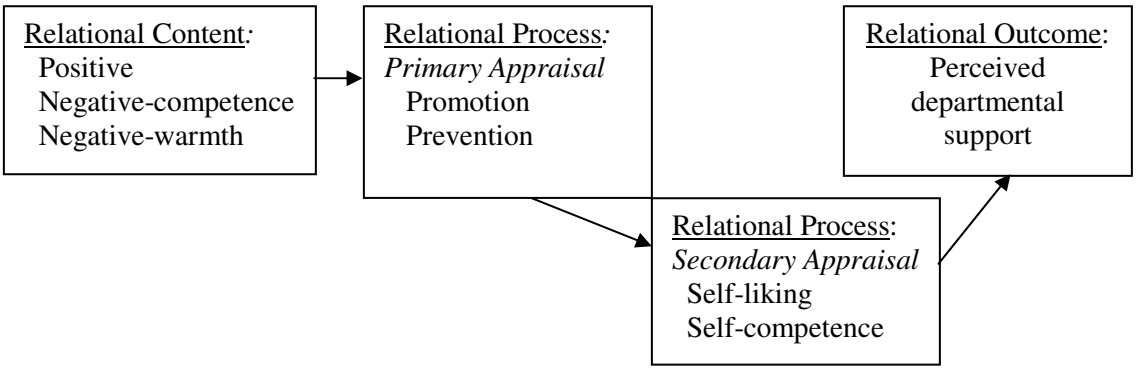

Figure 3. Basic Appraisal Model of Relational Communication in Groups.

To establish the role of the appraisal process, the literature review incorporated the cognitive theory of appraisal (Lazarus, 1991, 1995, 2006) and other relevant theories of emotion (LeDoux, 1996; Higgins, 1997; Fiske et al., 2002). The emotion system is the primary self-regulatory mechanism, continuously engaged in two interdependent appraisal processes that assess the person-environment relationship. Primary appraisal involves an assessment of environmental support versus threat. To assess the effects of relational messages on primary appraisal, participants were asked about the quality of feelings they associate with collegial interaction, e.g., feelings of calmness versus anxiety and dejection versus eagerness. Results were consistent with all expected effects. Secondary appraisal assesses individuals' coping potential for dealing with the perceived

threat or opportunity present. The present study measured individuals' reported coping potential in terms of Tafarodi, Marshall, and Milne's (2003) constructs of self-competence and self-warmth, conceptualized consistently with Judd et al. (2005). Results showed that relational messages influence self-liking and self-competence in the predicted directions, and that self-liking partially mediated the effects of relational messages on perceived departmental support.

The third goal of the study was to understand the role of two levels of social identity in the model in terms of 1) the strength of faculty members' identification with their department and 2) the extent to which they consider gender, as a sub-group identity, salient in their interactions with colleagues. To address these identity issues, communication accommodation theory (CAT, Boggs & Giles, 1999; Gallois, Ogay, & Giles, 2005), social identity theory (Turner & Onorato, 1999; Brewer, 2000; Onorato & Turner, 2004), and self-expansion theory (Aron, Norman, & Aron, 1998) were incorporated into the theoretical framework. Results indicated that relational messages are significantly associated with identification with department and gender salience in interaction, and that both identity variables are predictors of perceived departmental support.

To address the fourth goal of the study, Crocker and Garcia's (2006) stigma cycle and social identity threat theory (Walton & Cohen, 2007; Davies, Spencer, & Steele, 2005; Steele, Spencer, & Aronson, 2002) were foundational in understanding possible gender differences in relational communication experiences and outcomes. Results indicated no gender differences in receipt of positive and negative-warmth relational

messages. However, female faculty members reported receiving significantly higher levels of negative-competence messages than males. Women also reported significantly more negative feelings about the person-environment relationship in interaction than their male colleagues, with lower scores on all of the appraisal variables. While no gender differences in identification with department were found, there was a huge main effect indicating that females were significantly more aware of gender in departmental interaction than men. Significant gender differences in perceived departmental support were also found, showing a definite pattern of gender differences overall.

The stigma cycle and stereotype threat theory were also utilized to address goal five, the assessment of cross-level moderation effects involving gender and type of department in the model. Past research had indicated a potentially "chilly climate" for women faculty in mathematics and science-related fields in which they comprise a small minority (Sandler, 1991; Hult, et al., 2005; Valian, 1998; Handelsman, Cantor, et al., 2005; Kanter, 1977; Thompson & Sekaquaptewa, 2002). Therefore, two department-level factors were tested: 1) hard science vs. other types of department and 2) departments with token (less than 40%) vs. non-token representation of women. Surprisingly, results indicated no cross-level moderation effects involving gender and type of department. While significant gender differences were found in the model, the effects were not localized in any particular type of department.

Figure 4 illustrates the complete relational communication model that was developed and tested in the present study. The model that was supported by the multilevel modeling analyses is quite similar, with the exceptions that type of department,

prevention feelings under primary appraisal, and self-competence under secondary appraisal, were found to be non-significant.

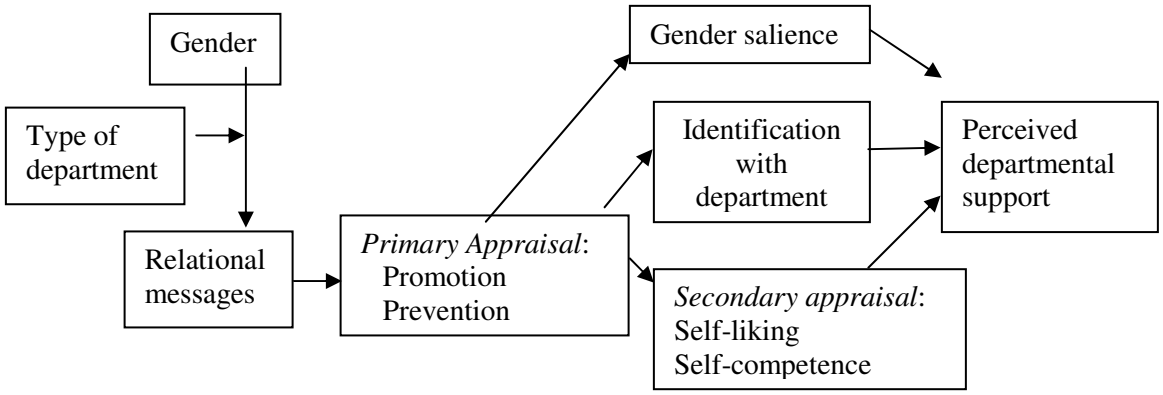

Figure 4. Full Relational Communication Model of Perceived Departmental Support.

Chapter 2 provides a description of the methods used in this study, including detailed information regarding predictor and outcome variables and their measures. An online survey was employed to gather data from tenure track faculty members across 61 departments in 7 colleges at the University of Arizona; 262 faculty self-selected to participate.

Chapter 3 discusses the results of 1) the multilevel modeling analyses that were employed to test hypotheses underlying the model in the present study, and 2) the Chi-square analyses employed to answer the research question regarding the gender-association of different types of relational message.

Chapter 4 interprets results and offers possible implications, discusses the

limitations of the study, and offers suggestions for further research on relational communication in the context of task-oriented groups.

In summary, to my knowledge, this is the first study to develop and test a communication systems model of the effects of relational messages exchanged in collegial interaction on perceived departmental support. Previous research has shown the importance of perceived departmental support in predicting individuals' job attendance and performance, job satisfaction, prosocial acts benefiting the organization, and desire to remain in the organization (Rhoades & Eisenberger, 2002). Specifically, in higher education, supportive collegial relationships have been shown to be important because they offer help with research and teaching, institutional linkage, linkage to one's discipline, emotional support, intellectual stimulation, and friendship (Hitchcock, Bland, Heckelman, & Blumenthal, 1995). Settles, Cortina, Malley, and Stewart (2006) described a supportive departmental climate in academia as a function of collaboration and cooperation, respect, and collegiality. Underscoring the importance of departmental climate, a recent study from the Harvard School of Education found that, among a sample of 4,500 tenure track junior faculty from 51 universities in the United States, satisfaction with departmental climate was the most important predictor of global job satisfaction (COACHE, 2006).

The results of the present study provide detailed knowledge about the types of relational messages exchanged in collegial interaction and their relationship with faculty members' perceptions of departmental climate. This knowledge will help faculty members, administrators, and communication experts improve intradepartmental

communication and develop a more supportive, positive, and productive climate for faculty members in higher education. Further, the present study established an interdisciplinary theoretical model for continued research on relational communication and its effects in working groups.

Departmental climate and communication research

To understand how relational communication affects faculty members' perceptions of their workplace climate, we must first clarify the outcome of interest, *perceived departmental support*, an aspect of psychological climate. Because the construct of psychological climate has been defined and operationalized inconsistently in the literature, it is necessary to begin by explaining the rationale for using perceived departmental support in the present study. Subsequent sections of this chapter will review the literature related to relational communication, the cognitive appraisal process, and identity issues in intragroup interaction. After establishing a basic model of relational communication, potential differences in communication experiences and outcomes based on gender and departmental affiliation will be discussed.

Psychological climate

Koys and DeCotlis (1991) distinguished between *organizational climate* at the group level and *psychological climate,* the construct of interest in the present study, at the individual level. *Organizational climate* refers to group members' shared perceptions of the internal environment of their organization or work group that 1) results from the behaviors, policies, and practices of the organization, 2) serves as a common frame of reference for interpreting workplace events, and 3) acts as a source of pressure for directing activity (Pritchard & Karasick, 1973; Poole & McPhee, 1983). According to structuration theory (Poole & McPhee, 1983; Poole, 1985), group-level patterns of interaction among members "gel" into the explicit and implicit norms and practices that comprise organizational climate. Organizational climate is thus an emergent "esprit" that

pervades all aspects of a group's functioning, encompassing both a collective perception of the organization and the quality of interaction through which it is maintained (Poole, 1985, p. 101). It is *intersubjective* because it is produced and reproduced—created and maintained—by members of the group in interaction.

In contrast, *psychological climate* refers to each member's unique, subjective, holistic perception of the degree of workplace supportiveness from his or her unique point of view (James et al., 1990; Stringer, 2002). Based on Lazarus' (1991, 2006) cognitive appraisal theory of emotion, James et al. (1990) defined psychological climate as individuals' "cognitive appraisal of the degree to which the work environment is personally beneficial versus personally detrimental." This global sense of the extent of environmental support emerges from individuals' experiences in workplace interactions that, over time, comprise their more or less supportive relationships in that context. Psychological climate functions as an individual-level frame of reference for perceiving, interpreting, and evaluating group members' behaviors and initiating situation-appropriate responses (West, Smith, Feng & Lawthom, 1998; James et al., 1990; Riger et al., 1997).

Group members' psychological climate varies to the extent that they evaluate the organizational climate differently. For example, based on individual differences in temperament, goals, and skill sets, a high-achieving climate could be construed as supportive and challenging by upwardly mobile managers and as exploitive and stressful by less aggressive and/or less skilled managers (Poole & McPhee, 1983). Secondly, systematic variations in psychological climate are also likely to occur to the extent that a

workplace offers different supports and threats to members of different sub-groups within the organization—for example differences based on identity group membership, such as gender or race, or organizational group membership, such as divisions by rank, job function, or department, e.g., administration vs. research and development (Alderfer & Smith, 1982; Hurtado et al., 1998).

Perceived organizational support

There is considerable disagreement regarding the dimensionality of the construct of psychological climate (Carr, Schmidt, Ford, & DeShon, 2003; Ostroff, 1993). Koys and DeCotlis' (1991) meta-analysis of the literature factor-analyzed 80 separately measured dimensions of psychological climate to eight factors: support, trust, autonomy, time pressure, recognition, fairness, cohesion, and encouragement of innovation. The authors found that, even within this simplified framework, various combinations of dimensions had been measured in different studies. Eisenberger et al. (1986) formulated what I consider to be the most useful approach to psychological climate for the purposes of the present study. The authors defined the global construct *perceived organizational support* (POS) as the extent to which individuals perceive that their organization 1) values their contributions and 2) cares about their well-being. Amason and Allen (1997) articulated fairness as a third aspect of POS, roughly the extent to which the organization treats an individual fairly in relation to other members. Note that defining POS in these terms differentiates supportiveness in a group context from "social support" in an interpersonal context, which is generally described as the provision of assistance and emotional support, usually in times of difficulty. The value, caring, and fairness aspects

of POS, included in self-report measures created by Eisenberger et al. (1986) and adapted by other researchers into shorter measures, consistently factor-analyze as a unidimensional construct that indicates a global sense of environmental support.

Research involving more than 70 studies has substantiated the importance of POS as a predictor of individual-level outcomes in organizational settings. Level of POS predicts outcomes including individuals' commitment to their organization, job attendance and performance, job satisfaction, expectancies of reward for good performance, innovation and prosocial acts benefiting the organization, and desire to remain in the organization (Rhoades & Eisenberger, 2002; Eisenberger, Fasolo, & Davis-LaMastro, 1990). Less research has been devoted to identifying the antecedents of POS, an important goal of the present study. In their initial theoretical rationale, Eisenberger et al. (1986) stated that sincere statements of praise and approval from co-workers and administrators, as well as promotions, raises, and other rewards used to communicate organizational approval, should influence POS. Allen (1992) and Amason and Allen (1997) investigated the relative impact of three communication sources on employees' POS—top management, immediate supervisor, and co-workers—on two qualitative dimensions, quality of information and quality of communication relationship, yielding 6 communication variables. Sampling employees in two engineering firms, Allen (1992) found that all six communication variables were significant predictors of POS. Using the same communication variables, Amason and Allen (1997) explored whether the effect of communication on POS is moderated by gender and/or type of organization. Multiple linear regression analyses showed that type of organization had a main effect on POS,

with individuals from engineering firms reporting significantly higher POS than university faculty and staff members, while gender moderated the effects of the two co-worker communication variables on POS. Note that the results reported in these seminal studies should be taken with caution because multilevel modeling was not employed in the data analyses.

The present study extends this line of research exclusively in the context of academic departments in higher education, and defined the outcome of interest as perceived departmental support rather than POS. While previous research on POS encompassed both the quality of information and the quality of the communication relationship, the present study focused exclusively, and in more depth, on the relational dimension. In Allen and Amason's studies, the construct indicating quality of communication relationships was rather loosely operationalized in terms of individuals' attitudes and beliefs, e.g., *I feel free to disagree with my immediate supervisor* and *Top management is sincere in their efforts to communicate with employees.* Realizing the limitations of this approach, Allen (1992) suggested that future research focus on the actual content of communication with coworkers and administrators that would lead individuals to reach such conclusions. This is a major goal of the present study.

Bales' social-interaction systems theory

Fortunately, the nature of relational content exchanged in interaction is also a nexus of research for two important systems theories of communication, Bales' social interaction systems theory (1950, 1970) and relational communication theory (Watzlawick et al., 1967; Keyton, 1999).

Influenced by general systems theory, Robert Bales (1950) introduced social-interaction systems theory as a framework for understanding work group dynamics in order to improve productivity and increase members' satisfaction. Bales (1999) described a *social-interaction system* as two or more individuals whose communication behaviors in interaction establish a patterned set of roles among interactants. To record and analyze the task-oriented and socio-emotional messages that group members contribute in interaction, Bales and colleagues developed Interaction Process Analysis (IPA, 1950), based on the following 12-category coding scheme:

- Three positive socio-emotional behaviors: *shows solidarity*, *shows tension release*, and *agrees*;
- Three negative socio-emotional behaviors: *shows antagonism, shows tension*, and *disagrees*; and
- Six neutral task behaviors: *asking for and giving orientation, opinions,* and *suggestions*.

Bales found that task-oriented discussion inevitably creates conflict and fragments a group as members take opposing positions on substantive issues. In a predictable cycle, task-focused behaviors are followed by positive socio-emotional or "maintenance" behaviors, such as humor, that release tension, restore member relationships, and "reset" the group to a comfortable level of cohesion—ready to refocus on the task at hand. According to Bales, positive socio-emotional messages maintain a group climate that facilitates shared answers to the questions "what is the problem?," "how does it affect us?," and "what shall we do about it?" (1950, p. 60). The author also observed negative

socio-emotional behaviors that exacerbate member differences, increase tension, and inhibit group cohesion.

Using IPA, Bales and colleagues created profiles of groups' and individuals' communication behaviors, making it possible to compare a group's interaction profile before and after an intervention and also to make group-level and individual-level comparisons. For example, using individuals' IPA profiles, Borgatta, Couch, and Bales (1955) were able to identify members of task-oriented groups that had demonstrated a high level of either task- or socio-emotional leadership behaviors, or both. These individuals were assigned as leaders of new groups that were organized according to the following conditions: 1) task leader only, 2) socio-emotional leader only, 3) one task- and one socio-emotional leader, 4) one leader skilled in both behaviors, 5) no leader, or 6) random assignment. The authors found that productive groups required both task leadership and socio-emotional leadership. Groups with two or more members who "specialized" either in task or socio-emotional leadership were found to be as successful as groups with a "great man leader" who was expert at both types of communication behavior. Groups without both bases covered were significantly less successful.

Communication patterns position members within the group. According to Bales (1950), every task and socio-emotional behavior in interaction has a "positional implication," maintaining or modifying the interrelationships within the group. Bales held that differentiation among group members is an inevitable result of different patterns of contribution in group problem-solving that stabilize into expected, functional roles over time. For example, members may expect one individual to contribute task expertise,

another to facilitate group discussion, and another to contribute annoying, off-topic interruptions. Based on their roles within the group, members differentiate themselves on four basic dimensions of activity: 1) control over persons, 2) general status or prestige, 3) access to resources, and 4) solidarity and identification with the group. Regarding the last point, Bales described two facets of solidarity, including a spontaneous positive affect toward other ingroup members and a formalized responsibility to cooperate and regard the self as "a part of the other, as the sharer of a common fate" (1950, p. 79). According to Bales, communication behaviors regarding solidarity take the form of acceptance or rejection of the conversation partner as an ingroup colleague. These early findings within the IPA framework anticipate research related to self-expansion theory (Aron et al., 1998) and communication accommodation theory (Gallois, et al., 2005) to be discussed in later sections.

While IPA provided a clear cut set of categories of task and socio-emotional behaviors and a comprehensive theoretical framework regarding how members' communication behaviors position them within their group, it had three major drawbacks: 1) the less than perfect correspondence in the ways observers and actual group members might code or interpret any given behavior, 2) the inadequacy of using frequency of coded behaviors to determine individuals' roles in the group, ignoring qualitative information, and 3) the lack of generalizability from the twelve coded behaviors to the status and solidarity dimensions of differentiating group members. After 20 years of IPA research, Bales and colleagues developed a new research paradigm that addressed these drawbacks.

Bales and Cohen (1979) introduced systematic multiple level observation of groups (SYMLOG) to enable researchers to use survey data collected from members to statistically map their relative positions within a working group. Bales and colleagues asked each member to rate self and others on 26 values or internal motivations by inferring them from behaviors in group interaction. The data were statistically analyzed to construct a Field Diagram that showed the position of each group member on three fundamental value dimensions: dominance-submissiveness, friendliness-unfriendliness, and authority orientation, i.e., acceptance-non-acceptance of the group's authority and direction. Note that nuances within the status dimension in Bales' IPA framework—relative differences in control of persons, general status, and access to resources—were collapsed into the more general dominance-submissiveness category, and that the solidarity dimension within IPA was reconceptualized as friendliness-unfriendliness. For purposes of the present study, we will focus on these two dimensions.

Data from all members, about all members, are statistically integrated to create a Field Diagram, which thus represents members' positions within the group from an aggregated, group perspective. According to Bales, a Field Diagram shows the patterns of relationships within the group, the "psychological pressures exerted by the behavior of each member on each of the others" (1999, p. 15). Such a diagram also shows any clusters or sub-groups of members that exist based on patterns of cooperation and conflict in the group. Bales theorized that dual forces simultaneously exist in any group toward polarization and unification of members. Individuals are drawn into cooperative relationships based on similar value positions and are repelled, toward conflict, when

their values diverge (Bales, 1999, p. 75). Regular patterns of conflict may in time motivate cooperation as members with common values form coalitions for mutual support. From a SYMLOG perspective, a working group is thus a dynamic self-organizing system in which relationships emerge based on behaviors in group interaction that signal members' similar or divergent values.

Bales' SYMLOG consulting group continues to use Field Diagrams as a basis for discussion in workplace interventions to improve group communication, cohesion, and productivity. Provided with a Field Diagram, each member is able to visualize his/her value position in terms of dominance and friendliness in relation to other group members', e.g., far outside a clustered group majority, in one of two competing sub-groups, or centrally placed within a cohesive group. The Field Diagram provides members with a glimpse of their group and their place within it from a group perspective, something akin to the generalized other described by Mead: "The individual experiences himself as such, not directly, but indirectly, from the particular *standpoints* of other individuals of the same social group, or from the generalized standpoint of the social group as a whole to which he belongs" (Mead, 1934, p. 138, my italics).

Two "holes" in this brilliant and useful SYMLOG framework provide a clear direction for the present study. First, because Field Diagrams are based upon members' inferences regarding values, rather than directly upon task- and socio-emotional behaviors, SYMLOG does not account for the specific types of relational messages or communicative "moves" that position members vis a vis each other. Secondly, a group's Field Diagram shows how members evaluate each other and themselves on the

dimensions of status and solidarity, based on members' communicative behaviors *toward everyone in the group*. Primarily concerned with group-level phenomena, SYMLOG was not designed to ascertain how receipt of relational messages *from everyone in the group* gives each member a sense of his or her own place within the group. Interestingly, Bales suggested that "at the time of any given act, the actor conceives of the self as having a kind of generalized position in each of these…(dominance and friendliness) dimensions insofar as they have become stabilized in the group as a whole" (1950, p. 81). Essentially, SYMLOG assumes that, in order to interact effectively, members generate their own mental Field Diagrams, however rough they might be. But the SYMLOG framework does not account for how this occurs.

The present study extends SYMLOG by showing how each group member conceptualizes his or her own position in the group based on patterns of relational messages that group members direct *toward him or her personally*. Fortunately, specifying the types of relational messages and demonstrating their "positioning" effects is also a nexus of current research based on relational communication theory. Therefore, to understand the communication mechanism through which each member "maps" his or her position within the group, we turn to the body of literature on relational communication.

Relational communication theory

The foundational text of relational communication theory, *The Pragmatics of Human Communication*, by Watzlawick, et al., (1967), grew out of work at the Mental Research Institute at Palo Alto, CA, where researchers, including Gregory Bateson,

explored mental dysfunction and therapeutic interventions in terms of entire family systems rather than isolated individuals. Watzlawick et al. defined an interaction system as "two or more communicants in the process of, or at the level of, defining the nature of their relationship" (1967, p. 121). The authors held that the only way to understand an individual's behaviors and outcomes is to consider him or her as a person-in-situation, influenced by system-level patterns of interaction and the interrelationships emerging from them. To that end, the "Palo Alto group" developed a new relational communication paradigm focused on "the sender-receiver relation, as mediated by communication" (Watzlawick et al., 1967, p. 22).

The fundamental premise of this pragmatic perspective is that all behavior communicates, whether intentionally or not, and whether the vehicle is verbal behavior, nonverbal behavior, or communicative cues from the environment, such as whether a colleague's office door is usually open or usually closed. Note that this assumption greatly widens the field of relational communication beyond Bales' conception of socio-emotional (versus task-oriented) messages. From a pragmatic, relational perspective, task-oriented messages inevitably include a relational component.

According to Bateson (1951), there are two aspects of meaning within any communicated message, i.e., any behavior. The report aspect carries topical information. The command aspect indicates how the sender intends the receiver to "take" or interpret the informational content, based on his or her conception of their relationship. In relational communication theory, these aspects are called the content and relational dimensions of the message—in simplest terms, *what* is said and *how* it is said. Bateson

(1951) called the relational subtext metacommunicative—communication about communication—because it qualifies, contextualizes, and narrows the possible interpretation of informational content. Every communicated message has a relational aspect, including those with no topical content, e.g., a particular type of gesture or posture, whereas topical content cannot be delivered without a relational component associated with it (Watzlawick et al., 1967). The actual content of relational messages includes how individuals define and evaluate themselves in context of the relationship, how they regard other interactant(s), and how they regard the relationship (Burgoon & Hale, 1984).

According to Keyton (1999), most relational communication research has involved coding and analyzing various patterns of messages as they constitute healthy and unhealthy relationships in couples, families, and doctor-patient relationships. From its inception, research in this tradition has focused on the role of relational messages in the continuous negotiation of relational control, the power to define the relationship. Early relational control research fleshed out an observable, codable process through which interactants negotiate their relative status—in the SYMLOG framework, their positions on the dominance-submissiveness dimension. According to Courtright (2006), one-up messages signal dominance and claim the right to define the relationship, one-down messages signal submission to the others' definition and relinquishment of the claim to define the relationship. One-across messages simply allow the conversation to move forward, with the relationship in status quo. Relational control research has shown that much interpersonal communication involves the exchange of one-across messages,

particularly in relationships whose definition is not, at the moment, contested by either party. For example, Courtright's meta-analysis found that married couples average 50% one-across messages, and 25% each for one-up and one-down messages. According to Watzlawick et al. (1967), interactions—and entire relationships—may be either *symmetrical*, emphasizing interactants' similarity in status, or *complementary*, emphasizing status and power differences and characterized by a "one-up" or superior position and a "one-down" or inferior position. Maintenance of a complementary relationship requires that interactants agree to play complementary roles, offering appropriate one-up and one-down responses to validate self, other, and the relationship (Rogers & Escudero, 2004).

Burgoon and Hale (1984) challenged the notion that relational messages are primarily about relational control and status, i.e., that they position individuals relative to each other only on a dimension of dominance-submission. In several studies, their factor analyses of relational content identified as many as 12 relational topoi or themes: dominance-submission, intimacy, affection-hostility, inclusion-exclusion, trust, intensity of involvement, emotional arousal, composure, similarity and social category information, depth-superficiality, formality, and task-social orientation. Further, the authors showed that meaning on more than one relational dimension may be present within any given message. Subsequently, Burgoon and colleagues developed and tested iterations of a relational communication measure that included between six and eight dimensions. Dillard, Solomon, and Palmer (1999) then factor analyzed Burgoon and Hale's eight-factor Relational Communication scale (1987) to two substantive factors,

with other possible dimensions, including involvement, characterized as intensifier variables only. Dillard et al. defined their dominance or control factor as "the degree to which one actor attempts to regulate the behavior of another." They defined the second, affiliation factor as "the extent to which one individual regards another positively."

Dillard, Solomon, and Samp (1996) put forward a differential salience hypothesis that individuals focus on either dominance or affiliation when interpreting social interactions, and that either a dominance or affiliation interpretive frame comes into play to understand ambiguous situations. The authors' held that the two frames operate in "mild opposition" to one another such that when one frame is active in information processing, the other is inhibited. Their 1996 study presented participants with "affiliation scenarios" and "compliance scenarios," each of which described an interaction in terms of either an affiliation goal or a compliance goal, i.e., scenarios that were "pre-coded" and could in no way be described as ambiguous. Participants were asked the extent to which each frame was relevant in interpreting the various situations. Despite a study design that should have resulted in very large differences in frame salience, only small differences were found for both types of scenario (Dillard et al., 1996). Although Dillard and colleagues effectively reduced Burgoon and Hale's (1984) 12-theme typology to the two key dimensions of dominance and affiliation, their differential salience hypothesis asserting that the two dimensions function in "mild opposition" is not at all compelling.

In summary, the relational perspective challenged Bales' assumption that task-oriented messages are relationally neutral. According to Watzlawick et al. (1967), all

communicated messages contain a metacommunicative, relational aspect that contextualizes topical content and guides its interpretation. Secondly, relational communication research clearly demonstrated that two types of relational message, "one-up" and "one-down" messages, function to define interactants' relative status positions. The way task-oriented messages are delivered may signal a one-up, one-down, or one-across definition of the interactants' relationship, none of which could be characterized as evaluatively neutral. Particular patterns of exchange of relational messages "solidify" over time into symmetrical or complementary relationships. Although Dillard and colleagues introduced the relational dimension of friendliness-unfriendliness to complement the dominance-submissiveness dimension, very little research has been done outside of Bales' SYMLOG framework that incorporates the two dimensions. The task remains to develop a typology of relational message content that incorporates both positive and negative values of these two fundamental dimensions.

A new typology of relational messages

Judd, et al.'s (2005) review of the social judgment literature established two dimensions, comparable to dominance-submissiveness and friendliness-unfriendliness, as the two fundamental dimensions of social perception, *competence* and *warmth*. In a seminal study, Rosenberg, Nelson, and Vivekananthan (1968) had subjects sort 64 trait names, then employed multidimensional scaling to demonstrate that social perception involves two dimensions that they called, simply, *good intellectual-bad intellectual* and *good social-bad social*, i.e., competence and warmth. Similarly, according to Eagly and Chaiken's review of the source credibility literature (1993), the two key dimensions of

source credibility are *competence* and *trustworthiness*. Fiske et al. (2002) found that the same fundamental dimensions, which they refer to as *competence* and *warmth*, structure group stereotypes, or generalized knowledge structures, about social groups. According to the authors, "When people meet others as individuals or group members, they want to know what the other's goals will be vis a vis the self or in-group and how effectively the other will pursue those goals. That is, perceivers want to know the other's intent and capability; these characteristics correspond to perceptions of warmth and competence, respectively" (2002, p. 3).

Fiske, Xu, Cuddy, and Glick (1999) and Fiske et al. (2002) summarized the competence or status dimension as comprising agentic, intellectual, and task-oriented traits, whose positive values include *independent, intelligent, informed, skillful,* and *dominant*. The warmth dimension comprises communal traits including *sincere, friendly, sensitive, tolerant,* and *trustworthy* that reflect the cooperative or, in its negative aspect, competitive relationship between individuals and groups. In the extensive body of literature on the stereotype content model, Fiske and colleagues showed that stereotype content contains information on the two independent dimensions of competence and warmth that position an outgroup relative to a reference ingroup. Content on the two dimensions may be consistently positive, consistently negative, or ambiguous, e.g., a powerful enemy that is high in competence and low in warmth. Information on both dimensions is necessary to position one social actor relative to another, whether the actor is an individual or a social group.

Therefore, I propose a typology of relational content that involves positive and

negative messages about interactants' relative competence and warmth, yielding four types of relational message: positive-competence, negative-competence, positive-warmth, and negative-warmth. The competence dimension represents agency and status position in a social hierarchy that translates into the ability to achieve one's goals in that setting. Positive competence messages indicate approval and validation of an individuals' capabilities, achievement, and status, while negative messages derogate them. The warmth dimension represents ingroup vs. outgroup status, what Leary, Tambor, Terdal, and Downs (1995) called individuals' "inclusionary status" in the social environment. Positive-warmth messages indicate liking, similarity, and in-group solidarity, while negative messages challenge them.

However, according to Walton and Cohen (2007), in a performance context such as an academic department—in contrast with a family or social group—belonging requires competence as a prerequisite for inclusion. Thus, belongingness and competence become interdependent and inferentially related in that environment. In the present study, empirical results indicated that positive-competence and positive-competence messages were functionally equivalent, while the two types of negative messages represented two orthogonal dimensions. Therefore, in the following hypotheses and the arguments leading up to them, the inclusive description, "positive messages," will refer to both positive-competence and positive-warmth messages. Similarly, "negative messages" will refer to both negative-competence and negative-warmth messages. However, when the two types of negative messages are predicted to function differently, each will be referenced separately in the hypotheses.

As positioning "moves," positive messages are convergent, functioning to decrease social distance between interactants, while negative messages are divergent, functioning to increase social distance. Receipt of different patterns of positive and negative relational messages should, over time, result in an overall sense of departmental support versus a sense of alienation, conflict, and lack of support. Therefore:

H1a: Positive relational messages will be positively associated with perceived departmental support (PDS).

H1b: Negative relational messages will be negatively associated with PDS.

Cognitive appraisal—the fundamental interpretive process

On a continuous basis, individuals infer others' helpful or threatening intentions toward them, plus their power to carry out these intentions, from the relational messages they receive in interaction. Relational meaning is not located within the messages exchanged but in what Keyton (1999) called relational processes, the perceptual and interpretive processes of each interactant (Bateson, 1951). For example, a gesture intended to indicate support might be taken by another as patronizing or condescending, while a neutral or "one-across" message may be interpreted as either supportive or threatening based on the receiver's definition of the situation. The following sections of the literature review examine relational process in terms of the cognitive appraisal process—the fundamental interpretive process initiated by the emotion system that evaluates stimuli, determines the person-environment relationship, and formulates an appropriate response (Lazarus, 1991; 2006). This discussion will provide the rationale for adding four appraisal variables to the model in development, as shown in Figure 3.

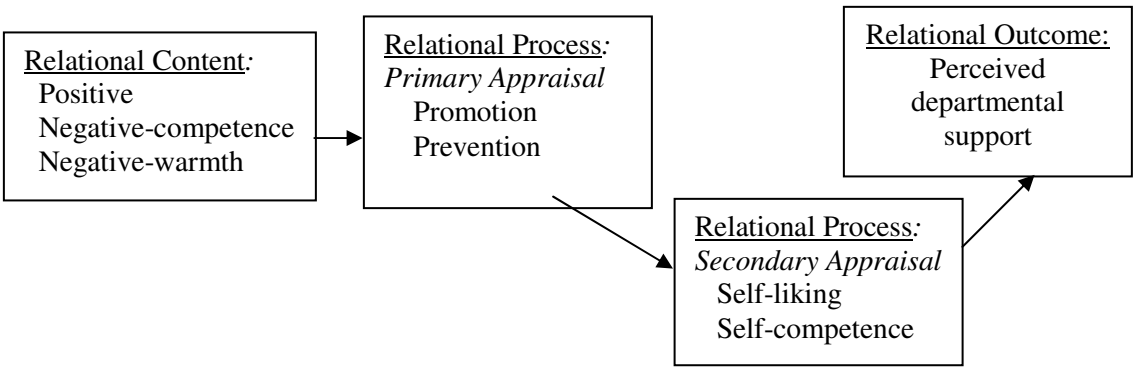

Figure 3. Basic Appraisal Model of Relational Communication in Groups.

Managing the person-environment relationship. According to cognitive appraisal theory, "we are constantly appraising—that is, imputing relational meaning to our ongoing relationships with others and the physical environment, and it is this meaning that shapes and defines our emotions" (Lazarus, 2006, 10). Further, every emotion has a *core relational theme* that represents the perceived person-environment relationship (Lazarus, 1995). Different emotions evolved as "response packages" comprised of motivations, thoughts, action tendencies, and physiological readiness for action in different types of situation (Neuberg & Cottrell, 2002). Essentially, individuals' implicit appraisal or interpretation of the situation drives the emotion experienced. Most researchers agree that the basic human emotions are fear, anger, disgust, and joy (LeDoux, 1996). Damasio (1999) also included sadness and surprise as primary emotions, and considered guilt, pride, shame or embarrassment, gratitude, sympathy, admiration, contempt, and jealousy as secondary or social emotions. Adolphs and

Damasio (2001) theorized that humans' varied repertoire of emotions evolved to facilitate complex social interaction.

Implicit and explicit aspects of the appraisal process. It bears mentioning that, while Lazarus argued for a cognitive theory of appraisal, there is substantial evidence that the appraisal process takes place implicitly and automatically, prior to conscious control (Zajonc, 1980; Nosek, Banaji, & Greenwald, 2002; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001; Bargh & Williams, 2006). "Cognitive" does not imply "conscious," nor is "cognitive processing" independent of extensive input from the emotion system. The two systems are interdependent, connected at various stages of processing via extensive feedback mechanisms, with more neuronal outputs from emotion centers to cognitive centers than vice versa. (LeDoux, 1996). According to Damasio (1999, p. 9) the appraisal process is cognitive because the earliest stages of perception involve the mental representation of a stimulus object, based on neurons' firing patterns that are detected in the sensory buffers. This mental "image" includes information about the object, an evaluative reaction of like-dislike, and the interrelationships of that object among other objects. Importantly, Damasio argued that together with the representation of the object, the brain simultaneously generates a sense of self, also a cognitive representation, based on physiological feedback about the increase or decrease in well-being that occurred when interacting with the object. As the stimulus is represented in the sensory buffers, feedback from the somatic system is simultaneously generating images of the ever-changing state of the body. The appraisal system integrates these inputs to represent the person-environment relationship on a

continuous basis, readying the entire organism for a coordinated response to environmental threats and opportunities.

Damasio found that emotional processing ranges from the preconscious generation of emotion in the appraisal process, to a somatic state of feeling that is outside of awareness, to a state of feeling that is available to conscious awareness (1999). The author described feelings as individuals' conscious association between an object and the change in well-being, for better or worse, that it precipitates in the subject. Feelings involve "the perception of a certain state of the body along with the perception of a certain mode of thinking and of thoughts with certain themes. When the activity of some part of the nervous system reaches a 'critical pitch,' the process is felt" (Damasio, 2003, p. 86). While it was beyond the scope of the present study to investigate faculty members' implicit appraisal processes, it was possible and useful to ask participants to access memories about the feelings they associate with collegial interaction. In this way, specific types and patterns of feelings associated with the cognitive appraisal process could inform us about individuals' interpretation of relational messages.

The present study examined the specific types of feelings that are functionally associated with primary and secondary appraisal, the two components of the appraisal process. Primary appraisal evaluates a stimulus to determine the nature and extent of situational demands, while secondary appraisal assesses the resources available to the individual to meet those demands (Lazarus, 1998; 2006). Overall, a stimulus situation is appraised as supportive when perceived resources meet or exceed demands, and threatening when demands are expected to tax or exceed resources (Blascovich, Mendes,

et. al., 2001). The following two sections demonstrate how relational messages affect feelings associated with primary and secondary appraisal, and how these feelings predict the effects of relational messages on perceived departmental support.

Feelings related to primary appraisal

According to Lazarus (1991, 1998), primary appraisal assesses the potential benefit or threat of harm that a stimulus object or situation presents, based upon: 1) relevance to personal goals; 2) goal congruence, e.g., whether the stimulus is facilitating or inhibiting goal pursuit; and 3) type of motivation or ego involvement that is active. Higgins' self-regulatory focus theory (1997) offers a strong theoretical framework for differentiating the motivations and feelings associated with a support versus threat orientation. According to Higgins, a *promotion focus* is associated with positive goals and an approach motivation, i.e., "going for it." Emotional feedback in a promotion focus conveys how well one is doing in closing the gap between the actual state of the self and the ideal state desired (Higgins, 1987). Setbacks and progress in promotion focus involve a continuum of emotions from sadness to happiness (Brockner & Higgins, 2001). In the language of cognitive appraisal theory, the core relational theme of sadness is an irrevocable loss or threat of loss, while the core relational theme of happiness is making reasonable progress toward attaining a valued goal (Lazarus, 1991). Negative promotion emotions such as dejection and discouragement represent low values on the promotion continuum, while the high end of includes feelings of eagerness and enthusiasm.

In contrast, *prevention focus* is associated with anti-goals or potentially harmful stimuli, avoidance motivation, and a focus on protection from a potential loss of well-

being. Emotional feedback in a prevention focus conveys how well one is doing in widening the gap between the actual state of the self and a negative situation or judgment one wants to avoid (Higgins, 1987). Progress and setbacks in prevention focus involve a continuum from fear and anxiety to calmness, indicating regulatory failure or success in avoiding potential harm. The core relational theme of fear is "immanent harm," anxiety indicates "facing an uncertain, existential threat," and calm indicates safety (Lazarus, 1991). Negative prevention feelings such as tenseness and anxiety represent low values on the prevention continuum, while the high end includes feelings of safety and being at ease.

Because positive relational messages convey environmental support and affirmation:

H2a: Positive relational messages will be positively associated with promotion feelings and prevention feelings.

Because negative relational messages indicate a threat to one's standing within the group and/or one's inclusionary status:

H2b: Negative messages will be negatively associated with promotion feelings and prevention feelings.

Feelings related to secondary appraisal

According to Lazarus (2006), secondary appraisal of individuals' coping potential involves several interdependent processes: 1) attribution of blame or credit for a stimulus event, 2) comparing personal resources to situational demands to evaluate possible responses and their future consequences, and 3) generation of an action tendency that

initiates a cascade of events in the brain, hormonal system, and physiology to initiate a particular type of emotion and behavioral response. While the implicit, secondary appraisal process is not accessible to measurement, individuals' explicit feelings about the adequacy or inadequacy of their personal resources have been extensively researched in terms of self-esteem.

Self-esteem has traditionally been understood as a self-evaluative feeling that has intrinsic value, state and trait aspects, and implicit and explicit aspects (Greenwald, Banaji, Rudman, et al., 2002). Tafarodi et al. (2003) differentiated two additional dimensions of self-esteem, *self-competence* and *self-liking*, referencing the two dimensions of social judgment, competence and warmth. Incorporating these understandings, the present study further hypothesized that state self-esteem has an adaptive, self-regulatory function that goes well beyond the benefits of feeling good about oneself in reference to a particular situation. Implicit, state self-esteem can be understood as the continuous assessment of situational coping potential generated in secondary appraisal. Explicit, state self-esteem reflects individuals' consciously accessible feelings about their situational coping potential, with positive feelings associated with personal adequacy, and negative with inadequacy. From this perspective, feelings associated with the competence and warmth dimensions of self-esteem can be considered as byproducts or reflections of the secondary appraisal process.

While self-liking is group-referential, evaluating the extent to which individuals feel comfortable with their social worth, self-competence is self-referential, indicating feelings associated with their ability to achieve personal goals in a particular situation.

Tafarodi et al., described self-liking as the degree of social worth that individuals assign to themselves based on qualities such as trustworthiness, appearance, the quality of their relationships, and their memberships in valued social groups. This self-liking dimension parallels Leary, et. al.'s (1995) description of self-esteem as a "sociometer" or internal perception of individuals' inclusionary status in a social group or setting. High self-liking is described by such attributes as *likable, popular, appreciated,* and *accepted,* while low self-liking is characterized by feeling *isolated, ignored, criticized, despised,* and/or *excluded* (Tafarodi et al., 2003).

According to Tafarodi et al., the self-competence dimension of self-esteem is the "valuative imprint of general self-efficacy on identity…the experience of oneself as a causal agent" (2003, p. 29). The authors referred to Bandura's (1997) definition of self-efficacy as a belief that one has the ability to act in a way that will successfully produce a given outcome. High self-competence is associated with attributes such as *competent, effective, powerful, capable, energetic*, and *successful*, while low self-competence is characterized by feeling *incompetent, ineffective, weak, afraid, passive*, and/or *unsuccessful* (Tafarodi et al., 2003).

According to Keyton (1999, p. 193) "when group members communicate directly or indirectly about their relationships with one another, they provide cues about their own and other members' worth and identities that, ultimately, affect their self-esteem." It is hypothesized here that relational messages experienced in interaction affect group members' appraisal of self-competence and self-liking based on two related processes. First, relational communication research has established that individuals necessarily

register others' points of view, including their definitions of self, other, and the relationship, in order to communicate (Watzlawick et al., 1967; Bateson, 1951). As a result, in interaction, individuals take into account what Cooley (1902) called the "looking glass self." Cooley claimed that living within groups requires us to construct an image of ourselves from others' points of view, including their beliefs about us and their evaluative reactions to us. He theorized that these imagined or inferred attitudes that others hold toward us necessarily affect our own self-concept and self-esteem. Rosenberg (1973) showed that individuals respond to these "reflected appraisals" selectively. We attend most strongly to the evaluative reactions of others whose opinion we both value and respect. Interestingly, Rosenberg also found that we most value the opinions of those who hold us in high regard! In a work group context, relational messages that convey the reflected appraisals of at least some valued colleagues should influence individuals' self-competence and self-liking.

Secondly, individuals attend to relational messages to monitor and manage the quality of their relationships, not just to maintain a positive self-evaluation. On the level of microstructuration, positive relational messages are constitutive as well as indicative of good, supportive relationships. Conversely, negative relational messages create and maintain conflicted relationships, and pose socio-emotional problems that interfere with goal pursuit and diminish coping potential. Contrary to Cooley, Leary et al. (1995) showed that it is not others' evaluations of us per se that affect our self-esteem, but whether or not they signal disapproval, rejection, and/or possible exclusion from important relationships. According to Leary et al.'s sociometer hypothesis, there is a

basic human motivation to seek inclusion and avoid exclusion in valued groups because they are instrumental to survival. The self-esteem system evolved to monitor the quality of individuals' relationships, attend to others' reactions, and alert the individual to any potential threat of rejection or exclusion. Others' reactions of disapproval or rejection conveyed in negative relational messages are threats to self-esteem and invoke anxiety, while indications of approval and support function to bolster self-esteem and are associated with positive emotions.

To some extent, relational messages about both competence and warmth should influence both dimensions of self-esteem. Walton and Cohen (2007) demonstrated that, in a performance context such as an academic department, individuals' sense of their own competence and inclusionary status are mutually dependent. However, both positive and negative messages about competence should have a stronger effect on self-competence, and messages about warmth should have a stronger effect on self-liking. Therefore:

H3a: Positive relational messages will be positively associated with self-competence and self-liking.

H3b: Negative-warmth messages will be negatively associated with self-liking.

H3c: Negative-competence messages will be negatively associated with self-competence.

Generalizing perceived departmental support

According to Damasio (2003, p. 145), individuals store knowledge about life events in memory that include description of a stimulus problem, the response made, its outcome in terms of reward or punishment, the outcome in emotional terms, and possible

future consequences—information that encompasses the elements involved the appraisal process. Storage of appraisal-related information facilitates rapid recognition and response to a specific type of situation based on early detection of its key features (Damasio, 2003; Inzlicht & Ben Zeev, 1991; Markus & Kitayama, 1991; Feldman & Swim, 1998). It also means that an entire conceptual category such as workplace interactions is likely to become associated with particular emotions and feelings over time. In context of the present study, patterns of positive and negative relational messages and the feelings associated with them are expected to predict individuals' generalized sense of departmental support. Therefore:

> H4: The appraisal variables—promotion (H4a), prevention (H4b), self-liking (H4c) and self-competence (H4d)—will mediate the effect of relational messages on perceived departmental support.

Adding identity processes to the basic appraisal model

When individuals' assess the person-environment relationship, the "person" aspect of the equation is not only affective and evaluative, but includes cognitive elements of identity that also have implicit and explicit aspects. In the present study, respondents were asked to access the explicit aspects of two social identity processes, 1) the extent to which they identify with their departments, and 2) the extent to which they feel that gender is important when they interpret their interactions with department colleagues. According to Tropp and Wright (2001), identification with department indicates the extent to which faculty members feel an "enduring interconnectedness" with the group and consider it an important part of their self-concept. The authors describe

gender salience as the extent to which individuals categorize themselves as males or females, i.e., a simple awareness of category membership (2001). More specifically, according to Harwood, Raman, and Hewstone (2006), group salience in interaction is an individual's awareness of intergroup differences in an intergroup encounter. The next part of the literature review will argue that faculty members may interpret relational messages in terms of two social identities—their common, departmental membership and their separate, gender identities—and that both variables predict perceived departmental support, as shown in Figure 5.

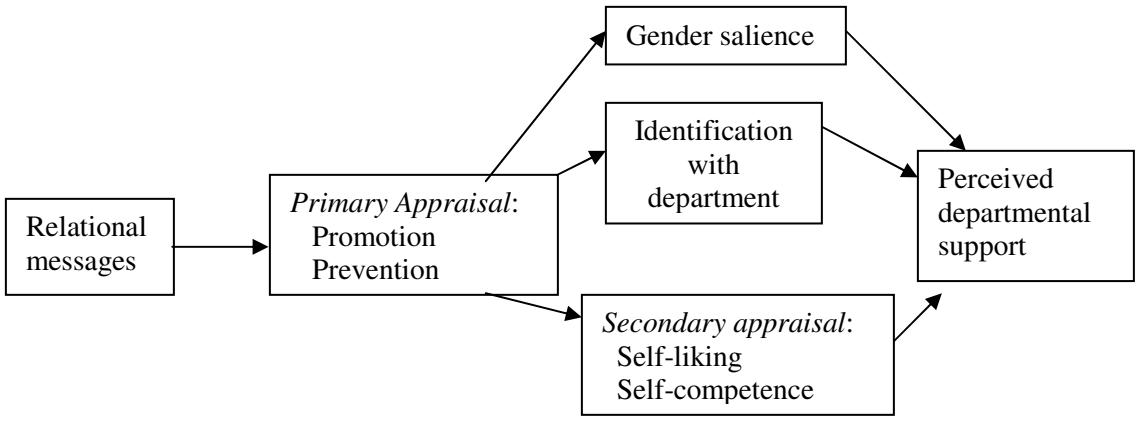

Figure 5. Adding Identity Variables to the Basic Appraisal Model of Perceived Departmental Support.

Identification with the department

Based on the SYMLOG and relational communication literatures, it has been established that positive relational messages validate ingroup status and solidarity among interactants. Frequent receipt of such positive reflected appraisals from other group

members should facilitate individuals' identification with the group and the extent to which group membership is important to their self-concept. According to Self-Expansion Theory (SET, Aron, Aron, & Smollen, 1992; Aron, et al., 1998; Tropp & Wright, 2001), individuals join and identify with groups to expand their efficacy and realize goals that can only be achieved cooperatively with others. Self-expansion occurs when a situation offers an opportunity to expand one's material, social, and psychological resources, including others' perspectives and identities, by entering into empowering alliances (Wright, Aron, McLaughlin-Volpe, & Ropp, 1997; Aron, et al., 1998). Tropp and Wright (2001) described this motivation to "include others in the self" as a fundamental human motivation, rooted in human's reliance on group membership for survival. Therefore, frequent evidence of one's good standing and secure inclusion in the group should promote inclusion of the group in the self.

H5a: Positive relational messages will be positively associated with identification with department. However, this relationship will be mediated by the primary appraisal variables, promotion and prevention feelings, as illustrated in the model.

Conversely, strong patterns of negative relational messages that devalue a group member and/or increase social distance are likely to be interpreted as indications of low regard that pose threats of poor treatment and exclusion. Individuals that receive more frequent negative relational messages in interaction should thus find it harder to identify with the group.

H5b: Negative messages will be negatively associated with identification with department. This relationship will be mediated by the primary appraisal variables, promotion and prevention feelings, as illustrated in the model.

The relationship of identification with department and perceived departmental support

Lipponen, Helkama, and Juslin (2003) argued that the degree of identification with the ingroup is independent of an individual's feelings about it, i.e., the cognitive and evaluative aspects of individuals' relationship with the group are separate constructs. In context of the present study, identification with one's department is separate from one's evaluation of departmental supportiveness. For example, an individual in a dysfunctional family or work group may strongly and frequently identify with the group as an important part of the self-concept but, at the same time, consider the group to be unsupportive to his or her personal well-being. Nevertheless, the need to maintain cognitive consistency suggests a tendency for the cognitive and evaluative aspects of the self to be congruent, i.e., in balance (Greenwald et al., 2002). In the present study, this suggests a tendency for the cognitive and evaluative aspects of group membership, the person-group relationship, to be congruent.

As previously discussed, more frequent receipt of positive relational messages should to some extent foster a greater degree of identification with the department. A higher degree of identification with the group should, in turn, serve as a positive interpretive frame that orients members to expect respectful and supportive ingroup treatment, foster a positive interpretation of events, and precipitate positive behaviors in

interaction that members should generalize into a comparable degree of perceived departmental support. Therefore:

H6: Identification with department will be positively associated with perceived department support.

Gender salience in interaction

As Bales (1950, 1999) demonstrated, there are tendencies toward polarization and unification within any task-oriented group. Sub-groups form quickly and spontaneously around value differences in task-oriented discussion that often dissipate after tension-releasing maintenance behaviors. In addition, multiple, long-term sub-groups also exist in most work groups that may systematically influence individuals' relational communication experiences and outcomes. According to Alderfer and Smith (1982), organizational sub-groups are based on rank, occupational function or category, and type of department, while identity groups are based on personal characteristics such as gender, ethnicity, or other social category. According to social identity theory, individuals' identity encompasses multiple group and social category memberships that differentiate individuals within a social system (Turner & Onorato, 1999; Onorato & Turner, 2004). For example, in the present study, faculty members' personal identities reflect interpersonal differences; sub-group identities reflect differences in gender, rank, and other social categories that differentiate members within their departments; and all department members possess a shared, superordinate, group identity that differentiates them from members of other departments within the university. Which of individuals' multiple identities are salient in a given situation depends upon the comparative context.

According to Richardson (2005), intergroup competition, unequal distribution of resources, differential group status, and unequal numerical representation in a setting are environmental cues that foreground sub-group identities—cues that are likely to signal gender differences in many academic departments. According to Watzlawick et al. (1967), these environmental cues convey relational messages. As such, they are expected to affect the way individuals define themselves, each other, and their relationships and how they interpret each others' behaviors in interaction. The next section of the literature review discusses cognitive factors that may influence individuals' interpretation of relational messages when gender, as a sub-group identity, is salient in interaction.

Cognitive representation of intergroup situations. According to Brewer (2000), three principles characterize individuals' cognitive representation of sub-grouped or intergroup situations. First, the intergroup accentuation principle holds that selective perception results in accentuation of within-group similarities and between-group differences. When social identities are salient, individuals are motivated to maximize the metacontrast ratio, to focus on similarities between the self and other in-group members and focus on differences between themselves with outgroup members through implicit processes of assimilation and contrast. Second, Brewer's (2000) ingroup favoritism principle holds that increased similarity generates increased positive affect toward similar others within the ingroup and less positive affect toward dissimilar outgroup members. According to Fiske, Ruscher, Mackie, & Hamilton (1993), ingroup bias is based on individuals' presumption that mere membership in an ingroup signals a cooperative intent, while outgroup membership is implicitly associated with goal blockage. Finally,

the social competition principle describes a natural competitiveness between groups for material and psychological resources, based on the self-enhancement motivation, the desire to be better than others on a valued dimension. Brewer argued that any group-level categorization scheme generates these three, predictable cognitive dynamics. As soon as a social identity related to a particular group is activated in interaction, it orients perception, processing, and retention of information, guides inference and judgment processes, and influences behavioral response. For example, when faculty members' superordinate, department-level identity is active, the tendency to maximize the metacontrast ratio foregrounds ingroup similarities and the ways that the ingroup is different from and better than other departments. When gender identities are active, the same cognitive processes operate at a sub-group level, foregrounding similarities within each gender group and differences between males and females in the same department.

The content of gender stereotypes. Social groups—including social categories such as *male* and *female* which function as grouping factors in social perception—are associated with stereotypes, which Eagly and Wood described as inferential relations that associate various attributes and behaviors with category membership (1991). In social perception, stereotypes function as hypotheses, expectations, and predictions about individuals' competencies, motivations, and behaviors based on their group memberships (Walton & Cohen, 2007).

According to the social-structural hypothesis of the stereotype content model (SCM, Fiske, Xu, & Cuddy, 1999), stereotype content involves the two dimensions of competence and warmth, based upon groups' relative status in a particular context, plus

the degree to which their relationship is cooperative versus competitive. The authors argued that the primary function of stereotypes is to organize and maintain status relations in society, rather than merely reflect them. Stereotypes develop based on groups' *relative position* vis a vis each other in context of the social system in which they are embedded.

Stereotypes may be of single valence—with both dimensions negative (low competence and low warmth) or both positive (high competence and high warmth)—or, stereotypes may be ambivalent, involving complementary expectations on the two dimensions. For example, in the U. S., males are stereotypically associated with high competence but low warmth, while women are expected to be warm, i.e. cooperative, but not competent. In the SCM framework, four possible types of stereotypes or group characterizations emerge:

1. High competence and high warmth (indicating powerful and valued allies)
2. High competence and low warmth (powerful rivals)
3. Low competence and high warmth (children and others of low competence who are under the group's protection)
4. Low competence and low warmth (groups that are lower in competence, yet drain or threaten ingroup resources, either material or psychological or both).

Gender divides the superordinate category *human* into two complementary categories. Although gender stereotypes vary according to context and culture and evolve over time, they nevertheless imply fixed, global, and stable traits assumed to be characteristic of males and females. For example, Bem's Sex Role Inventory (BSRI,

1974) measures masculinity in terms of traits which include *dominant, acts as a leader,* and *independent*, while feminine traits include *sensitive to the needs of others* and *helpful.* According to Bem (1993), the masculine and feminine traits in the BSRI typology were selected to reflect characteristics culturally defined as gender appropriate in the U.S. in the early 1970s. Questioning whether these differentiations were still valid, Holt (1998) found the BSRI to continue to be a valid measure of gender role perceptions.

Based on this complementary division of traits, masculinity is generally believed to be correlated with high social status, leadership, and economic power (Wagner & Berger, 1997). Sell, Knottnerus, Ellison, and Mundt (2000) suggested that because many occupations, including department chair and administrative assistant, have traditionally been divided along gender lines, holdover beliefs exist that they *should* be divided this way, based on men's and women's preferences and competencies. In a reciprocal process, everyday interactions among men and women with unequal status reinforce gender-stereotypes and are shaped by them, in a self-fulfilling prophecy (Ridgeway and Smith-Lovin, 1999).

However, numerous studies have shown that "masculine" and "feminine" behaviors in small group interaction are typical of any person in a high or low status position (Wagner & Berger, 1997; Aries, 1996). Ridgeway and Smith-Lovin (1996, 1999) noted that masculine and high status persons are both described by the adjectives *respected, competent,* and *leader-like* versus *supportive, less competent,* and *follower-like* descriptions for both feminine and low status persons. According to expectation states theory (EST, Wagner & Berger, 1997), group members develop aggregated expectations

for self and other members by combining evaluative information from observing individuals' actual performance with assumptions based on social stereotypes. The authors' burden of proof assumption states that stereotypes related to status characteristics, such as gender, influence "normal interaction" unless specifically discounted as irrelevant to the task or the situation. Stereotypes shape interaction by influencing actors' expectations regarding each other's attitudes, motives, capabilities, and behaviors—all fundamental, in Bales' framework, in determining members' value positions within a group. In this way, gendered expectations detrimental to women may be automatically imported into everyday social judgment processes unless specifically negated—for example, by public expressions of confidence by peers and/or a superior. On the other hand, men may benefit from stereotypical expectations that give males a "competent until proven otherwise" expectation advantage.

Communication accommodation theory

Communication accommodation theory (CAT, Gallois, et al., 2005; Boggs & Giles, 1999) provides a framework for understanding how expectations associated with gender may affect faculty members' interactions with colleagues. Gallois et al. (2005) conceptualized communication as a negotiation of interactants' personal and social identities, and described CAT as "an interdisciplinary model of relational and identity processes in interaction" (p. 131).

The theory was developed to explain the relational processes of association and disassociation, convergence and divergence, that operate in interaction between members of different sub-groups in an intergroup context. Grounded in SIT, the fundamental

premises of the theory are that 1) interactants strategically modify their communication to achieve their goals in interaction, both with conscious intent and automatically, outside of conscious awareness, and 2) when interactants signal a desire to increase or decrease social distance between them, their "moves" in interaction often reflect an intragroup (accommodation) or intergroup (non-accommodation) orientation to the relationship. This conception is similar to Bales' description of how group members use socio-emotional messages to indicate acceptance or rejection of the interaction partner as an ingroup colleague.

According to Gallois et. al. (2005), communication accommodation involves changing one's verbal and non-verbal behaviors to be more similar to the conversation partner(s)', i.e., emphasizing behavioral similarities and moving toward convergence. Accommodation signals liking, foregrounds similarities between interactants, and is usually interpreted positively by one's communication partner. In contrast, non-accommodation emphasizes differences between the interaction partner's communication style and one's own, increases social distance, and is usually interpreted negatively by an interaction partner. The three forms of non-accommodation include 1) maintenance or under-accommodation, involving insufficient change of one's usual communication style to ensure good communication, 2) contra-accommodation, involving deliberate adoption of communication practices that block comprehension by one's communication partner, and 3) over-accommodation, characterized by excessive or exaggerated change of communication style, usually in the direction suggested by an outgroup stereotype, e.g., over-explaining a simple concept to a female faculty member, implying lower capability

(Boggs & Giles, 1999). Essentially, accommodation emphasizes similarities in order to create or validate an ingroup relationship with interaction partners, while non-accommodation emphasizes differences to imply or maintain an intergroup relationship.

Boggs and Giles' (1999) described a workplace gender non-accommodation cycle in which women enter traditionally male jobs, males non-accommodate—i.e., send negative relational messages—females non-accommodate in response, and communication breakdown occurs. This non-accommodative pattern of interaction activates gender stereotypes and reinforces treatment of males and females as separate organizational sub-groups. The entire cycle constructs a competitive or, in the extreme, hostile relationship between co-workers in which expectations based on gender stereotypes are inadvertently fulfilled. In the present study, this cycle would be described as the exchange of negative, non-accommodative relational messages among male and female faculty members that may function to cognitively foreground gender differences as interactants interpret their experiences in interaction. Individuals that receive frequent negative messages in interaction with colleagues should be susceptible to using gender to understand and explain the relational problem at hand. Therefore:

> H7a: Negative messages will be positively associated with gender salience in interaction. This relationship will be mediated by the primary appraisal variables, promotion and prevention feelings, as illustrated in the model.

It follows that positive relational messages would be negatively related to gender salience for two key reasons. First, positive messages signal convergence and validate a common ingroup identity, regardless of any sub-grouping tendencies or cues that may be

present. Second, people receiving positive messages don't need a reason or attribution for being treated well. They would naturally credit themselves, their ingroup status, and a good relationship with their interaction partner(s) for the affirming relational messages that they receive. Therefore, the importance of gender in interaction should fade into the background when individuals receive a predominance of positive relational messages in interaction.

H7b: Positive messages will be negatively associated with gender salience in interaction. This relationship will be mediated by the primary appraisal variables, promotion and prevention feelings, as illustrated in the model.

The relationship of gender salience and perceived departmental support

When situational cues including environmental factors and relational messages make gender salient in interaction, implicit stereotype content is automatically and unconsciously primed in memory. Therefore, stereotype effects occur at early and implicit stages of information processing, making implicit theories, expectations, and evaluations related to gender more accessible. This means that, along with memories about interactants' own relationship, information about the relationship between males and females in general is likely to be used to help interpret the communication partner's behaviors. Repeatedly wondering whether one is being treated "as a man" or "as a woman" in interaction rather than simply as an individuated, ingroup colleague likely introduces uncertainty regarding the degree of support that can be expected from colleagues' that are not in one's gender ingroup. Therefore:

H8: Gender salience in interaction will be negatively associated with perceived departmental support.

Gender differences in type of messages received

The following sections present specific hypotheses related to the addition of gender to the model, as shown in Figure 6.

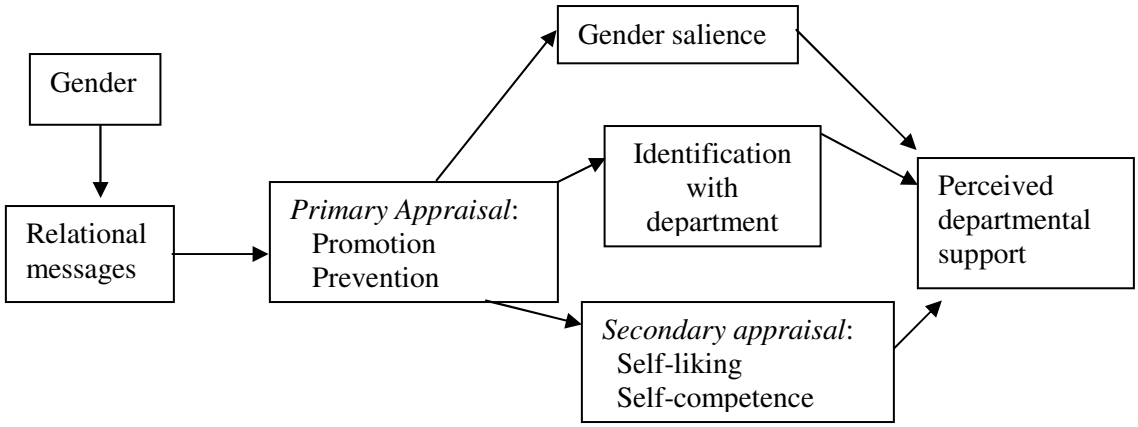

Figure 6. Gender Differences in the Model of Perceived Departmental Support.

The previous discussion of gender salience in interaction suggests that male and female faculty members are likely to receive different patterns of relational messages that differentially affect the outcomes under study. Previous research has shown that 1) members who communicate with each other based on different social identities are likely produce divergent messages in interaction, and 2) minority group members are likely to receive more negative relational messages than majority group members (Barker, Abrams, et al., 2000). Therefore:

H9a: Males will report more frequent receipt of positive relational messages than females.

H9b: Females will report more frequent receipt of negative relational messages than males.

Gender and primary appraisal

Crocker and Garcia (2006) described a stigma cycle of interaction in which gender acts as a stigma or negative status marker for women, based on gender stereotyping. Shown in Figure 7, the stigma cycle models the thoughts, feelings, and behaviors of male and female interactants.

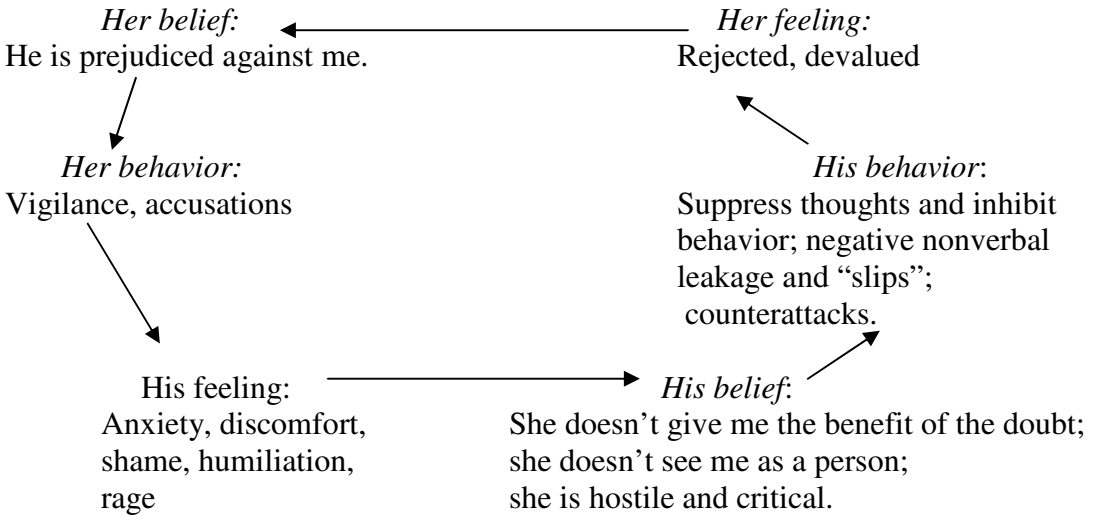

Figure 7. Crocker and Garcia's Stigma Cycle (2006).

The stigma cycle is similar to Boggs and Giles' (1999) workplace gender non-accommodation cycle, while providing fuller detail about the social-psychological and

emotional bases of intergroup communication behaviors. According to Crocker and Garcia (2006), members of any two sub-groups with status differences in a particular context are likely to approach intergroup interaction with anxiety. Anxiety reflects social identity threat—a threat that an individual may be personally devalued in a setting because of a social identity that has negative implications there (Steele, Spencer, & Aronson, 2002). Social identity threat is consistent with anxiety's core relational theme—*an uncertain, existential threat*, with uncertain coping potential (Lazarus, 1991).

In an intergroup situation, a lower status individual experiencing identity threat is likely to be vigilant for prejudiced communication that is motivated by negative stereotypes and affect. Prejudiced communication involves the subtle or blatant, verbal and/or nonverbal conveyance of stereotypical expectations and prejudiced attitudes toward someone considered an outgroup member (Ruscher, 2001, p. 2). According to Ruscher (2001), prejudice is perhaps the opposite of empathy—feeling *against* or *separate from* rather than *feeling with*. Blatant expressions of prejudice include physical or verbal threats, group-targeted humor, derogatory names, and non-accommodative nonverbal behaviors such as glaring, staring, or rolling the eyes in contempt. More subtle forms of prejudiced communication also exist. For example, in patronizing speech, the sender "talks down" to the receiver using simplistic language or overly detailed explanations, while in controlling talk, one interactant may ignore another's contributions to the conversation, interrupt, or use unwarranted commands (Ruscher, 2001). Prejudice itself may "go underground" in the sense that it operates implicitly and sometimes in opposition to individuals' conscious intentions, manifesting through very subtle changes

in verbal tone and body language. Stigmatized receivers may detect and respond to such unintentional, nonverbal leakage outside their own conscious awareness, complicating both interactants' interpretations of the situation.

For members of stigmatized groups, therefore, situational cues of prejudice including types of individuals, remarks, interactions, and settings may become emotionally coded or "pre-appraised" as threatening, based on personal and vicarious experiences in memory (Markus & Kitayama, 1991; Murphy, Steele, & Gross, 2007). For example, Feldman and Swim (1998) showed that individuals are more likely to label a male than a female as sexist, and a European American rather than an African-American as racist, given identical behaviors. These pre-appraisals are, of course, prejudicial in their own right. While stigmatized persons are sensitive to cues of prejudice, a non-stigmatized person is likely to be apprehensive that a stigmatized conversation partner will indeed have prejudged him or her as prejudiced. Blascovich et al. (2001) showed that non-stigmatized individuals may experience physiological signs of threat in interaction with stigmatized others as well as lowered performance on a cognitive task. The authors theorized that these responses result from evaluations of increased demand in primary appraisal in terms of extra effort, uncertainty, and emotional management in the presence of a stigmatized person. These concerns of non-stigmatized persons simultaneously diminish their resource evaluations in secondary appraisal. In this way, *both* participants may approach interaction with negative and complementary expectations that may compromise their interaction.

However, while both high and low status interactants are likely to approach

intergroup interaction with some degree of anxiety, arguably the stakes are higher for the person of lower status who is positioned more peripherally within the superordinate group. First, it is a stronger threat to identity to be considered incompetent or peripheral than to be considered prejudiced by a lower-status group member. Indeed, Mendoza-Denton, Page-Gould, and Pietrzak (2005) explained that members of lower status groups may experience what she called *group-based rejection expectation* or *prejudice apprehension* such that they are more vigilant for prejudiced behavior, tend to perceive social rejection more readily, and react to it more strongly than members of high status groups. These dynamics should heighten the impact of relational messages that signal negative-competence and/or warmth to lower status individuals. Second, the higher status person, together with his or her ingroup allies, wields more clout in influencing the other's relationships and standing within the group. Higher status also makes him or her less personally vulnerable to criticism, based on a more secure and central position within the group. Therefore:

H10a: Males will report more positive promotion feelings in interaction than females.

H10b: Males will report more positive prevention feelings in interaction, than females.

Social identity threats to self-liking

As previously discussed, self-liking is the evaluative feeling associated with individuals' inclusionary status, their sense of social worth and fit within a social environment. Walton and Cohen (2007) demonstrated that a social situation that causes

members of a lower status sub-group to question their social fit can trigger a state of *belonging uncertainty*, a hypothesis that "people like me do not belong here" (p. 83). The authors showed that in an achievement domain, particularly in academic and professional contexts, individuals inferred their own probability of success from the numerical representation of people similar to themselves in that context. In one study, the authors manipulated participants' sense of social fit with computer science by asking them to list either two or eight close friends interested in that field. In a second study, participants were asked to generate two or eight skills they possessed that would help them succeed in computer science. In both studies, participants in the "eight" condition, who experienced difficulty in generating eight examples, reported both a lower sense of fit and a lower probability of success than those in the "two" condition or controls.

According to Leary's sociometer hypothesis (Leary et al., 1995), belonging uncertainty would be a type of threat to inclusionary status. Similarly, McLaughlin-Volpe (2006), showed that members of stigmatized groups experience self-expansion threat that entails threat of exclusion and/or marginalization. Marginalization involves being denied the benefits of full status membership, including good relationships, positive sense of self, positive affect, respectful interactions, and higher self-efficacy based on self-expansion. In the present study, female faculty members should be more vulnerable to belonging uncertainty, while males enjoy the psychological benefits of majority representation in many departments, and greater representation at higher ranks in most departments. Therefore:

H11a: Males will report a higher level of self-liking than females.

Social identity threats to self-competence

Stereotype threat is a situational predicament in which individuals' anticipation of being judged in a biased manner or treated poorly, based on a salient negative stereotype, undermines their cognitive performance (Spencer, Steele, & Quinn, 1999; Steele, 1997; Steele & Aronson, 1995; Steele, Spencer, & Aronson, 2002). Stereotype threat effects have been shown to include heightened anxiety, increased cognitive load and/or distraction (Wheeler & Petty, 2001), and diminished working memory capacity (Schmader & Johns, 2003).

Any factor that increases the salience of a negative stereotype may constitute a threatening intellectual environment (Inzlicht & Ben-Zeev, 2000). For example, Asian-American females whose gender identity was primed before a math test performed more poorly than controls, while those whose Asian identity was primed, triggering positive expectations, scored better than controls (Shih, Pittinsky, & Ambady, 1999). The stereotype threat literature links stereotype threat effects to females' underperformance in math and science-related tasks as well as leadership tasks that are stereotypically associated with men. Competent members of other stereotyped groups have also experienced performance deficits in various contexts, including White men taking a test of natural athletic ability, an attribute usually linked with African-Americans, and African-American men taking the same test framed as a test of sports intelligence, usually linked with White athletes (Stone, Lynch, Stone, Sjomeling, & Darley, 1999). Interestingly, math-proficient White men who believed that they were being compared with Asian men on a math test did more poorly than controls (Aronson, Lustina, et al.,

1999), indicating that the common denominator for threat effects is an expected downward comparison, rather than a salient stereotype, since no stereotype exists about White men's inability in math. The essential factor that predicts social identity threat is individuals' anticipation of a negative social comparison with members of another group that is presumed more competent at the task at hand than one's own group.

On the other hand, stereotype threat effects do not occur when individuals are told that the task is not diagnostic of innate ability, when it is explicitly stated that both sexes are expected to perform equally well on the task, and when the experimenter shares the negatively-stereotyped identity, modeling that the identity is irrelevant, i.e., does not pose a threat, in the present situation. Sex differences in achievement disappear when women perform the same mathematical operations as part of a stereotypically feminine task rather than in a male-oriented context. (Bandura, 1997). Similarly, when gender stereotypes are explicitly disassociated from performance expectancies in testing situations, male and female participants perform equally well (Marx, Brown, & Steele, 1999; Bandura, 1997). The common denominator for creating what Steele called an "identity-safe environment" that ameliorates or eliminates stereotype threat is an explicit or implicit re-framing of the task and/or the situation that lessens the accessibility of negative stereotypes (Davies, Steele, & Spencer, 2005: Steele & Aronson, 1995; Spencer et al., 1999). As predicted by expectation states theory (Wagner & Berger, 1997), when no message is conveyed to diffuse an identity-threatening situation, individuals from a negatively-stereotyped group are likely to use stereotype-based attributions for any difficulty that arises in their task performance. This means that, in situations where

gender sub-grouping exists, unless the task is in some way reframed as gender-irrelevant, or the situation is reframed as gender-neutral, the conditions necessary for stereotype threat exist by default.

Davies et al. (2005) engineered identity safety in a stereotyped context by verbal assurances that women, as targets of negative stereotypes, would be welcomed and valued in that environment, and that stereotypical expectations would not predict individuals' task performance. The authors exposed women to situational cues that primed their gender identity, which predicted poor performance on a leadership task. Despite these ideal conditions for stereotype threat, participants who received a short, simple verbal message became immune to threat effects. The experimenter indicated that although there is controversy about gender differences in leadership ability, previous research had revealed no gender difference in ability on the task at hand. Women in this threat-defused condition showed no lessening of aspirations to take a leadership position on a small group's problem-solving task. On the other hand, participants whose gender identity was primed, without the threat-diffusing message, showed predictable stereotype threat effects.

To date, much stereotype threat research has occurred in experimental situations in which very specific relational messages have been engineered for participants. The present study hypothesizes that relational messages exchanged by men and women in naturally occurring groups serve the same function—creating positive or negative expectations for individuals' performance by defining sub-group identities as a positive, negative, or neutral resource in that situation. Because male faculty members generally

enjoy higher status and a higher level of numerical representation in many departments, and because they are expected to receive positive relational messages more frequently than females:

H11b: Males will report a higher level of self-competence than females.

Gender differences in identity effects

Brewer (2000) showed that individuals' social identities at different levels of inclusiveness need not be competitive and that a strong sub-group identity may be salient at the same time as a superordinate group identity, i.e., for members of the offensive and defensive squads of a football team. What Brewer called awareness of "dual identity" allows all members to see themselves as complementary and necessary parts of a larger whole. However, sub-group identification presents a challenge to dual identity when one sub-group is so strongly associated with the superordinate group that its characteristics describe the larger group's prototype. For members of a higher status, prototypical sub-group, expectations for performance are equally high when either superordinate or sub-group identity, or both, are salient. Sub-group membership is only linked with a potential identity threat for members of a lower status group, female faculty in the present study, who are more likely to attribute difficulties in interaction to gender-related issues. Therefore:

H12. Males will report a higher level of identification with the department than females.

H13. Females will report a higher level of gender salience in interaction than males.

Based on these hypothesized gender differences, and prior assumptions that identification with department is positively associated with perceived departmental support, while gender salience is negatively related:

H14: Males will report a higher level of perceived departmental support than females.

Gender and type of department as cross-level moderators

We have established that, to the extent that gender sub-grouping exists in a department, males and females are likely to receive different patterns of relational messages that would differentially affect the outcomes under study. The following section of the literature review will argue that these effects should be significantly larger in departments where gender representation is most skewed and/or in fields that are stereotypically associated with males. Adding cross-level moderation effects involving gender and type of department will produce the completed model, shown in Figure 4.

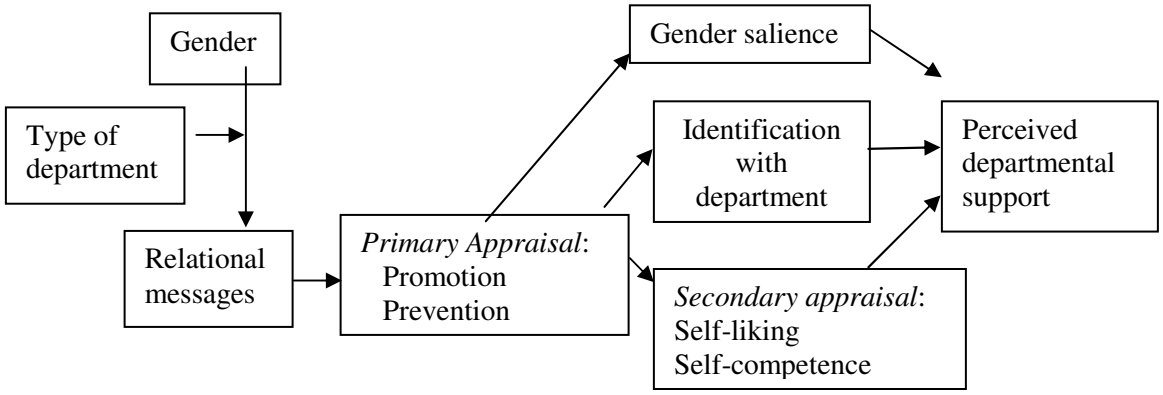

Figure 4. Full Relational Communication Model of Perceived Departmental Support.

Effects of token status. A gender identity carries positive or negative valence, and is considered an advantage or disadvantage, based on the fit of gender attributes with the requirements of particular tasks and domains of activity (Heilman, Wallen, Fuchs, & Tamkins, 2004; Heilman, 2001). Imagine a professor lecturing to a computer science or engineering class and you are likely to imagine a male, and rightly so. In departments of technology, engineering and the "hard" sciences, where women comprise a low-status minority, gender categorization is often accurately predictive of individuals' rank and level of achievement. For example, sampling 1,080 colleges and universities in the U. S., the National Center for Educational Statistics found that faculty in schools of engineering are 90 percent male and, in the natural sciences, 77 percent male (NCES, 2005). In the 'top 50' departments of science and engineering disciplines in research universities, as ranked by NSF, the number of women attaining a PhD in science and engineering has significantly increased between 1993-2002, yet the corresponding faculties have not hired female faculty in proportion to the number of women available in the "pipeline" (Handelsman, et al., 2005). Further, there is a progressively smaller female minority at increasingly higher ranks (Committee on Science, Engineering, and Public Policy of the National Academies of Science, 2006). Congruent with national trends, 57% of assistant professors, 63% of associates, 78% of full professors, and 80% of department heads are male in the large public university under study (Office of Institutional Research, University of Arizona, 2006).

Predictable effects of social structure occur on the evaluation and treatment of women in workplaces where they are a small minority. Kanter (1977) described three

types of minority representation: solo status, token status, and critical mass. Token status occurs when a low status minority represents less than 15% of work group members. Tokens report either being highly visible and distinctive or being ignored, and both distinctiveness and isolation are associated with negative, stigmatizing feelings (Niemann & Dovidio, 1998; Thompson & Sekaquaptewa, 2002). According to Sackett, duBois, and Noe (1991), women receive lower performance evaluations and are less likely to be promoted when in a token minority. Kanter's research pointed to a critical mass around 35% representation, at which point a minority becomes integrated into the larger group and is treated and evaluated accordingly. Women in departments of critical mass are more likely to report more professional recognition and social support than women in departments where they are tokens (Kemelgor & Etzkowitz, 2001). Tolbert, Simmons, Andrews, and Rhee (1995) found that solos and tokens tend to be ignored in a workplace, then resistance increases until a threshold of about 40%, at which time the minority's integration into the communication networks and power structure of the workplace occurs. Therefore, token numerical representation of women in a department should exacerbate the influence of gender on the patterns of relational messages exchanged among members. Statistically, type of department is expected to moderate the effect of gender on reported receipt of relational messages.

H15: Females in departments with token representation of women will report a lower level of receipt of positive relational messages and a higher level of receipt of negative relational messages than males, as well as females in departments of critical mass.

H16: Females in departments with token representation of women will report a lower level of perceived departmental support than males, as well as females in departments of critical mass.

Stereotype effects in "male" domains

Some academic departments and fields of activity are strongly linked with males, e.g., mathematics, engineering, and the "hard" sciences. Some departments, including education, are linked with females, while some, including psychology, are relatively gender neutral. In a study involving over 60,000 respondents, Nosek, Banaji, and Greenwald (2002) showed that both men and women hold explicit and implicit associations between males and math and science. Approximately the same strength of association was found for males and females from the ages of 15 through 50. The flip side of these strong implicit associations is the complementary disassociation of males and females with achievement domains associated with the "opposite" sex. Surprisingly, Nosek et al. found that even females majoring in math and science showed a strong implicit association between math and males. Not surprisingly, the stronger women's implicit math = male stereotype, the weaker their association of math with the self.

Therefore, the influence of strong and widely-held gender stereotypes in some departments but not others should result in stronger effects of gender in departments of math and the hard sciences. For women, negative gender stereotypes disassociating women with the "hard sciences" should exacerbate the influence of gender on the patterns of relational messages exchanged among faculty colleagues. Statistically, hard

science versus other type of department is expected to moderate the effect of gender on reported frequency of receipt of relational messages.

H17: Females in the hard sciences will report a lower level of receipt of positive relational messages and a higher level of receipt of negative messages than males, as well as females in other fields.

H18: Females in the hard sciences will report a lower level of perceived departmental support than males, as well as females in other fields.

The completed model

The completed model shown in Figure 4 establishes how relational messages received in collegial interaction are associated with faculty members' perceptions of departmental support. It is important to emphasize that this model does not, in any way, imply that relational messages are the only influence on individuals' generalized sense of departmental support. In addition to individual-level variables related to personal characteristics, motivations, and values, Eisenberger et al. (1986) emphasized the importance of individuals' "being in the loop" in the exchange of quality, task-related information, receiving material and status incentives from the organization, and the overall quality of organizational culture as contributing variables that influence individuals' perceptions of organizational support.

The conceptual framework underlying the present model

The model presented in this chapter assumes that relational messages exchanged in interaction implicitly contain the sender's definition of the self, the interaction partner(s), and their relationship in the present situation. These definitions have a

cognitive, identity component and an evaluative, emotional component, both of which indicate the person-environment relationship. According to Wheeler and Petty (2001), the extent to which the self is construed in terms of personal, sub-group, or superordinate social identity is important in determining whether or not a situation, e.g., collegial interaction, is perceived as supportive or threatening. The present study suggests that reciprocal causation exists, that 1) an individual's appraisal of interaction as supportive or threatening is an important determinant of which of his or her multiple social identities will be foregrounded, and 2) there is internal pressure to generate a cognitive identity that matches the sense of support or threat generated in primary appraisal. Consistent with Damasio (2003), it is hypothesized that primary appraisal of relational messages exchanged in interaction—a quick and dirty appraisal of situational support versus threat—is the first step in generating individuals' sense of self-in-situation that incorporates both cognitive and evaluative aspects. Based upon primary appraisal, the self-concept and self-esteem are likely generated as a package, on a continuous basis, in parallel processes.

These understandings are consistent with the communication, emotion, and social-psychological literatures and point to an integrated, overarching framework for understanding how individuals interpret relational messages. Such a meta-theoretical framework was developed to conceptualize the present study. See Appendix A for a brief discussion of this framework, which was adapted for the study of relational communication from Greenwald et al.'s unified framework of implicit attitudes, self-concept, and self-esteem (2002).

Association of positive and negative messages with gender of interaction partner

Finally, the literature review raises a research question associated with the new model: Do respondents associate particular types of relational messages more with male or female colleagues?

CHAPTER II

METHOD

The sample

All of the approximately 1,100 tenure track faculty in the Colleges of Agriculture and Life Sciences, Education, Engineering, Fine Arts, Humanities, Science, and Social & Behavioral Sciences at the University of Arizona were invited to participate in the present study. Refer to Table 1A for a breakdown of the population by college and sex.

The sample consisted of 262 tenure track faculty members, 101 women and 161 men from 61 academic departments. Women represented 33% of the recruited population versus 39% of the sample, i.e., women were slightly overrepresented in this study. See Table 1B for a breakdown of the sample by sex, rank, and type of department. Of the 257 participants that responded to the question about ethnicity, 81% were European-American (White), 10% were Asian-American, Hispanic, or Native-American, and 9% were foreign scholars of various ethnic backgrounds. No African-American faculty elected to participate in the study.

Recruitment of participants. A multi-stage recruitment process was successfully implemented. First, in compliance with the UA Internal Review Board, a written site authorization letter that granted permission to recruit faculty participants was obtained from deans of the 7 participating colleges. A copy of the deans' letter is found in Appendix B. After obtaining deans' authorization, an email was sent to all department heads in the 7 colleges requesting their assistance with recruitment of tenured and tenure-track faculty (see Appendix C). Heads' assistance was requested because 1) they could

most accurately identify faculty eligible to participate in the study, 2) add credibility to recruitment efforts, and 3) forward the recruitment email easily via a department list serve. The initial email to department heads explained the purpose of the study, assured anonymity and confidentiality of participation, stated that no results would be reported about individual departments, and asked heads to forward the recruitment email that would follow in two days. The delay was intended to give department heads time to access the survey via the department-specific URL provided and to have any questions they had answered by the PI. One head responded that his department had already been subjected to too many annoying surveys, and no further recruitment efforts were made in that department. After the 2-day delay, the PI sent the recruitment email, included in Appendix D, to heads for forwarding. Each department was assigned a unique URL for prospective participants to access the survey. By noting which URLs had become active within the next week, the PI ascertained that about one third of department heads had forwarded the recruitment email to their eligible faculty. For departments with inactive URLs, the recruitment email was sent directly to faculty members, using personal email addresses compiled from departments' websites.

The survey was accessible online through SurveyMonkey.com for approximately three weeks, from April 19 through May 11 2007. By monitoring activity on the various URLs, the PI was able to track which departments were participating in the survey and which were inactive, facilitating efficient and effective follow-up recruitment strategies. All eligible faculty received two recruitment emails total. A copy of the final, recruitment/thank you letter to faculty is included in Appendix E.

Data preparation

The researcher aggregated several data files provided by SurveyMonkey.com into a single Excel file that was imported into SPSS for statistical analysis. From the approximately 1,100 faculty recruited, 266 completed questionnaires were received from 61 departments across all seven colleges, representing a response rate of 24%. Four cases were eliminated due to having outliers on more than one scale, together with systematic, non-thoughtful patterns of response, resulting in a total sample size of 262. The number of respondents per department ranged from 1 to 14, with an average of 4.47 respondents per department. Thirty-one departments had 3 or fewer respondents, while 30 departments had 4 or more respondents. The data set thus consisted of an unbalanced population inventory.

The total percentage of missing data was approximately 1%. The missing data were randomly distributed between variables and cases. Inspection of data revealed that 10 participants did not complete the survey question about their department affiliation. The researcher filled in the missing data based on the URL from which participants accessed the survey. About 10 participants did not respond to the question about the percentage of males/females in their department. In those cases, the researcher used mean substitution to fill in missing values. Mean substitution was also used for the gender salience scale in one case.

Measures

Pretest. Several new scales were created for the present study and several adapted scales were also being used for the first time. Therefore, it was necessary to conduct a

pretest of the survey instrument in order to compute internal consistency estimates of reliability for all scales to be used in the main study. A pre-test was conducted using 24 Graduate Teaching Assistants and Associates from the departments of Communication, Psychology, and Education. The only scale that did not achieve acceptable reliability (Cronbach's alpha < .7) in the pretest was the measure of gender salience in interaction, Cronbach's alpha = .59. For the main study, one item was reworded, one was added, and one deleted from this scale. An acceptable alpha (.84) was achieved. See Table 2 for reliability estimates for all scales used in the pretest and the main study. The pretest required respondents to use one of two URLs to access the survey in order to test the viability of using department-specific URLs in the main survey. SurveyMonkey.com delivered data from the two URLS both separately and in aggregated form, allowing a close comparison of data. The test was successful, ensuring a correct and complete data set in the main study.

The survey instrument. The entire survey instrument for the main study is included in Appendix F.

Demographic information. Several items asked participants to indicate their departmental affiliation, rank, gender, and ethnicity. One item asked respondents to estimate the percentage of males in their department. This item was intended to measure participants' perception of gender representation and was not considered to be an accurate measure of gender representation. As such, answers varied within as well as between departments, indicating that individuals perceived the same situation differently. A variable, *Token*, was created by transforming this data into two values; 0 = 0-39% or

token representation of women, and 1 = 40+% women or critical mass. I did not use a continuous variable because a clear breaking point was necessary to test whether reversals in communication behaviors and outcomes occur at the threshold of critical mass predicted in the literature. A second variable using the gender percentage data, *Predominance*, was created to facilitate Chi-square analysis of items that asked whether respondents associated particular types of relational messages 1) more with females, 2) equally with males and females, or 3) more with males. To compute *Predominance*, the original percentage data was transformed into responses of 1) 61-100% females, 2) 40-60% males, and 3) 0-39% females, respectively.

Types of relational messages in interaction. The twenty-two items in this section of the survey were newly developed for use in this study, based on the literature review (Bales, 1950; Ruscher, 2001; Boggs & Giles, 1999). The items were designed to measure the specific types of positive and negative relational messages that may occur during collegial interactions. Each item named a specific type of relational message, followed by a short description of communication behavior that might commonly signal that message, e.g., *inclusive--includes you in informal discussions in the hallway or a colleague's office*. (See Figure 2 in Chapter 1 for a description of the 22 items.) Participants were asked to think about the range of their everyday interactions with colleagues—conversations in the hallway or over lunch, committee meetings, discussions about research and teaching, etc.—and indicate the extent to which they encounter each type of relational message on a 5-point Likert scale: *never encounter* (1), *rarely* (2), *sometimes* (3), *often* (4), and *almost always* (5). One item, *inappropriate*, designed to measure

sexual harassment, was intended to be analyzed separately. The remaining 21 items comprised three scales, Positive, Negative-competence, and Negative-warmth, that were considered as sub-scales of the Relational Message scale. See Table 2 for reliability estimates for all scales used in the present study.

The dimensionality of the 12 positive items was factor analyzed using principal component analysis with Varimax rotation. Two factors were expected—positive messages about individuals' competence or inclusionary status. Instead, the scree test showed that all 12 items loaded onto one factor that accounted for 54.3% of the item variance. The Kaiser-Maier-Olkin measure of sampling adequacy was .94, very close to 1, indicating that the study sample size was more than adequate for an effective factor analysis. Cronbach's alpha for the resulting 12-item Positive scale was .92.

As shown in Table 3A, the dimensionality of 12 negative RM items was analyzed using factor analysis with Varimax rotation. The scree test and factor solution indicated the presence of two factors comparable to the expected negative-competence and negative-warmth dimensions. Factor 1 consisted of the five items contained in the Negative-competence scale. Factor 2 consisted of four items included in the Negative-warmth scale. Three items—*aggressive, critical, and uninterested*—loaded strongly onto both factors and were eliminated. A second factor analysis of the remaining nine items showed that Factor 1, Negative-competence, accounted for 32.4% of the item variance, while the Factor 2, Negative-warmth, accounted for 31.5%. The KMO was .90, indicating excellent sample size for factor analysis.

The resulting 5-item Negative-competence scale (Cronbach's alpha = .85) measured the extent to which participants receive negative relational messages about their relative competence or status, e.g., *condescending—talks down to you as if you have less ability or intelligence*. The items *patronizing* and *controlling*, originally intended as part of the Negative-warmth scale, loaded onto the second, negative-competence factor, and were therefore included in the Negative-competence scale. The four items on the Negative-warmth scale referenced negative relational messages about an interaction partner's ingroup solidarity and inclusionary status. The scale's internal consistency reliability was adequate (Cronbach's alpha = .80). See Table 4 for descriptive statistics regarding these and other variables in the present study.

Feelings associated with the appraisal process. The next section of the survey instrument included 16 items related to primary and secondary appraisal. Participants were asked to think about how they generally feel when interacting with faculty colleagues in their department. Eight semantic differential items assessed participants' approach-avoidance emotions related to primary appraisal. The items were adapted from Higgins' measures of feelings associated with promotion and prevention motivations (Higgins,1997; Brockner & Higgins, 2001). Four bipolar semantic differential items, with a 5-point spread, were created for the Promotion scale that measured feelings related to approach motivation, positive stimuli, and feelings of eagerness and/or challenge. The four items were *hesitant-eager, very discouraged-very optimistic, cheerful-depressed,* and *very sad-very happy* (Cronbach's alpha = .89). The four items comprising the Prevention scale were measured feelings related to avoidance motivation, threatening

stimuli, and feelings ranging from fear to calmness. The items were *extremely tense-completely relaxed, calm-anxious, extremely uncomfortable-totally at ease,* and *very secure-insecure* (Cronbach's alpha = .89). Several items on the two scales were reverse-coded so that higher scores indicated more positive emotions.

Secondary appraisal: self-liking and self-competence. Eight semantic differential items, rated on a 5-point scale, were adapted from Tafarodi, et al.'s (2003) Self-liking and Self-competence scales. As shown in Table 3B, the dimensionality of the eight items was analyzed using factor analysis with Varimax rotation. The scree test and factor solution indicated the presence of two factors, as shown in Figure 9. Factor 1 consisted of four items that comprise the Self-liking scale adapted for the present study (Cronbach's alpha = .90). Factor 2 consisted of three items that comprised the Self-competence scale (Cronbach's alpha = .79).

Surprisingly, the item *very successful-unsuccessful*, intended as part of the Self-competence scale, loaded strongly onto both factors and was strongest in an unintended direction and was, therefore, eliminated. A second factor analysis of the remaining seven items showed that Factor 1, Self-liking, accounted for 44.1% of the item variance, while the second factor, Self-competence, accounted for 31.0%. The KMO was .87, indicating excellent sample size for factor analysis.

Gender salience. A Gender Salience scale was developed for the present study to ascertain the extent to which participants are aware of gender in daily interactions with colleagues. The scale consisted of 5 items, e.g., *I am very aware of being male or female when interacting with department colleagues* and *I communicate the same way with male*

and female colleagues (reversed). Participants responded using a 5-point Likert scale from *strongly disagree* (1) to *strongly agree* (5). Higher scores on the scale indicated higher levels of gender salience. Scale reliability was adequate (Cronbach's alpha = .84).

Identification with department. Three items comprised an Identification with Department scale, e.g., *being a member of my department is an important part of who I am*. Participants were asked to respond using a 5-point Likert scale: *strongly disagree* (1) to *strongly agree* (5). Scale reliability was adequate (Cronbach's alpha = .83).

Perceived department support. A 6-item scale was adapted from Eisenberger's Perceived Organizational Support scale (1986) and the very similar, climate and collegiality dimension of the faculty satisfaction instrument developed by the Collaborative on Academic Careers in Higher Education at the Harvard School of Education (COACHE, 2007). Participants rated the six Likert items, e.g., *my department cares about my well-being*, from 1(strongly disagree) to 5 (strongly agree).

The items in the Perceived Departmental Support scale and Identification with Department scales were factor analyzed to demonstrate that they measured two separate constructs rather than a single latent variable encompassing both dimensions. Theoretically, it is clear that sub-group members of a larger group can be strongly identified with a superordinate group that they do not consider supportive. However, factor analysis was necessary to demonstrate that separate identification and supportiveness constructs were operative in the present context. As shown in Table 3C, the dimensionality of 10 items comprising the two scales was factor analyzed with Varimax rotation. The factor solution and scree test indicated the presence of two

factors, with Factor 1 comparable to perceived departmental support and Factor 2 comparable to identification with department. However, the item measuring *sense of fit with one's department,* intended as part of the ID scale, loaded almost equally onto both factors equally and, therefore, was not used in either scale. In a second factor analysis, with *fit* eliminated, Factor 1, perceived departmental support, accounted for 45.1% of the item variance, while the 3-item identification with department factor accounted for 26.7%. The KMO was .85, indicating adequate sample size for factor analysis.

Gender association of different types of relational messages. Finally, respondents were asked whether they associated different types of relational messages 1) more with males, 2) equally with males and females, 3) more with females, or 4) never encounter this type of message. Three types of positive messages, *collegial, inclusive*, and *likeminded*, and five types of negative messages, including *patronizing, condescending, aggressive, renders invisible*, and *controlling* were selected for testing gender associations because they exhibited the most variance among the items in the relational message scales. The eight items were analyzed separately, rather than aggregated into positive and negative scales.

Method of data analysis

Two-level hierarchical linear modeling, or simply multilevel modeling (MLM) was employed in data analyses, based on the social structure of the population under study, in which individual faculty members at level-1 are nested within academic departments at level-2. Responses from faculty in the same department are subject to group-level influences such as shared departmental interaction and status norms,

available interaction partners, history and resources, as well as selection processes that favor hiring and promotion of colleagues who tend to be similar to some extent. Data thus violate the assumption of independence of observations required by single-level methods of analyses such as multiple linear regression (MLR), and may also violate the assumption of normal distribution of level-2 errors. As a result, single-level analyses of multi-level data have been shown to underestimate standard errors and produce Type I errors and spurious significances (Hox, 1995, 2002; Schreiber & Griffin, 2004). Formerly, survey researchers who employed single-level analyses of multi-level data applied a formula to correct standard errors based on number of respondents per level-2 unit and the estimated proportion of total variance at level-2 (Kish, 1965 and 1987, cited by Hox, 2002). However, according to Hox (2002), multi-level modeling procedures properly account for simultaneous analysis of variables at both levels and do not require additional corrections.

According to Hox (1995), attempting to analyze multilevel data with single-level analyses also leads to two related problems in the interpretation of results. The ecological fallacy involves drawing inferences about individuals from aggregated, level-2 data, while the atomistic fallacy involves generalizing from individual-level data to draw inferences about departments. MLM facilitates appropriate analyses and interpretation thereof by allowing intentional aggregation of data (e.g., assigning departments a number indicating percentage of gender representation, with gender being an individual-level factor) as well as disaggregation (e.g., assigning individuals a value that represents whether the department's representation of female faculty is at token level or critical

mass). Further, by partitioning total variance into level-1 and level-2 components, MLM analyses provide a clear indication of predictors' effects at each level.

Types of variables used

The types of variables involved in the present study are as follows:

1. Level-1 factors – fixed characteristics of individuals, e.g., gender and rank.
2. Level-1 covariates – individuals' scores on continuous variables, e.g., self-liking.
3. The level-2 grouping factor, academic department.
4. Level-2 factors – fixed characteristics of departments.
5. Outcome variables – level-1 continuous variables, e.g., perceived departmental support.

Fixed factors are measured without measurement error, whereas covariates include true scores plus random error. In MLM, the fixed and random effects of both types of predictor may be estimated within the same model. To facilitate comparison and interpretation of results involving multiple predictors, all covariates in the present study were grand-mean centered by subtracting the sample mean from each individual's score.

MLM vs. multiple linear regression. Single-level, ordinary least squares multiple linear regression (MLR) establishes a line that best models variability in the outcome based on the effect of one or more predictors. The best fitting model is the line with the lowest sum of squared residuals. The regression line for outcome Y with predictor X is estimated as $Y = \beta_0 + \beta_1 X_1 + r_1$ where β_0 represents the fixed intercept, $\beta_1 X_1$ is the fixed slope of predictor X, and r_1 is the level-1 random residual. Like MLR, in MLM the sum of squared residuals is assumed to have a mean of zero. Additionally, MLM is able to

accommodate non-normal distribution of errors. MLM estimates a different regression line for each level-2 unit, e.g., a different line for each of the 61 departments in the present study. Each model thus comprises what Hox (1995, p10) called "a hierarchical system of regression equations." Together, the department-level regression lines form a distribution with a particular mean and variance characteristic of the multilevel model.

In a multilevel model, each of the j-number of departments has a different intercept β_{0j} and a different slope $\beta_{1j}X_1$, yielding $Y_{ij} = \beta_{0j} + \beta_{1j}X_{1j} + r_{1j.}$ In addition to the level-1 variance component, r_{1j}, which is similar to the error term in MLR, a multilevel model includes a random effect for the intercept, u_{0j} that Singer (1998) described as the variation in intercepts between level-2 units, i.e., the variation in department means around the grand mean. Including this term, the following equation models the fixed effects of predictor X on dependent variable Y:

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{1j} + u_{0j} + r_{1j}$$

Types of multilevel model. Three possible types of multilevel model for a level-1 outcome variable exist. First, the *unconditional model* specifies the grouping variable (e.g., department) and the fixed and random effects of the intercept, and does not include predictor variables. This model is estimated first to 1) parcel total variance into level-1 and level-2 components (Peugh & Enders, 2005); 2) provide information regarding the extent to which level-2 units differ on the outcome variable; 3) estimate the level-1 variance, σ^2, to provide a baseline for estimating the statistical significance of predictors

in subsequent models (Hayes, 2006); and 4) estimate a deviance statistic that Hox (1995) described as the degree of mis-fit of the model that subsequent models are designed to reduce. The second type of model, described as a *variance components model*, includes fixed and random effects of the intercept plus fixed effects of predictors. Intercepts, but not slopes, are allowed to vary across departments. Because variables are grand-mean centered, the fixed effect of a predictor describes its average effect on the outcome across all participants (Snijders, 2005), assuming that its influence on individuals is the same in all departments. Each fixed effect indicates the change in outcome Y for each unit change of predictor X, holding all other predictors at their averages. The third type of model, a *random coefficients model*, includes both fixed and random effects of predictors, allowing both intercepts and slopes to vary across departments. Random coefficients models were tested in the present study, but none reached significance.

Hox's steps of model estimation

Hox's (1995, 2002) step-by-step method for estimating increasingly complex models was used to guide the series of multilevel analyses employed in the present study.

Step 1: Estimating the unconditional model. Two equations, one for level-1 and one for level-2, are merged to specify a two-level unconditional model. The level-1 equation states that the value of the outcome for faculty member-i in department-j equals the average outcome in department-j plus i's deviation from it, represented by the individual-level error term $r_{ij:}$

Level-1: $Y_{ij} = \beta_{0j} + r_{ij}$ (1)

The level-2 equation explains that β_{0j}, the average outcome in department-j, equals the average outcome across all participants ($\boldsymbol{\gamma_{00}}$, the grand mean) plus $\mathbf{u_{0j}}$, the level-2 error term, which represents department-j's deviation from the sample mean.

Level-2: $\beta_{0j} = \gamma_{00} + u_{0j}$ (2)

The merged, 2-level equation for the unconditional model states that the outcome of individual-i in department-j equals γ_{00}, the grand mean plus u_{0j}, the amount i's department mean deviates from the grand mean, plus r_{ij}, the amount i's score differs from his/her department's mean, as follows:

Multilevel unconditional model: $Y_{ij} = \gamma_{00} + u_{0j} + r_{ij}$ (3)

The intra-class correlation. The unconditional model divides the total variance into two independent parts, the level 1, within-department variance, $\mathbf{r_{ij}}$, represented by σ^2, and the level-2, between-department variance, $u_{0j,}$ represented by τ_{00}. Based on the unconditional model, the intra-class correlation, ρ, represents the proportion of variance in the outcome at level-2 compared with total variance, expressed in the equation:

$\rho_1 = \tau_{00} / \ \tau_{00} + \sigma^2$ (4)

The ICC is a key indicator of the advisability of adding level-1 and/or level-2 predictors to the unconditional model, bearing in mind that level-1 predictors may

explain variance at both levels, while level-2 predictors only affect the level-2 variance (Hox, 1995). For example, in the unconditional model of perceived departmental support in the present study, $\rho = 0.12/0.12 + 1.02 = 0.105$, indicating that only 10.5% of the total variance in perceived departmental support occurred at level-2. This low ICC indicates that variations among individual faculty members were much more important than variations between departments on this outcome. Nevertheless, according to Hayes (2006), MLM should still be employed for accurate analyses of multilevel data, even with an ICC of .05 or less. He argued that, a value of ICC that is sufficiently close to zero to make MLM unnecessary has not yet been determined (p. 394).

Step 2 – Fixed effects of level-1 predictors – estimating variance components models. According to Hox (1995), the fixed effects of level-1 predictors are the first predictors added to the unconditional model because they are likely to explain some of the level-2 variance as well as level-1 variance. This step isolates the level-2 variance that can only be explained by level-2 predictor(s) in later models. Adding the fixed effect of predictor X to the unconditional model produces the equation:

$$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + u_{0j} + r_{ij} \quad (5)$$

In this step, predictors X_{2ij} and X_{3ij} can also be added, usually one at a time, to subsequent models to determine the effects of each predictor. Note that a predictor tends to have different values in different models, based on which other predictors are included with it. Predictors that are not significant are eliminated from subsequent models.

Step 3: Random effects of level-1 predictors – estimating random coefficients models. After modeling the fixed effects of level-1 predictors, Hox (1995) recommended testing the random effects of significant level-1 predictors, i.e., exploring whether their slope(s) as well as their intercepts vary across departments. For example, in the present study, gender was hypothesized to have a greater effect on perceived department support in departments linked with gender stereotypes, e.g., engineering or mathematics. To ascertain whether the effect of predictor X on the outcome varied across departments, the random effect of predictor X, gender in this case, was added to the equation. Hox recommended testing the random slopes of predictors one at a time at this step, and stated that even predictors that did not prove significant in step-2 may be tested for random effects in step 3. With the random effect of the slope of predictor X—$u_{1j}X_{ij}$—added to the previous, Step 2 equation, the Step 3 equation now includes two fixed components and three random components:

$$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + u_{1j}X_{ij} + u_{0j} + r_{ij} \quad (6)$$

Step 4—Fixed effects of level-2 predictors. The level-2 predictor, Z, is written such that its influence on the department means, j, is added to the Step 3 equation. By definition, level-2 predictors vary across departments, so an additional step to model their slopes is unnecessary.

$$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \gamma_{01}Z_j + u_{1j}X_{ij} + u_{0j} + r_{ij} \quad (7)$$

Step 5—Cross-level interactions. This step adds one or more interaction terms comprised of level-2 predictors and the level-1 predictors that had significant slope variation across departments, e.g., significant random effects in step 3, in order to establish a multilevel moderation relationship (Hayes, 2006):

$$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \gamma_{01}Z_j + \gamma X_{ij}Z_j + u_{1j}X_{ij} + u_{0j} + r_{ij} \quad (8)$$

Convergence

Estimating a multilevel model using SPSS or other software is an iterative process that begins with a "ballpark" estimate followed by iterative steps of calculation that use different values for the parameters to improve the accuracy of the solution. When improvements are trivially small, computation stops and convergence occurs (Hox, 2002). In MLM, a model may not converge for two main reasons, poor specification of the model or an inadequate sample size. To improve chances of convergence, the model should be simplified by removing highly correlated variables. It is also possible to change the iteration rules, increasing the limit of maximum iterations before non-convergence is declared and/or lowering the threshold for reaching convergence.

Methods of estimation

Two methods of estimation may be used in MLM. Full Maximum Likelihood (FML or, simply, ML) is the most widely used method (Hox, 2002). Restricted Maximum Likelihood (REML or RML) calculates a deviance statistic or Likelihood Ratio Test that indicates the goodness-of-fit of the random components of the model

only. When using REML, a chi-square test can only be used to compare differences in the random components of two models (Schreiber & Griffin, 2004). In contrast, ML simultaneously calculates coefficients and variance components, both fixed and random effects, so that the deviance statistic reflects the goodness-of-fit of an entire model, not just its random components. Using ML for all analyses in the present study thus made it possible to use a chi-square deviance test to compare the goodness-of-fit of one entire model with another. Singer (1998) argued that ML is also preferred when estimating fixed effects or combinations of fixed and random effects. According to Hox (2002), ML is preferred because it offers accurate estimates with smaller samples.

Significance tests

According to Hox (1995), to arrive at the best model, one starts with the unconditional model of an outcome variable and uses significance tests to compare subsequent models, as predictors are added, until the model with best fit is achieved.

Proportion of modeled variance. Ordinary MLR uses R^2 to indicate the variance explained by a model relative to total variance. In MLM, there is no perfect equivalent to R^2 that expresses the extent to which a model accounts for unexplained variance at both level-1 and level-2. Instead, Hox (2002) and Snijders and Bosker (1994) recommended the following formula to compare the success of two models in MLM analyses:

Modeled variance or *"pseudo* R^2*"* $= 1 - [\sigma^2(\text{current model}) / \sigma^2(\text{previous model})]$ (9)

Note that the formula is based on a comparison of the variance accounted for at level-1 in the two models. According to Hayes, this *variance accounted for* measure is "conceptually equivalent to a squared partial correlation in ordinary OLS regression" and is the closest approximation of R^2 in MLM (2006, 396).

The chi-square test of the deviance. Hayes (2006) and Singer and Willett (2003) recommended the chi-square test of the deviance, also called the Likelihood Ratio test, to compare different models' relative goodness-of-fit to the data. As the name suggests, the smaller the deviance statistic, the better the model. Using the chi-square test, the difference between the deviance of the current and previous models is compared with the critical value of a chi-square distribution, using the difference in the number of parameters between the models as the degrees of freedom. As an alternative, the Wald test uses the ratio of a coefficient to its standard error (Z) to assess the coefficient's significance. The test is accurate for large samples only and is not used in the present study. In the chi-square test, each predictor added to an earlier model increases the number of parameters by one. Adding the random effect of a predictor in addition to its fixed effect also adds one parameter to the model. Adding parameters changes the statistical estimation of intercepts, slopes, and residuals, so the effect of any given predictor is conditional upon the entire specification of the model. The equation for the chi-square test is as follows:

$$\chi^2 \text{ (df)} = \text{-2LL(Model1)} - \text{-2LL(Model 2)} \qquad (10)$$

In MLM analyses, beyond looking for significant effects of the predictors, the fit of the model is of ultimate importance. Note that the fewer parameters used, i.e., the more parsimonious the model, the greater the likelihood that the chi-square test will prove significant. The chi-square deviance test can be used only if the models are nested, i.e., the later model contains the identical data and all the parameters of the previous model, and FML rather than REML estimates are used (Singer & Willett, 2003). To compare two models with non-nested data, Singer and Willett recommended using AIC and BIC statistics rather than deviance statistics.

Power in MLM

Power in the present study was adequate for MLM analyses. Most researchers in this area hold that a sufficient number of level-2 units is the key factor in obtaining accurate results (Singer, 1998). According to Myers and McPhee (2006, 453), when using a sample consisting of 50 groups of 5 each, both fixed and random estimates at both levels are unbiased or minimally biased such that "95% confidence intervals cover at worst 92.6% of cases." Maas and Hox (2004) came to similar conclusions with comparable simulation studies. Note that there are 61 groups at level-2 in the present study, with an average of 4.47 responses per department.

CHAPTER III

RESULTS

Table 4 presents descriptive statistics for the variables in the present study. Table 5 presents the Pearson correlations between the variables. Level-1 correlations are appropriate because the intraclass correlations for all variables except gender salience in interaction indicated that the responses were statistically independent. Note that all variables except identification with department and gender salience in interaction were significantly associated at the $p \leq .001$ level.

Table 6 summarizes the hypotheses tested, whether or not each was supported, and the table(s) that present results of relevant analyses. The hypotheses tests to be discussed reference the proposed model, shown in Figure 4.

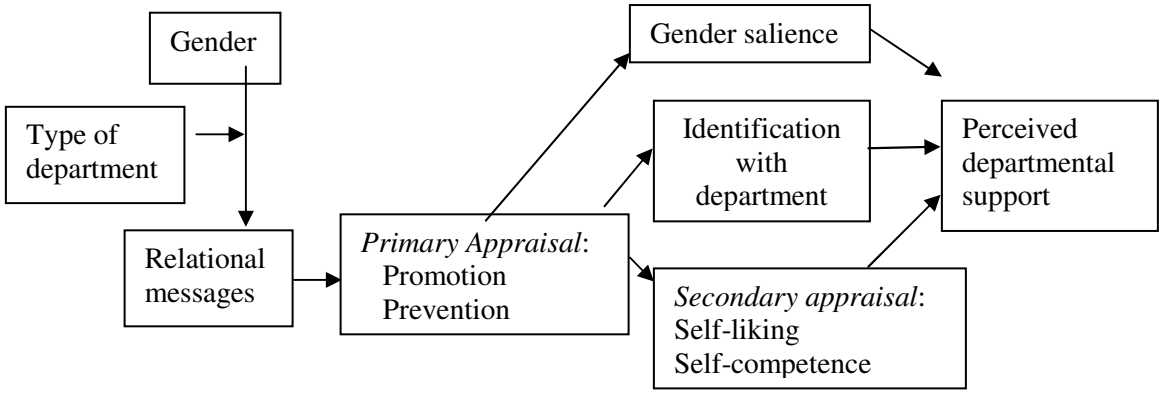

Figure 4. Full Relational Communication Model of Perceived Departmental Support.

Hypothesis tests

Hypotheses were structured to drive a series of multilevel regression analyses that would identify predictors of perceived departmental support while testing for mediator and moderator effects (Baron & Kenny, 1986). According to Lubbers, Van Der Werf, Snijders, Creemers, and Kuyper (2006), a series of multilevel analyses is comparable to two-level structural equation modeling, but is better able to handle moderator effects such as the hypothesized cross-level moderation involving gender and type of department.

In the present study, mediation required that the relational message variables have a direct effect on perceived departmental support as well as on each of the mediators, which consisted of the four appraisal variables and the two identity variables. Second, the mediators must each have a direct effect on perceived departmental support. Third, the direct effect of the RM variables must be eliminated or substantially reduced (partial mediation) when the mediating variables are entered into the model (Baron & Kenny, 1986). Cross-level moderation required that gender and type of department significantly alter the effects of RM variables on the model.

Establishing the basic appraisal model of perceived departmental support

For all analyses, the continuous predictor variables were grand-mean centered. The intercept was set as random to allow the mean of individuals' responses to vary between departments. It was anticipated that departmental rank should be added to the model as a control variable, but it failed to predict any of the mediators or the outcome, so it was not included in the analyses.

Tables 7-10 present results pertaining to Hypotheses 1-4, which establish the appraisal variables as mediators of the effects of relational messages on perceived departmental support (PDS), as shown in the basic appraisal model in Figure 3.

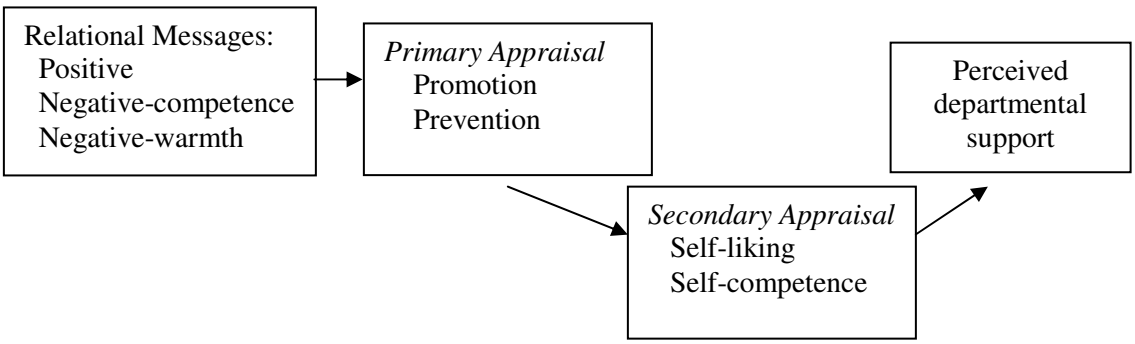

Figure 3. Basic Appraisal Model of Relational Communication in Groups.

Effects of relational messages on PDS. Table 7 presents results associated with Hypothesis 1. This hypothesis stated that positive relational messages would be positively associated with PDS (H1a), while negative-warmth and negative-competence messages would be negatively associated with PDS (H1b). Hypothesis 1 was fully supported.

As shown in Table 7, the effects of positive, negative-warmth, and negative-competence messages were separately entered in Models 2-4 to illustrate their unique predictive values. (Note that, unless indicated otherwise, the fixed effects of predictors were entered into the models pertaining to all hypotheses.) All three predictors were significant, and each of the models accounted for considerable variance: for positive messages, R^2 = .44; for negative-warmth, R^2 = .24; and for negative-competence, R^2 = .28. However, when the three predictors were added simultaneously to the unconditional

model, negative-warmth did not reach significance, as shown in Model 5. The final model, Model 5 includes the fixed effects of positive and negative-competence messages. No interaction or random effects were significant. The model accounted for a large amount of level-1 variance in PDS, $R^2 = .50$, with positive messages accounting for approximately twice as much unexplained variance as negative-competence messages. A chi-square deviance test showed that the goodness-of-fit of Model 5 was a significant improvement over the unconditional model, $\chi^2(3) = 181.82$, $p < .001$.

Effects of relational messages on promotion and prevention feelings. Tables 8A and 8B present results pertaining to Hypothesis 2, which stated that positive messages would be positively related with promotion and prevention feelings (H2a), while negative-warmth (H2b) and negative-competence (H2c) messages would be negatively related. Although negative-warmth messages were not significantly associated with prevention feelings, all other aspects of the hypothesis were supported.

Table 8A, Model A.2 shows that when the three RM variables were simultaneously added to the unconditional model of promotion feelings, all were significant in the predicted directions. Note that high values of promotion feelings include happiness and eagerness, in reference to potential opportunity, while low values indicate dejection and discouragement. The final model, A.3, indicates that these predictors, plus the Negative-warmth x Negative-competence interaction, accounted for a significant amount of the variance in promotion feelings, $R^2 = .58$. The chi-square test comparing the Model A.3 deviance with that of the unconditional model was significant, $\chi^2(6) = 239.52$, $p < .001$. No random effects were significant.

Table 8B presents results of similar analyses using prevention feelings as the dependent variable. Prevention feelings range from high values indicating calmness to low values indicating high anxiety in reference to potential threat. Model B.2 shows that positive and negative-competence messages were significant predictors of prevention feelings, confirming H2a and c. However, negative-warmth failed to reach significance. Model B.3 shows that the fixed effects of positive and negative-competence messages, plus the term representing the interaction between them, were significant in predicting prevention feelings. The model accounted for a large amount of variance in the outcome, $R^2 = .46$. Note that the negative effect of negative-competence messages on prevention feelings—indicating an increase in anxiety—was approximately as powerful as the positive effect of positive messages on the outcome. No random effects were significant. The improvement in goodness-of-fit of Model B.3 over the unconditional model was significant, $\chi^2(3) = 187.95$, $p < .001$.

Effects of relational messages on self-liking and self-competence. Tables 9A and 9B present results pertaining to Hypothesis 3, which stated that positive messages (H3a) would be positively related to self-liking and self-competence, while negative-warmth (H3b) and negative-competence (H3c) messages would be negatively related. Negative-warmth messages were not significantly associated with self-liking. All other parts of the hypothesis were supported.

Table 9A presents results pertaining to self-liking. Model A.2 shows that positive and negative-competence messages predicted a large amount of the variance in self-liking, while negative-warmth was not significant. This simple model accounted for a

large amount of variance in self-liking, $R^2 = .66$. Positive messages predicted more than twice the amount of variance as negative-competence messages. No interaction or random effects were significant. A chi-square deviance test indicated that Model A.2 significantly improved goodness-of-fit compared with the unconditional model, $\chi^2(3) = 291.48$, $p < .001$. Model A. 3 shows that adding promotion and prevention in interaction, the primary appraisal variables, as predictors of self-liking significantly improved the model. Both promotion and prevention were significant. The final model, A.4 indicated that Positive x Promotion and Positive x Prevention interaction effects were also significant predictors of self-liking. Model A.4 provides a very strong prediction of self-liking, $R^2 = .78$, with deviance significantly reduced from the unconditional model, $\chi^2(6) = 385.88$, $p < .001$. No random effects were significant.

In Table 9B, Model B.2 indicates that all three RM variables predicted a significant amount of variance in self-competence. A chi-square deviance test indicating improved goodness-of-fit over the unconditional model, $\chi^2(3) = 107.27$, $p < .001$; $R^2 = .33$. Model B. 3, the final model for self-competence, shows that when the primary appraisal variables, promotion and prevention feelings in interaction, were added to the model, positive messages were no longer significant. This final model provides a strong prediction of self-competence, $R^2 = .53$, a significant improvement over Model B.2, with model deviance significantly reduced in comparision with the unconditional model, $\chi^2(5) = 198.45$, $p < .001$. No random effects were found.

Basic appraisal model of perceived departmental support. Table 10 presents the series of mediation analyses related to perceived departmental support, with Models 1-4

relating to hypothesis 4. Hypothesis 4 stated that the four appraisal variables—promotion (a), prevention (b), self-liking (c), and self-competence (d)—would mediate the effect of relational messages on perceived departmental support. Results confirmed promotion and self-liking as mediators, supporting Hypotheses 4a and c. Prevention and self-competence were not supported.

In Table 10, Model 1 presents the results for the unconditional model, and Model 2 shows the effects of relational messages on perceived departmental support, previously discussed in reference to Hypothesis 1. In Model 3, promotion and prevention, plus their interaction term, were added to Model 2. Promotion and the interaction term were significant, and addition of these variables reduced the contribution of positive messages to the model by almost half. Model 3 improved goodness-of-fit over Model 2, $\chi^2(2) = 43.01$, $p < .001$, with $R^2 = .58$. No random effects were significant.

In Table 10, Model 4, the fixed effects of self-liking and self-competence were added to the significant predictors from Model 3. Only self-liking was significant. When self-liking was added to the model, positive messages and the Positive x Promotion interaction failed to reach significance. The contribution of negative-competence was reduced by almost half, and the contribution of promotion was reduced by more than half. Thus, self-liking was found to partially mediate their effects on PDS. Model 4 showed a significant reduction in deviance from Model 3, $\chi^2(1) = 45.32$, $p < .001$, and accounted for a great deal of variance in PDS, $R^2 = .64$.

To summarize results to this point, Table 10, Model 2 shows that positive messages accounted for the most variance in PDS among the relational message

variables, while negative-competence was also significant at $p < .001$. As shown in Model 4, among the three significant predictors in the basic appraisal model, self-liking accounted for approximately twice the amount of variance in the model as negative-competence and promotion combined. A partial mediation model, rather than the basic appraisal model predicted by Hypothesis 4, was indicated.

Mediation analyses for the identity variables

Tables 11 and 12 present results pertaining to Hypotheses 5-8, which established identification with department and gender salience as mediators of the effects of relational messages on perceived departmental support, as shown in Figure 8.

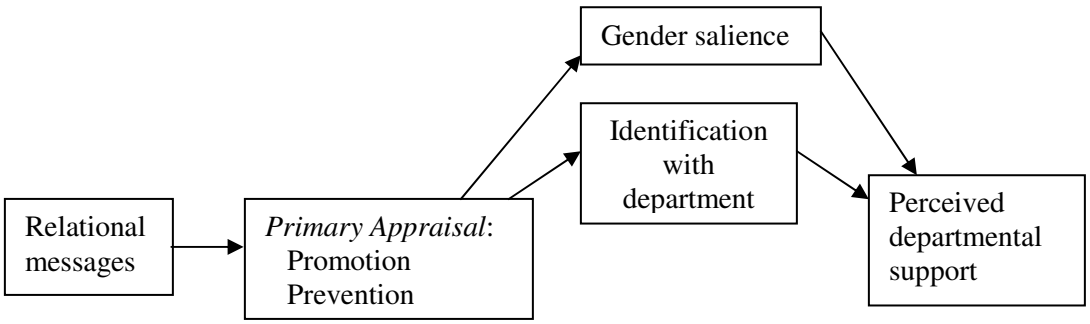

Figure 8. Identity Variables as Predictors of PDS in the Hypothesized Model.

Effects of relational messages on identification with department. In Table 11, Models 1 and 2 present results pertaining to Hypothesis 5, that positive messages would be positively associated with identification with department (H5a) and, conversely,

negative-warmth and negative-competence messages would be negatively associated (H5b). When the three relational message variables were entered simultaneously into Model 2, only positive messages were significant, supporting H5a and disconfirming H5b. This simple model accounted for a significant amount of variance in identification with department, $R^2 = .25$, and it represents a significant improvement over the unconditional model, $\chi^2(3) = 87.32$, $p < .001$. To confirm that the primary appraisal variables mediate the effects of relational messages on identification with department, promotion and prevention were added to positive messages in Model 3. When the two variables and their interaction term were added, all were significant. However, the contribution of positive messages was also still significant at the level of $p < .001$ (positive coefficient = .84, *SE* .09 in Model 2 and .59, *SE* .11 in Model 3. No random effects were found. As a check, self-liking and self-competence were added to Model 3 to ensure that only primary appraisal variables were involved in generating identification with department. As shown in Model 4, the two variables failed to reach significance.

Identification with department predicts PDS. Table 10 presents results pertaining to Hypothesis 6, that a higher level of identification with department would predict a higher level of perceived departmental support. This hypothesis was supported. In the series of mediation analyses shown in Table 10, Model 5 shows that identification with department was significant when added to the three significant predictors from Model 4. Model 5 improved the goodness-of-fit over Model 4, $\chi^2(1) = 13.21$, $p < .001$. Comparing Model 5 with the unconditional model of perceived departmental support, $R^2 = .66$. No

interaction or random effects involving identification with department reached significance.

Relational message effects on gender salience. In Table 12, Models 1 and 2 present results pertaining to Hypothesis 7, that positive messages would be negatively associated with gender salience in interaction (H7a) and, conversely, negative-warmth (H7b) and negative-competence (H7c) messages would be positively associated. Only H7c was supported. As shown in Model 2, when the three RM variables were added simultaneously to the unconditional model, only negative-competence was significant. An improvement over the unconditional model was found ($R^2 = .15$), with deviance reduced significantly, $\chi^2(3) = 47.47$, $p < .001$. There were no significant random or interaction effects involving the RM variables as predictors of gender salience.

As indicated in the proposed relational communication model, but not in an independent hypothesis, 1) the primary appraisal variables should predict gender salience and mediate the effects of relational messages on gender salience. In Table 12, Model 3 shows that when promotion and prevention were added to negative-competence messages from Model 2, only prevention was significant, although the contribution of negative-competence messages remained at $p < .01$, disconfirming mediation in the model. Model 3 represented a significant improvement over Model 2, $\chi^2(1) = 11.95$, $p < .001$. There were no random or interaction effects involving negative-competence and prevention. As a check, self-liking and self-competence were added to Model 3 to ensure that only primary appraisal variables were involved in generating identification with department. As shown in Model 4, the two variables failed to reach significance.

Gender salience predicts PDS. To test the third step of mediation, Hypothesis 8 stated that gender salience would be negatively related to perceived departmental support. This hypothesis was confirmed. Table 10, Model 6 shows that gender salience was significant when added to the significant predictors from Model 5. There were no random or interaction effects. A small improvement in goodness-of-fit over Model 5 was found, $\chi^2(1) = 6.32$, $p < .05$. This final model of PDS accounts for a large amount of variance in perceived departmental support, $R^2 = .67$.

In summary, hypotheses 5-8 confirmed that identification with department and gender salience in interaction are significant predictors of perceived departmental support. Surprisingly, however, Model 6 shows that the effects of negative-competence messages were still unmediated in the model, even after adding the two identity variables. The estimated model to this point is shown in Figure 9.

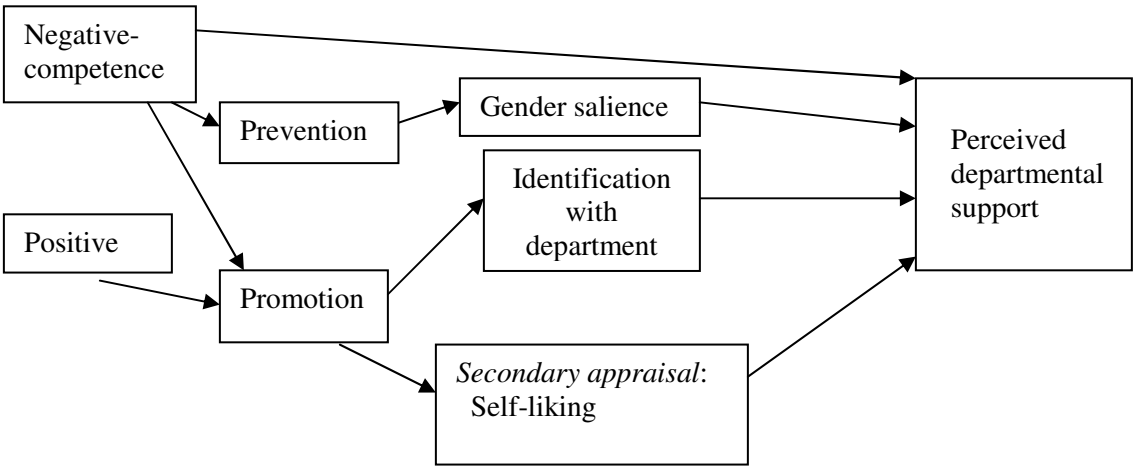

Figure 9. Estimated Model of PDS Including Appraisal and Identity Variables.

Gender differences in the model

Table 13 presents results of analyses testing hypotheses 9-14 that predict gender differences in the model.

Hypothesis 9 stated that males would report more frequent receipt of positive relational messages than females, while females would report more frequent receipt of negative relational messages than males. The hypothesis was partially supported. No significant gender differences were found in receipt of positive and negative-warmth relational messages. However, as shown in Table 13, females (M = 1.96) received significantly more negative-competence messages than males (M = 1.70), Coefficient = .25, SE = .08, $p < .01$. Also shown in Table 13, analysis of the single relational message item, *inappropriate – sexualizes conversation or makes unwanted advances*, indicated that females (M = 1.29) received significantly more inappropriate messages than males (M = 1.15), Coefficient = .14, SE = .06, $p < .05$.

Hypothesis 10 stated that males would experience more positive promotion and prevention feelings in collegial interaction than females. This hypothesis was fully supported. Males' promotion feelings (M = 3.81) were more positive than females' (M = 3.54), Coefficient = -.27, SE = 10, $p < .001$. Similarly, males reported a higher level of prevention feelings (M = 4.04) than females (M = 3.59), Coefficient = -.45, SE = .10, $p < .001$.

Hypothesis 11 stated that males would report higher levels, i.e., more positive values, of self-liking and self-competence in interaction than females. This hypothesis was fully supported. Males reported a higher level of self-liking in interaction (M = 3.95)

than females (*M* = 3.73), Coefficient = -.23, *SE* = 11, $p < .05$, and a higher level of self-competence *(M* = 3.92*)* than females (*M* = 3.59), Coefficient = -.33, *SE* = .09, $p < .001$.

Hypothesis 12 stated that males would report a higher level of identification with the department than females. This hypothesis was not supported.

Hypothesis 13 stated that females would report a higher level of gender salience in interaction than males. The hypothesis was strongly supported. Females (*M* = 2.71) reported a significantly higher awareness of gender in interaction than males (*M* = 1.91), Coefficient: .80, *SE* = .12, $p < .001$.

Finally, males reported a higher level of perceived departmental support (*M* = 3.84) than females (*M* = 3.58), supporting Hypothesis 14, Coefficient = -.27, *SE* = .14, $p < .05$. However, also shown in Table 13, when gender was added to the significant RM predictors of perceived departmental support—positive and negative-competence messages—gender failed to reach significance.

In summary, when entered alone into models of the mediating variables and perceived departmental support, gender was a significant predictor in all cases except positive and negative-warmth messages and identification with department. There were no random effects of gender on these separate models. Table 13 also shows that when gender was entered along with the positive and negative-competence message variables into a model of PDS, gender failed to reach significance. Figure 10 shows the operation of gender within the model that has been developed to this point.

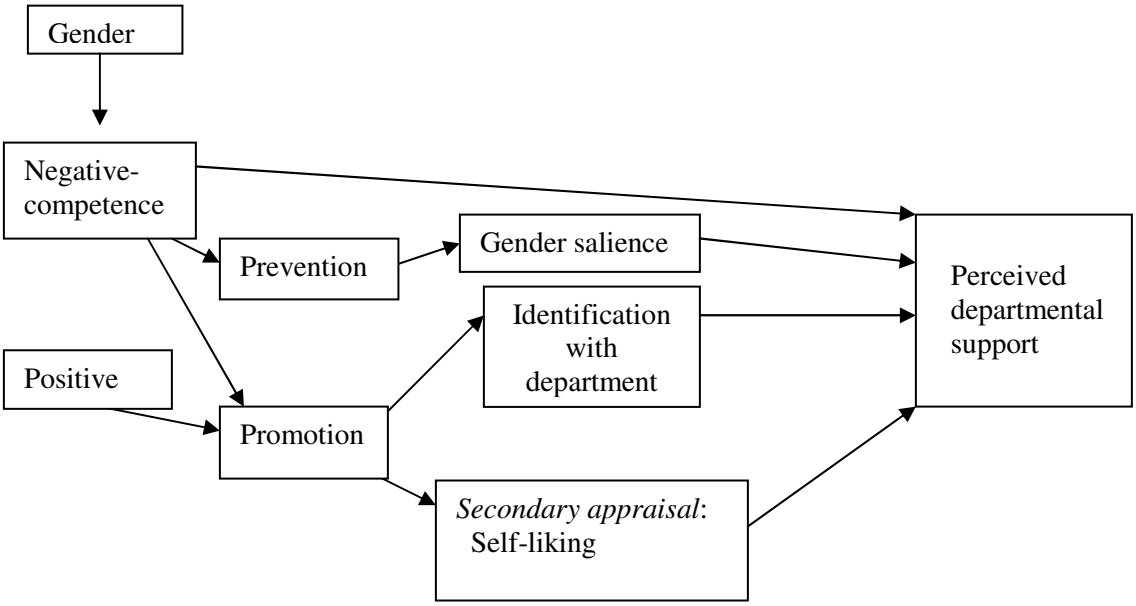

Figure 10. Estimated Relational Communication Model of Perceived Departmental Support.

Cross-level moderation effects associated with perceived departmental support

Hypothesis 15 stated that females in departments with less than 40% female faculty would report a lower level of positive relational messages and a higher level of negative relational messages than males, as well as women in departments of critical mass. MLM analyses were done with the relational message variables as dependent variables, using Token separately, and the Gender x Token interaction term as predictors. No main effects were found involving token representation. Results also indicated no cross-level interaction effects, and the hypothesis was not supported.

Similarly, Hypothesis 16 stated that females in departments with less than 40% women would report a lower level of perceived departmental support than males, as well as women in departments of critical mass. This hypothesis was also not supported.

Similarly, no cross-level interactions between gender and departments in the hard sciences versus other departments were found in the receipt of relational messages or the level of perceived departmental support, disconfirming Hypotheses 17 and 18.

The completed model

Table 10, Model 6, shows the final model of departmental support. It includes significant fixed effects of negative-competence relational messages, self-liking, identification with department, and gender salience in interaction. While gender was significant as a direct predictor of a number of the mediating variables, as well as perceived departmental support, it failed to reach significance when the RM variables were entered into the models. Accordingly, there were no cross-level interaction effects involving gender and either of the level-2 variables that indicated type of department.

Figure 4, illustrating the originally hypothesized model, and Figure 10, illustrating the complete estimated model, are presented together on the next page to facilitate comparison.

The originally hypothesized model and estimated model:

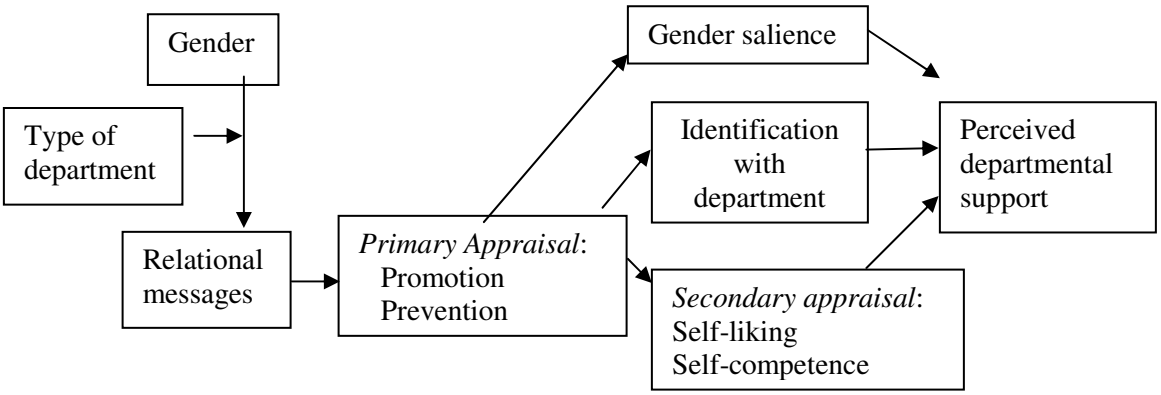

Figure 4. Full Relational Communication Model of Perceived Departmental Support.

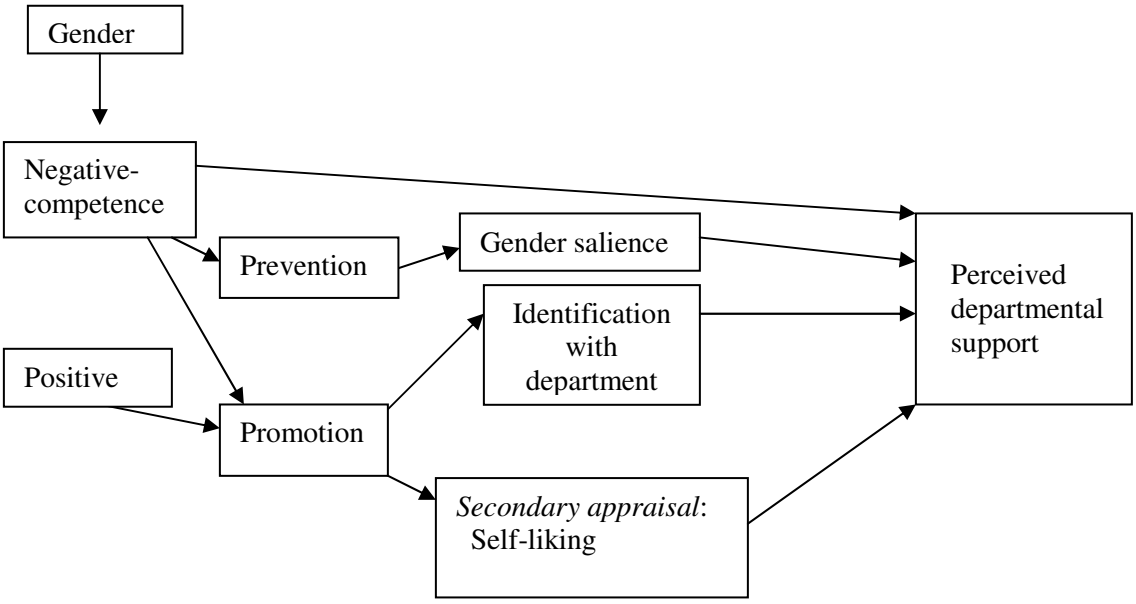

Figure 10. Estimated Relational Communication Model of Perceived Departmental Support.

Association of positive and negative messages with gender of interaction partner

The present study included a single research question regarding whether faculty members associate different types of relational messages more with male or female colleagues, or equally with both genders. Respondents were presented with descriptions of various positive and negative messages and asked whether it was more likely that the sender would be 1) female, 2) equal probability of male or female, 3) male, or 4) do not encounter this type of message. For descriptions of each type of relational message, see Figure 2 in Chapter 1. Initially, MLM analyses were employed to compute unconditional models for each type of message, ensuring that intraclass correlations were insignificant and, therefore, that responses were statistically independent. Separate chi-square analyses for each type of message were then computed for each variable.

Table 14 presents results of crosstabs analyses that indicate the extent to which respondents associate three types of positive relational messages—collegial, inclusive, and like-minded—more with male senders, female senders, or both equally. Overall, both male and female respondents reported that they expect more positive messages from colleagues of their own gender. For example, more females than expected (ASR = 3.4, $p < .01$; using 1.96 = $p < .05$ and 2.58 = $p < .01$) associated collegial messages with female colleagues, while less males than expected associated collegial messages with females (ASR = -3.4, $p < .01$). Similarly, less females than expected and more males than expected associated collegial messages with males, although these discrepancies did not reach significance. Equal or gender-neutral associations were less than expected for female respondents (ASR = -2.0, $p < .05$) and more than expected for males (ASR = 2.0,

$p < .05$). Results showed a similar pattern for inclusive and like-minded messages. Overall, significant gender differences were found involving collegial ($V^2 = .06$, $p < .01$), inclusive ($V^2 = .10$, $p < .001$), and 3) like-minded ($V^2 = .05$, $p < .01$) types of relational message.

Table 15 presents results of similar analyses for negative relational messages including *patronizing, condescending, aggressive, renders invisible*, and *controlling.* Among these negative variables, only analyses of patronizing ($V^2 = .06$, $p < .001$), renders invisible ($V^2 = .08$, $p < .001$), and controlling ($V^2 = .04$, $p < .05$), reached significance. Significant differences were found involving 1) the extent to which respondents associate these types of negative message equally with both genders and, 2) the number of respondents' that reported no experience with these types of negative message. For example, more females than expected reported associating patronizing messages equally with both genders (ASR = 3.2, $p < .01$), while less males than expected reported such an equal association (ASR = -3.2, $p < .01$). Also, significantly less females than expected (ASR = -4.0, $p < .001$) and more males than expected (ASR = 4.0, $p < .001$) reported no experience of patronizing messages in interaction with colleagues. A similar pattern was found in relation to renders invisible and controlling types of message as well.

To achieve finer-grained comparisons, chi-square analyses were computed for male and female respondents for each of the eight relational message variables after 1) excluding respondents that indicated that they do not experience each type of message, and 2) controlling for gender representation in respondents' department. The latter is

important because the pool of available interactants in respondents' departments can be expected to influence responses to some extent. For example, respondents in a predominantly male department might tend to associate males with all types of messages, while respondents in a relatively gender-balanced department might be expected, as a baseline probability, to associate all messages equally with both males and females. Therefore, for each chi-square analysis, a unique expected value for the three responses—associate more with females, equal probability, and associate more with males—was derived from frequencies of the variable, *predominance*, which indicates respondents' estimates of the gender representation in their department as 1) more females (61-100% female), 2) equal representation (40-60% female), or 3) more males (0-39% females).

As shown in Table 16, separate chi-square analyses were conducted for male and female respondents for the three positive message variables, *collegial, like-minded*, and *inclusive*. For each of the six analyses, 1) male or female cases were selected, 2) all cases were excluded that reported that they do not experience each type of message, 3) frequencies of *predominance* indicating gender representation were calculated for the unique *n* for each item, and 4) the values for more males, equal representation, and more females were then entered as the expected values in the analysis, controlling for gender representation in respondents' departments. All analyses were significant at the $p < .001$ level. Results indicated that significantly more male and female respondents associated positive messages with males than expected, based on gender representation in respondents' departments, while the equal association condition was significantly less

than expected. Overall, results suggest that respondents strongly associate receiving positive relational messages with males.

Table 17 presents results of similar chi-square analyses for the five negative relational message variables—*patronizing, condescending, aggressive, renders invisible*, and *controlling*. For female respondents, only *renders invisible* reached significance [$\chi^2(2, 86) = 18.54$, $p < .001$]. Fewer female respondents than expected associated this type of negative message with female colleagues; more females than expected reported equal gender association; and, surprisingly, fewer females than expected associated this type of message with male colleagues. In contrast, analyses of males' responses regarding all five types of negative messages were significant at the $p < .001$ level. Overall, more male respondents than expected associated negative messages with females; more males than expected reported equal association; and fewer males than expected associated negative messages with males.

Taken together, the findings reported in Tables 16 and 17 indicate that both male and female faculty members tend to associate positive messages significantly more than expected with male colleagues. For female respondents, results of analyses involving four out of five types of negative messages failed to reach significance. This indicates that women's responses were, for the most part, congruent with expectations based on gender representation in their departments. In contrast, male respondents were found to associate the five types of negative messages more equally with male and female colleagues than expected, and also associate negative messages significantly less with male senders than expected, based upon gender representation in their departments.

CHAPTER IV

DISCUSSION

Results and Implications

The present study built upon Keyton's (1999) model of relational communication in groups by 1) delineating three types of relational messages—positive, negative-warmth, and negative-competence—that faculty members exchange in interaction with department colleagues, and 2) demonstrating that relational messages affect individuals' perceptions of departmental support through two parallel processes: the appraisal process based in the emotion system and cognitive, identity processes associated with sub-group and superordinate group memberships. The construct of perceived departmental support references the extent to which respondents believe that their department cares about their well-being, values their contributions, supports their career advancement, and treats all faculty fairly in terms of assigning workloads, sharing departmental resources, and rewarding individuals' performance. Overall, the study established a detailed, interdisciplinary model of how the receipt of relational messages influences group members' sense of "place" in naturally occurring, task-oriented groups.

Relational message variables

The first goal of the study was to delineate the specific types of relational messages exchanged in workplace interaction (See Chapter 1, Figure 2, for the full typology developed). Three new Relational Message scales were pre-tested and tested in the present study, with excellent Cronbach's Alpha reliability estimates. Positive relational messages, such as *collaborative*, *like-minded,* and *friendly,* convey that the

sender values the interaction partner both professionally and personally, i.e. that he or she is respected and liked. Negative-competence messages, such as *patronizing* and *condescending*, convey a downward comparison of interactants' relative capability and/or status. This type of message is the proverbial "put-down," such as a conveying a look of surprise when told that a colleague's article has been accepted by a top journal, or giving an overly-simplified answer to a question, implying that the interaction partner is less knowledgeable or intelligent. Negative-warmth messages, such as *insulting, withdrawn, and unfriendly*, convey dislike, dissimilarity, and a competitive orientation that is usually reserved for outgroup members rather than ingroup colleagues. Ignoring a colleague's presence in the copy room or telling a "harmless" joke at his or her expense conveys a threat to that person as a group member as well as an individual. Note that the new typology references meanings generated in interaction that may be conveyed via many different behaviors and also may be interpreted differently by different individuals.

Results of multilevel modeling analyses showed that positive, negative-warmth, and negative-competence messages all had significant direct effects on perceived departmental support when modeled separately. But, negative-warmth messages failed to reach significance when all three variables were entered simultaneously into the model. Positive and negative-competence messages, plus their interaction term, accounted for approximately half of the variance in perceived departmental support ($R^2 = .50$), with positive messages contributing approximately half of that effect.

The appraisal variables

The second goal of the study was to illuminate the "black box" of relational process and demonstrate how faculty members interpret the relational messages they receive in everyday interactions with colleagues. Analyses indicated that the link between relational messages and perceived departmental support involves feelings in interaction that reflect the relational meanings generated in the cognitive appraisal process described by Lazarus (1991, 1995, 2006). For example, primary appraisal interprets the person-environment relationship as supportive vs. threatening. According to Higgins' regulatory focus theory (1997), promotion feelings, that reflect a supportive relationship with the environment, range from sadness and dejection to happiness and eagerness. Prevention feelings, related to perceived threat, range from fear and anxiety to positive feelings of calmness and security. While these two continua of emotions do not represent the full range of core relational themes identified by Lazarus (1991), they do target emotional responses that reflect perceptions of environmental support vs. threat. In the present study, respondents were specifically asked to think about the various types of interaction they have with department colleagues and to report on the extent to which they associate promotion and prevention feelings with collegial interaction.

When promotion and prevention were considered as dependent variables, relational messages accounted for 58% of the level-1 variance in promotion feelings and 44% in prevention feelings. These large effects indicate that relational content greatly impacts individuals' interpretation of a social situation as supportive or threatening. This finding is consistent with stereotype threat research that has shown that a simple verbal

message with positive relational content—e.g. affirming that a particular social identity is welcomed and valued in a particular context or that no sub-group differences in performance are expected on a task—can protect the performance of negatively stereotyped individuals (Davies, et al., 2005).

Results also indicated that promotion feelings reduced the contribution of both positive and negative-competence messages to perceived departmental support, while prevention feelings were not significant. This finding suggests that perception of departmental support requires the presence of available resources to support individuals' goal pursuit, as opposed to a mere absence of threat. Although prevention feelings were not found to be a predictor of perceived departmental support, they did have a significant effect when gender salience in interaction was treated as a dependent variable in the mediation analyses. This is consistent with the assumption that when a negatively stereotyped identity is salient, individuals are likely to experience identity threat that is associated with physiological indicators of increased stress and anxiety (Steele et al., 2002; Crocker & Garcia, 2006).

According to Lazarus (1991), individuals' coping potential—their ability to deal with the perceived opportunity or threat present—is assessed in secondary appraisal. Lazarus later qualified (2006) that primary and secondary appraisal are certainly interdependent processes, because the degree of environmental threat cannot be assessed independently of individuals' coping potential, and vice versa. The author emphasized, however, that the primary-secondary distinction is useful in differentiating appraisal content in terms of environment-directed versus self-directed assessments. In the present

study, individuals' feelings directed toward the self in collegial interaction, indicating coping potential in terms of social fit and personal agency, were conceptualized in terms of Tafarodi et al.'s (2003) two-dimensional construct of self-esteem. According to the authors, individuals' feelings related to their coping potential exist on the dimensions of self-liking, which references a sense of belongingness and in-group inclusion, and self-competence, which references perceived agency.

Results in the present study indicated that self-liking partially mediated the effects of positive and negative-competence messages on perceived departmental support, while self-competence did not reach significance. In the final model of perceived departmental support, self-liking accounted for more variance in the outcome than the other three predictors—negative-competence and the two identity variables—combined. When self-liking was considered as a dependent variable, positive and negative-competence messages taken together accounted for 66% of its level-1 variance. This large effect supports the idea that others' reflected appraisals significantly affect individuals' appraisal of their social worth and inclusionary status within the group.

Identity variables

The third goal of the study was to demonstrate the effects of relational messages on identification with department and gender salience in interaction, and the relationship of these identity variables with perceived departmental support. Interestingly, only positive messages predicted the extent to which faculty members identify with their department, while only negative-competence messages predicted gender salience in interaction. Results confirmed that the primary appraisal variables partially mediated

these identity effects. Positive promotion feelings such as happiness and eagerness predicted identification with department, while negative prevention feelings such as anxiety and insecurity predicted gender salience in interaction. The latter result is congruent with Crocker and Garcia's (2006) stigma cycle in which male and female interactants—as members of complementary, identity sub-groups—are both susceptible to experiencing anxiety in "intergroup" interaction.

To further check the proposed mediation model, analyses confirmed that the secondary appraisal variables, self-liking and self-competence, were not significant predictors for either identity variable. These findings suggest that identity effects follow from perceptions of environmental threat vs. supportiveness and emerge in parallel with the self-evaluative effects of self-competence and self-liking. This assumption is congruent with the findings of Zajonc (1980), LeDoux (1996), and Damasio (2003) that indicate that individuals' initial appraisal of environmental stimuli as supportive or threatening occurs via a quick-and-dirty affective pathway, prior to higher-level cognitive processing—including implicit cognitive processing. Results of the present mediation analyses suggest that primary appraisal of what Damasio (2003) called "emotionally competent stimuli" guides the adoption of a particular social identity that is congruent with the individual's implicit assessment of the person-environment relationship as supportive or threatening. Also confirming the proposed model, identification with department and gender salience were found to be significant predictors of perceived departmental support. As expected, identification with department was positively associated with the outcome, while gender salience was negatively associated.

Gender differences

The fourth goal of the study was to test for gender differences, as sub-grouping effects, in the model. Based on the larger culture, categorization of individuals based on gender and/or race may occur in addition to the formal and informal organizational sub-groups, e.g. rank, committee membership, or research interest, that function in academic departments.

Findings revealed that females reported receiving more negative-competence messages than males, although there were no gender differences in positive and negative-warmth messages. This is consistent with ambivalent sexism theory (Fiske, et al., 1999) that holds that, in the larger society, women are often stereotyped and treated as "warm but not competent." As expected, there were significant gender differences in all other variables in the study except identification with department. Males reported more positive feelings associated with primary and secondary appraisal, as well as a higher level of perceived departmental support, than females. In effect, males scored significantly higher than females on the variables indicative of good experiences in interaction, with the exception of identification with department. In contrast, females reported a significantly higher level of gender salience in interaction, which was negatively related with perceived departmental support. This result suggests that, for women, increased awareness of gender identity in interaction entailed a detrimental type of self-consciousness that was likely associated with 1) a diminished sense of social support and 2) increased cognitive and emotional work in interaction. For example, women are likely

to wonder, more often than males, whether the relational messages they receive from colleagues about their relative competence reflect their performance as colleagues, their identity as women, or a mix of both. As demonstrated by expectation states research (Wagner & Berger, 1997), wherever gender has not been explicitly disconfirmed as a status predictor, a mix is likely—a mix that diminishes expectations based on individuals' actual performance by a factor that represents the negative expectations associated with women in general.

Cross-level moderation

It was hypothesized that women in the "hard sciences" and/or women in departments in which less than 40 percent of the faculty is female would report less positive experiences in interaction and less perceived departmental support than all other faculty. These hypotheses were not supported. In fact, no between-department effects were detected, either in terms of random effects, main effects of the level-2 variables indicating type of department, or cross-level moderation effects involving gender and the level-2 moderators. The failure to detect systematic differences in reported experiences among women from different types of department indicates that women's relational communication experiences do not depend on the type of department in which they work. These findings were unexpected, based on the literature review, yet consistent with the low intraclass correlations for all variables except gender salience. These generally low ICCs indicated that participants' responses were statistically independent and that individual-level differences were much more important than department-level differences. More research on relational communication is necessary, however, before

announcing either a “global warming” in science or a “cold front” for female faculty throughout the university.

Gender association of relational messages

The present study included a single research question regarding whether faculty members associate positive and negative relational messages more with male or female colleagues, or equally with both genders. Gender associations with three types of positive message, *collegial, inclusive,* and *like-minded*, plus five types of negative message, including *patronizing, condescending*, and *controlling*, were explored. Overall, findings indicated that faculty of both sexes tend to associate positive messages with males more than expected, based on gender representation in respondents’ departments. These findings reflect subjective patterns of message interpretation rather than objective patterns of message exchange. As such, respondents’ gender associations with particular types of relational message serve as an interpretative frame that individuals use when predicting and interpreting their colleagues’ communicative behaviors in interaction. An orientation toward expecting more positivity in interactions with male colleagues, shared by both male and female faculty members, could thus have major consequences over time in shaping intradepartmental relationships.

An important and unexpected result regarding receipt of negative messages was also found. For all five negative message variables, “do not encounter this type of message” was the most prevalent answer reported by both male and female respondents, with males significantly more likely than females to report this response. While this gender discrepancy indicates that women in general are “fielding” more negative

messages in interaction, likely using valuable cognitive and emotional resources, the large number of faculty that do not experience these types of negative messages is heartening.

The final relational communication model: theoretical considerations

Taken together, the results of this study support a systems model of how relational messages exchanged among members of working groups affect individual-level relational outcomes. Findings imply that a communication systems perspective on relational communication effectively accounts for three characteristics of the social system under study: multilevel structure, patterns of interaction, and interactants' mental models of interaction.

Multilevel structure. First, a systems perspective takes into account the nested, multilevel structure of the social system under study. For example, the present study 1) examined sub-group influences based on gender, as well as individual- and departmental-level influences on members' perceptions of departmental support, 2) employed an interdisciplinary approach to understand influences from various levels of social structure, and 3) employed multilevel modeling analyses appropriate to the nested, non-independent data.

Focus on cooperation and competition in interaction as generative of structure. Second, a systems perspective encompasses both cooperation and competition in interaction. Each level of a system is comprised of interdependent agents that cooperate and compete, generate positive and negative feedback in interaction, and mutually adapt to each other. In doing so, individuals at each level form relationships and self-organize

into more and more complex, emergent units of structure (Waldrop, 1992). Recent research in the life sciences suggests that evolutionary forces shaping all interaction involve the continual interplay of cooperation and competition rather than competition or "natural selection" alone (Capra, 1996). Cooperation generates larger collectives and emergent levels of structure, while competition differentiates and privileges certain patterns of organization over others.

Bales' work on social interaction systems (1950) demonstrated that cooperation and competition are naturally present and often alternating tendencies in interaction in any working group. Relational messages exchanged among group members provide ongoing feedback regarding interactants' cooperative vs. competitive intent (warmth), and their perceived power to carry out these intentions (competence). Results of the present study suggest that individuals interpret this relational information in evaluative terms, regarding situational support vs. threat and the related assessment of self-liking and self-competence; in cognitive terms, regarding ingroup vs. outgroup orientation and relative status; and in motivational terms, regarding whether the need for self-expansion or self-enhancement underlies interactants' current and expected behaviors. A dual focus on cooperation and competition is congruent with Tropp and Wright's (2001) argument that both the self-expansion motivation that spurs intragroup cooperation and the self-enhancement hypothesis that leads to intergroup competition work toward unification and polarization of members within a working group. Similarly, Alderfer and Sims (2003, p. 603) argued that "an alternative formulation (to SIT) is to view the maturing self in its

intrapsychic, intragroup, and intergroup senses…in terms of a quest for greater wholeness and complexity as well as becoming more favorable."

Internal models of the environment. Third, complex adaptive systems, including individuals and groups, create internal models of their environment based on constraints and incentives experienced in interaction. According to Senge (1990), such models are predictive, and all human behavior is based upon individuals' mental models of how the world works. For example, if we have experienced that a colleague is untrustworthy, we act differently, and our actions shape the relationship to fit our mental model. But, beyond how the world works, individuals' mental models represent how the world works *from their point of view*, relative to their own well-being. According to Damasio (1999, 2003), individuals represent and store knowledge about their experiences in memory whose content is comparable to determinations made in the appraisal process—description of the stimulus problem or situation, possible responses, the response made, its outcome in terms of reward or punishment, and the outcome in terms of emotion, i.e. an experience of improved or lessened well-being. To maximize efficiency in sizing up the person-environment relationship, the executive functions in working memory compare the bottom-up inputs from the sensory system with top-down situation models (LeDoux, 2002). When an individual encounters a situation that fits the activated category, the learned emotions that are associated with the category are automatically deployed (Damasio, 2002, p. 45). As we study individuals' mental models of various situations, the person involved is not outside of the model, representing how an objective

world “out there” works. Mental models represent the person-environment relationship and include the sense of self as an integral, embedded, part of the model.

The present study modeled the consciously accessible elements of faculty members’ mental models of interaction with department colleagues, what Harwood (1998) and Harwood, McKee, and Lin (2000) called a communication schema, a holistic representation of a particular type of interaction that includes the affect, behavior, and outcomes associated with it, i.e., an expectation or prediction in the most general sense. The fact that faculty members in the present study were able to 1) make generalizations about the types of relational messages they encounter in everyday interactions with colleagues, 2) estimate the frequency with which they encounter different types of messages, and 3) report on feelings they associate with interaction suggests that they were able to access situation models from memory associated with collegial interaction. Importantly, results of the present study suggest that communication researchers can effectively model these models, e.g. represent interactants’ communication schemas for intragroup interaction.

See Appendix A for a brief discussion of the meta-theoretical framework for modeling members’ relational communication schemas in working groups that was developed in the present study.

Limitations

The limitations of survey research apply to this study. The data collected were limited to explicit, consciously accessible information and subject to selective memory, motivated cognitive processing, and self-presentational concerns, including social

identity concerns that one's gender look good (or bad) by comparison. On the other hand, the data collected represents the kinds of information that individuals access when consciously planning and strategizing their behavior. To make the data truly useful, triangulation is necessary. For example, the present study was theory-driven, based on the relational communication and prejudiced communication literature. Through qualitative analysis of open-ended survey questions and in-depth interviews, individuals' own descriptions of relational messages—including representative scripts and scenarios that they have experienced—should be sought to upgrade the survey instrument and improve construct validity. The survey could then be employed in tandem with observer coding of several group meetings in order to compare "objective" and subjective interpretations of interaction and intragroup relationships.

Although the sample provided adequate power for analyses, an unbalanced population inventory was not an ideal data structure for the present inquiry. Insufficient representation of the variety of interactants within departments may have masked or skewed within-department trends and between-department effects. Because participants self-selected, the data may be biased in unforeseen ways that compromised internal validity. Any generalization from the results should therefore proceed with caution. Ultimately, the best use of the survey instrument created for this study would occur when most or all members of the departments surveyed participate, whether that involves one or many departments.

Regarding the survey instrument, the study fell short in delineating positive messages into competence and warmth dimensions. It is possible that even when these

dimensions are described and operationalized accurately, their similar effects might thwart attempts to factor analyze the items into separate factors. Nevertheless, after upgrading the survey items, several retests should be employed to discern whether one or two dimensions of positive messages are operative. Second, choosing to measure only positive and negative socio-emotional messages, in the absence of what Bales (1950) considered the neutral task dimension (e.g. adequacy of task-oriented information), may have introduced a possible confound and limited the ability to discern the unique influence of relational messages on the outcome and mediator variables. Third, the study would ideally have involved two dependent variables, perceived departmental support and career aspirations. The effects of relational messages on career aspirations or another variable indicative of perceived competence, together with results for warmth-related, perceived departmental support, would have made a more complete relational communication model. Unfortunately, the single item used to measure career aspirations was found to be unacceptable, based on e-mail feedback from several participants in non-science departments that voiced objections to the wording of the item. Presumably, there were other like-minded participants who did not take the time to complain! Further, the complex set of influences on faculty members' career aspirations were not accounted for in the present study. Therefore, the variable was not used in the analyses.

Finally, due to the conceptualization of the original model and the analytic strategy used in the present study, it is likely that gender effects in the data were underestimated and that important findings were not reported. Results indicated a pattern of significant main effects of gender on the outcome and mediator variables, but

systematic analysis of gender as a moderator was not undertaken. Tables 18 and 19 present the Pearson correlation matrices for females and males, respectively. Negative-competence relational messages were found to have a stronger pattern of association for women, while negative-warmth messages have a stronger pattern of associations for men. Further, the strength of association between gender salience and other variables was greater for women than for men. Tables 20 and 21 present the series of mediation analyses that estimate the model of perceived departmental support, analyzed separately for females and males. Importantly, results indicate differences in the models. In the final model estimated for the entire sample, negative-competence messages, self-liking, identification with department, and gender salience were found to be significant predictors. In Table 20, the mediation model for females indicates that only self-liking, identification with department, and gender salience were significant predictors. In contrast, Table 21 shows that negative-warmth messages, self-liking, and identification with department were significant predictors for men, while gender salience failed to reach significance. While these findings are consistent with the stereotype content model and the identity threat literature cited in the rationale for this study, the results were not explicitly predicted and analyzed. Further analysis is needed to discern the extent to which relational messages function differently for men and women, and to adequately model these potential differences.

Future research

Rogers and Escudero (2004) called for future research on relational communication in working groups that 1) investigates the relationship between patterns

of relational communication and individual outcomes, 2) focuses on the emotional and cognitive meanings that interactants' associate with the interaction process, and 3) deals with relational dimensions beyond the competence or dominance dimension which has been the focus of most research to date. The present research covered these bases.

Further research is needed to create a complete and accurate typology of relational messages. Survey and interview studies are needed to understand how individuals define various types of relational messages and describe exemplars via short situation descriptions and scripts. Additionally, researchers should seek in-depth information regarding receivers' perceptions of the different types of messages, including senders' associated body language and tone of voice; what kinds of individuals receivers associate with different types of messages; what receivers think and feel when they receive such messages; what they consider the best type of response; and what they think should be done in their workplace to manage problematic communication.

While prevention and promotion emotions covered the important calm-fear and sadness-happiness continua associated with threat and opportunity, the emotion scale could be upgraded to include anger. Future studies could treat anger and/or the four emotions related to stereotype content—pride, contempt, pity, and envy—as dependent variables to more clearly understand the effects of different types of relational messages on emotions. Ultimately, communication researchers should be able to build upon the present study to create a typology of the *core relational themes of relational communication*, integrating cognitive appraisal theory with relational communication theory.

Additional instruments could be designed based on written and/or video scenarios to gather quantitative data about respondents' interpretations of and preferred responses to different types of relational message. Analyses of systematic variations in receipt of relational messages according to sub-group memberships, IAT results, and other characteristics of recipients would also be of interest.

Finally, further work should be done to improve the survey instrument as a diagnostic tool for use in practical interventions to improve the quality of communication within working groups. Pre- and post-testing will enhance researchers' ability to create effective interventions. The practical value of knowing how relational communication works is having the conceptual tools to make it work better.

Interestingly, the model tested in this study complements Bales' Field Diagrams that model group members' relative positions in terms of competence and warmth, the key dimensions of relational communication. While Field Diagrams provide an aggregated, group-level sense of members' position within the group, the present research provides the "flip-side" of a group's Field Diagram: a micro-level model of the specific patterns of relational messages in interaction that shape each individuals' sense of their place within the group. Used together as diagnostic instruments and bases for discussion in group interventions, a Field Diagram and a relational communication model, as delineated here, could bring to light the antecedents of cooperation and conflict in any group and, thereby, help leaders more effectively manage intragroup interaction and the organizational climate emerging from it.

Conclusion

Results of the present study indicate that, overall, males' mental models of relational communication contain more positive expectations for interaction with department colleagues than females'. Because expectations guide individuals' motivations, behaviors, and interpretation of everyday interactions, these differential mindsets are self-fulfilling prophecies waiting to happen and, therefore, have positive implications for males and negative implications for females. This is problematic on both individual and department levels in the sense that its effects are compounded over a myriad of everyday interactions. Fortunately, while social categorization is inevitable, it is also manageable through messages targeted to ameliorate sub-grouping effects, as demonstrated by Steele and colleagues' successful stereotype threat interventions with women and African-American students (Steele, 1997; Steele et al., 2002; Davies et al., 2005). The present study suggests that management of interaction and its outcomes is possible and necessary at both individual and departmental levels, taking a systems approach.

At the individual level, Seligman (1990) demonstrated that individuals can choose to learn interpretive skills and thereafter engage in mindset management. For example, some women are—and others can learn to be—less readily and less strongly influenced by reflected appraisals from colleagues than others. Their more stable, internally-referenced sense of capability and social worth is protective in identity-threatening environments and proactive in supportive ones. Similarly, some women are more able to effectively recognize, discount, and respond to biased feedback when it occurs.

Importantly, Steele and colleagues have shown that even when the perfect conditions for identity threat are present, it is possible to ameliorate stereotype threat by helping individuals reframe the task or situation (Steele, 1997). This demonstrates that individuals can rise to the occasion *before* identity threatening conditions change, when their mindset or orientation to the task is productive.

Johns, Schmader, and Martens (2005) have demonstrated that learning about stereotype threat protects women's performance in conditions that may trigger social identity threat. Carol Dweck's (2006) interventions to help individuals move from a "fixed" mindset to a "growth" mindset have also improved learning and performance over the long-term. It will take work for individual women to challenge their conditioned beliefs and improve their mindsets when necessary, not only in terms of task performance but social performance as well. Results of the present study suggest that learning about the function of relational messages in interaction and their effects could also be helpful to anyone working in a group environment. The female stereotype that women are "naturally" gifted socially sometimes blinds individuals to the possibility that they can learn new interpretive skills, as well as new communication skills, through mentoring, coaching, counseling, and peer networking. Workshops with an ample dose of research findings are likely to help women move from an orientation toward "proving themselves" to a more creative orientation toward work and work relationships. Such a change in mindset is likely not only to improve performance, but to enable women to feel more fulfilled and *be* more fun to work with. Ultimately, individuals can be the change they want to see in the world, but external conditions are also important. It is individuals'

responsibility to engineer their careers away from hostile work environments toward collegial and supportive ones where they can more readily achieve their goals. And it is to their benefit to support other sub-group members, as well as colleagues in general, along the way.

Results of the present study also suggest that, at the departmental level, sub-grouping effects may occur, not due to a "male culture" but perhaps based on one or two…let's go ahead and call them assholes. In *The No Asshole Rule*, Robert Sutton (2007) described how his department at Stanford University made an explicit decision not to hire demeaning and arrogant individuals, regardless of their credentials. He argued that collegiality is part of the measure of a faculty member's competence, and not a separate quality, because a single asshole can bring down a whole department's productivity as well as its climate. Two tests of unwanted behavior include: 1) After an interaction, does the "target" feel worse about himself or herself, de-energized, or humiliated? and 2) Is the negative behavior consistently directed toward people who are less powerful? (Sutton, 2007, p. 9). While everyone occasionally sends negative relational messages, assholes are readily identifiable based on a consistent pattern of behavior. Disallowing such behavior benefits everyone in the department and deals with the negative effects of sub-grouping in one fell swoop. Leaders within academic departments should be encouraged by the university, through material rewards and recognition, to manage departmental climate—not to enforce a uniform and numbing politeness, but to ensure a vibrant, cooperative, and innovative environment where differences that don't matter in predicting individuals' intellectual competence—like gender—don't matter.

Secondly, now that research has demonstrated that diverse teams outperform more homogenous teams in cognitive tasks (Page, 2007), it's time for the university to proactively use financial incentives to encourage departments to improve faculty diversity for practical and economic reasons—i.e. to boost departments' *collective* competence. Further, a university-wide culture can be adopted in which departments materially reward collaboration and collegiality *as an individual competency*, giving serious attention to the extent of individuals' collaborative work during hiring and promotion processes. Given the interdisciplinary focus of cutting edge research today, it's time to get beyond tolerating diversity and even "celebrating" diversity. It's time to put it to work.

TABLES

Table 1A

Gender Representation within the Population Recruited

College	Tenure track faculty	% Female	% Male
Hard sciences			
Agriculture & Life Sciences	151	22	78
Engineering	128	12	88
Science	286	17	83
Hard sciences total/%	565	17	83
Other			
Education	54	48	52
Fine Arts	113	45	55
Humanities	129	41	59
Social & Behavioral Sciences	237	43	57
Other total/%	533	44	56
Total	1,128	33%	67%

Note: Data from University of Arizona Office of Institutional Research: OIRE, 2006.

Table 1B

Sample by sex, rank, and type of department

Sex	Type of Department	Rank: Assistant	Associate	Full	Total	% of Sample
Female	Hard sciences	12	8	6	26	10%
	Other	31	20	24	75	29%
	Total Female	43	28	30	101	39%
Male	Hard sciences	16	31	48	95	36%
	Other	15	14	35	64	25%
	Total Male	31	45	83	159	61%

Note: $N = 260$. Two faculty members did not indicate rank.

Table 2

Cronbach's Alpha Reliability Estimates for Predictor and Outcome Variables

Variables	Pretest Alpha	# Items	Study Alpha	# Items
Positive relational messages	.94	13	.92	12
Negative-warmth	.75	5	.80	4
Negative-competence	.75	9	.85	5
Promotion feelings	.85	4	.89	4
Prevention feelings	.90	4	.89	4
Self-liking	.90	4	.90	4
Self-competence	.87	4	.79	3
Gender salience	.59	4	.84	5
Identification with department	.71	4	.83	3
Perceived departmental support	.88	5	.91	6

Note: Pretest $N = 24$. Study $N = 262$.

Table 3A

Rotated Component Matrices for Negative Relational Message Scales

	Rotated Component Matrix			
	First Analysis: *12 Negative Items*		Second Analysis: *Negative RM Scales*	
	1	2	1	2
Factor 1:				
Negative-competence				
Condescending	.709	.435	.726	.433
Controlling	.692	.372	.710	.383
Distancing	.793	.036	.774	.035
Invisible	.609	.459	.632	.427
Patronizing	.771	.234	.794	.252
Factor 2:				
Negative-warmth				
Insulting	.355	.657	.349	.677
Undermining	.258	.743	.244	.761
Unfriendly	.172	.782	.179	.798
Withdrawn	.174	.774	.200	.763
Deleted				
Aggressive	.582	.451		
Critical	.555	.523		
Uninterested	.430	.602		

Note: N = 262. The 5 items loading on Factor 1 comprise the Negative-competence scale. The 4 items loading onto Factor 2 comprise the Negative-warmth scale. Three items were deleted after the first analysis based upon loading onto both factors.

Table 3B

Rotated Component Matrices for Self-liking and Self-competence Scales

	Rotated Component Matrix			
	First Analysis: *12 Negative Items*		Second Analysis: *Self-liking and Self-competence scales*	
	1	2	1	2
Factor 1: Self-liking				
Rejected-Accepted	.815	.289	.798	.290
Disliked-Liked	.865	.129	.879	.143
Ignored-Appreciated	.843	.258	.854	.271
Criticized-Praised	.810	.299	.810	.306
Deleted				
Unsuccess.-Successful	.674	.441		
Factor 2: Self-competence				
Incomp.-Competent	.195	.864	.190	.867
Powerless-Powerful	.460	.682	.470	.691
Untalented-Talented	.200	.815	.195	.818

Note: N = 262.

Table 3C

Differentiation of Perceived Departmental Support and Identification with Department

	Rotated Component Matrix			
	First Analysis: *All Items*		Second Analysis: *PDS and Identification scales*	
	1	2	1	2
Factor 1: PDS				
Career Support	.753	.316	.761	.290
DeptCares	.804	.310	.811	.287
DeptValues	.786	.320	.793	.291
Fair Research	.830	.103	.832	.106
Fair Rewards	.830	.166	.833	.164
Fair Teaching	.780	.192	.783	.201
Deleted				
Fit	.513	.531		
Factor 2: Identification				
Reflect	.098	.734	.113	.757
ImportantPart	.218	.894	.236	.893
DeptDefines	.342	.840	.359	.837

Note: N = 262.

Table 4

Descriptive Statistics for Study Variables

Variables	*M*	*SD*	Minimum	Maximum
Positive RMI	3.60	.64	1.58	4.91
Negative-warmth RMI	1.81	.64	1.00	4.25
Negative-competence RMI	1.80	.65	1.00	3.60
Promotion	3.72	.81	1.25	5.00
Prevention	3.88	.79	1.00	5.00
Self-liking	3.86	.88	1.25	5.00
Self-competence	3.79	.72	2.00	5.00
Identification with department	3.92	.93	1.00	5.00
Gender salience	2.22	1.00	1.00	5.00
Perceived departmental support	3.71	1.07	1.00	5.00

Note: $N = 262$. Minimum and maximum based on 5-point Likert scales.

Table 5

Pearson Correlation Matrix of Predictor and Outcome Variables

	Variables	1	2	3	4	5	6	7	8	9
1	Positive									
2	Negative-warmth	-.53								
3	Negative-competence	-.49	.64							
4	Promotion	.71	-.61	-.54						
5	Prevention	.59	-.51	-.60	.77					
6	Self-liking	.79	-.54	-.59	.81	.72				
7	Self-competence	.50	-.24	-.45	.62	.67	.60			
8	Gender salience	-.24	.36	.40	-.36	-.41	-.34	-.27		
9	Identification	.53	-.25	-.18	.46	.32	.49	.29	-.08‡	
10	Perceived departmental support	.67	-.51	-.53	.70	.62	.79	.51	-.37	.52

Note: $N = 262$. All correlations are $p \leq .001$ (2-tailed) *except* the association indicated as not significant (‡).

Table 6

Hypotheses Tested in the Present Study

Hypotheses	Results	Table
H1a: Positive relational messages will be positively associated with perceived departmental support.	Supported.	7
H1b: Negative messages will be negatively associated with perceived departmental support.	Supported.	7
H2a: Positive messages will be positively associated with promotion feelings and prevention feelings.	Supported.	8A, 8B
H2b: Negative messages will be negatively associated with promotion feelings and prevention feelings.	Supported with the exception of the association between negative-warmth and prevention.	8A, 8B
H3a: Positive relational messages will be positively associated with self-liking and self-competence.	Supported.	9A, 9B
H3b: Negative messages will be negatively associated with self-liking and self-competence.	Supported with the exception of the association between negative-warmth and self-competence.	9A, 9B
H4: The appraisal variables will mediate the effect of relational messages on perceived departmental support. H4a: Promotion H4b: Prevention H4c: Self-liking H4d: Self-competence	 a. Supported. b. Not supported. c. Supported. d. Not supported.	10
H5a: Positive relational messages will be positively associated with identification with department. This relationship will be mediated by the primary appraisal variables, promotion and prevention feelings, as illustrated in the model.	Supported.	11

H5b: Negative messages will be negatively associated with identification with department. This relationship will be mediated by the primary appraisal variables, promotion and prevention feelings, as illustrated in the model.	Not supported.	11
H6: Identification with department will be positively associated with perceived department support.	Supported.	10
H7a: Negative-warmth messages will be positively associated with gender salience in interaction. This relationship will be mediated by the primary appraisal variables, promotion and prevention feelings, as illustrated in the model.	Not supported.	12
H7b: Negative-competence messages will be positively associated with gender salience in interaction. This relationship will be mediated by the primary appraisal variables, promotion and prevention feelings, as illustrated in the model.	Supported.	12
H7c: Positive messages will be negatively associated with gender salience in interaction. This relationship will be mediated by the primary appraisal variables, promotion and prevention feelings, as illustrated in the model.	Not supported.	12
H8: Gender salience in interaction will be negatively associated with perceived departmental support.	Supported.	10
H9a: Males will report more frequent receipt of positive relational messages than females.	Not supported.	13
H9b: Females will report more frequent receipt of negative-warmth messages than males.	Not supported.	13
H9b: Females will report more frequent receipt of negative-competence messages than males.	Supported.	13
H10a: Males will report more positive promotion feelings in interaction than females.	Supported.	13
H10b: Males will report more positive prevention feelings in interaction than females.	Supported.	13
H11a: Males will report a higher level of self-liking than females.	Supported.	13
H11b: Males will report a higher level of self-competence than females.	Supported.	13

H12. Males will report a higher level of identification with the department than females.	Not supported.	13
H13. Females will report a higher level of gender salience in interaction than males.	Supported.	13
H14: Males will report a higher level of perceived departmental support than females.	Supported.	13
H15: Females in departments with token representation of women will report a lower level of receipt of positive relational messages and a higher level of negative relational messages than males, as well as females in departments of critical mass.	Not supported.	Text only
H16: Females in departments with token representation of women will report a lower level of perceived departmental support than males, as well as females in departments of critical mass.	Not supported.	Text only
H17: Females in the hard sciences will report a lower level of receipt of positive relational messages and a higher level of receipt of negative messages than males, as well as females in other fields.	Not supported.	Text only
H18: Females in the hard sciences will report a lower level of perceived departmental support than males, as well as females in other fields.	Not supported.	Text only
Research question: Do respondents associate particular types of relational messages more with male or female colleagues?	Positive-male association.	14-17

Table 7

Relational Message Variables Predict Perceived Departmental Support

	Unconditional		Positive		Negative-warmth		Negative-competence		All RM	
	Model 1		Model 2		Model 3		Model 4		Model 5	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed										
Intercept	3.74	.08	3.72	.06	3.74	.07	3.74	.07	3.73	.06
Positive			1.10***	.08					.84***	
Negative-warmth					-.86***	.09			.15	.10
Negative-competence							-.86***	.08	-.37***	.09
Random										
Level 1 - σ^2	1.02	.10	.57	.06	.78	.08	.73	.07	.51	.05
Level 2 - τ_{00}	.12	.07	.07	.04	.07	.06	.09	.05	.06	.04
ICC	10.5%									
Model Fit										
Deviance	772.56		620.68		695.63		684.63		590.74	
χ^2			(1) 151.88***		(1) 76.93***		(1) 87.93***		(3) 181.82***	
"Pseudo R^2"			.44		.24		.28		.50	

Note: $N = 262$. Model 1: $PDS_{ij} = \gamma_{00} + u_{0j} + r_{ij}$; Model 5: $PDS_{ij} = \gamma_{00} + \gamma_{10}\text{Positive}_{ij} + \gamma_{20}\text{Negative-warmth}_{ij} + \gamma_{30}\text{Negative-competence}_{ij} + u_{0j} + r_{ij}$. * $p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 8A.

Primary Appraisal: Relational Message Variables Predict Promotion Feelings – Dejection to Eagerness

	Model A.1		Model A.2		Model A.3	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed						
Intercept	3.71	.06	3.71	.03	3.70	.04
Positive			.66***	.06	.64***	.06
Negative-warmth			-.31***	.07	-.34***	.07
Negative-competence			-.16*	.07	-.17*	.07
Neg-W x Neg.-C					.25**	.08
Pos. x Neg.-C					.16	.10
Pos. x Neg.-W					.11	.10
Random						
Level 1 - σ^2	.59	.06	.26	.03	.25	.02
Level 2 - τ_{00}	.06	.04	.01	.01	.01	.01
ICC	9.2%					
Model Fit						
Deviance	627.97		399.40		388.45	
χ^2			(3) 228.57***		(3) 10.95*	
"Pseudo R^2"			.56		.58 (+.02)	

Note: N = 262. Model A.3: Promotion = $\gamma_{00} + \gamma_{10}\text{Positive}_{ij} + \gamma_{20}\text{Negative-warmth}_{ij} + \gamma_{30}\text{Negative-competence}_{ij} + (\gamma_{20}\text{Negative-warmth}_{ij})(\gamma_{30}\text{Negative-competence}_{ij}) + (\gamma_{10}\text{Positive}_{ij})(\gamma_{20}\text{Negative-warmth}_{ij}) + (\gamma_{10}\text{Positive}_{ij})(\gamma_{30}\text{Negative-competence}_{ij}) + u_{0j} + r_{ij}$. Chi-square deviance test comparing unconditional and final models, A.1 and A.3: $\chi^2(6) = 239.52$, $p < .001$.
*$p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 8B.

Primary Appraisal: Relational Message Variables Predict Prevention Feelings – Anxiety to Calmness

	Model B.1		Model B.2		Model B.3	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed						
Intercept	3.87	.04	3.87	.04	3.91	.04
Positive			.46***	.07	.48***	.06
Negative-warmth			-.10	.08		
Negative-competence			-.44***	.07	-.45***	.06
Positive x Negative-competence					.19*	.08
Random						
Level 1 - σ^2	.59	.06	.32	.03	.32	.03
Level 2 - τ_{00}	.03	.00	.00	.00	.00	.00
ICC	4.8%					
Model Fit						
Deviance	618.11		448.71		444.15	
χ^2			(3) 168.4***		(1) 4.56	
"Pseudo R^2"			.46		.46 (no change)	

Note: N = 262. Model B.3: Prevention = $\gamma_{00} + \gamma_{10}\text{Positive}_{ij} + \gamma_{30}\text{Negative-competence}_{ij} + (\gamma_{10}\text{Positive}_{ij})(\gamma_{30}\text{Negative-competence}_{ij}) + u_{0j} + r_{ij}$. Chi-square deviance test for B.1 and B.3: $\chi^2(6) = 187.95$, $p < .001$. *$p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 9A.

Secondary Appraisal: Relational Message Variables Predict Self-liking

	Model A.1		Model A.2		Model A.3		Model A.4	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed								
Intercept	3.86	.06	3.86	.03	3.86	.03	3.89	.03
Positive			.88***	.06	.55***	.06	.51***	.06
Negative-warmth			.06	.07				
Negative-competence			-.33***	.06	-.17***	.05	-.17***	.05
Promotion					.38***	.06	.35***	.06
Prevention					.16**	.06	.20***	.06
Positive x Promotion							-.25***	.07
Positive x Prevention							.20***	.07
Random								
Level 1 - σ^2	.77	.08	.26	.02	.18	.02	.17	.02
Level 2 - τ_{00}	.01	.04	.00	.00	.01	.01	.00	.01
ICC	1.2%							
Model Fit								
Deviance	677.88		386.40		302.99		292.00	
χ^2			(3) 291.48***		(2) 83.41***		(2)10.99**	
"Pseudo R^2"			.66		.77 (+.10)		.78 (+.01)	

Note: $N = 262$. Model A.4: Self-liking = $\gamma_{00} + \gamma_{10}\text{Positive}_{ij} + \gamma_{30}\text{Negative-competence}_{ij} + \gamma_{40}\text{Promotion}_{ij} + \gamma_{50}\text{Prevention} + \gamma_{10}\text{Positive}_{ij}\gamma_{40}\text{Promotion}_{ij} + \gamma_{10}\text{Positive}_{ij}\gamma_{50}\text{Prevention}_{ij} + u_{0j} + r_{ij}$. There were no random effects. Chi-square deviance test comparing unconditional and final models, A.1 and A.4: $\chi^2(6) = 385.88$, $p < .001$. * $p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 9B.

Secondary Appraisal: Relational Message Variables Predict Self-competence

	Model B.1		Model B.2		Model B.3	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed						
Intercept	3.79	.04	3.79	.04	3.79	.03
Positive			.49***	.07	.14	.07
Negative-warmth			.27***	.08	.39***	.07
Negative-competence			-.42***	.07	-.22***	.07
Promotion					.29***	.07
Prevention					.36***	.07
Random						
Level 1 - σ^2	.51	.05	.34	.03	.24	.02
Level 2 - τ_{00}	.00	.02	.00	.00	.00	.00
ICC	0%					
Model Fit						
Deviance	566.78		459.51		368.33	
χ^2			(3) 107.27***		(2)91.18***	
"Pseudo R^2"			.33		.53 (+.20)	

Note: N = 262. Model B.3: Self-competence = $\gamma_{00} + \gamma_{20}$Negative-warmth$_{ij}$ + γ_{30}Negative-competence$_{ij}$ + γ_{40}Promotion$_{ij}$ + γ_{50}Prevention + u_{0j} + r_{ij} . Difference in deviance between B.1 and B.3: $\chi^2(5) = 198.45$, $p < .001$. There were no random effects in the model.
* $p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 10

Mediation Model of Perceived Departmental Support

	Unconditional Model 1		Relational messages Model 2		Primary Model 3		Secondary Model 4		ID Model 5		Gender salience Model 6	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed												
Intercept	3.74	.08	3.73	.06	3.81	.06	3.78	.05	3.72	.05	3.72	.05
Positive			.84***	.09	.44***	.10	.11	.10				
Negative-warmth			-.15	.10								
Negative-comp.			-.37***	.09	-.26**	.08	-.15*	.07	-.21**	.07	-.17*	.07
Promotion					.43***	.10	.19*	.09	.16*	.08		
Prevention					.10	.09						
Positive x Promotion					-.19*	.08	.14	.08				
Self-liking							.64***	.09	.63***	.08	.62***	.06
Self-competence							.00	.07				
ID with department									.21***	.05	.22***	.05
Gender salience											-.11**	.04
Random												
Level 1 - σ^2	1.02	.10	.51	.05	.43	.04	.37	.04	.35	.03	.34	.03
Level 2 - τ_{00}	.12	.07	.06	.04	.05	.03	.04	.02	.03	.02	.03	.02
Model Fit												
Deviance	772.56		590.74		547.73		502.41		489.20		482.88	
χ^2			(3)181.82***		(2) 43.01***		(1) 45.32***		(1) 13.21***		(1) 6.32*	
"Pseudo R^2"			.50		.58(+.08)		.64(+.06)		.66(+.02)		.67 (+.01)	

Note: $N = 262$. ICC = 10.5%. Model 6: PDS = $\gamma_{00} + \gamma_{30}$Negative-competence$_{ij}$ + γ_{60}Self-liking$_{ij}$ + γ_{70}ID with department + γ_{80}Gender salience + u_{0j} + r_{ij} . There were no random or interaction effects in the model, and no effects of gender or type of department. * $p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 11

Identification with Department as an Outcome Variable

	Model 1. Unconditional		Model 2. RMs		Model 3. Primary Appraisal		Model 4. Secondary Appraisal	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed								
Intercept	3.94	.07	3.92	.05	3.98	.06	3.98	.06
Positive			.84***	.09	.59***	.11	.50	.12
Negative-warmth			-.01	.11				
Negative-competence			-.17	.10				
Promotion					.33**	.11	.27*	.12
Prevention					-.22*	.10	.25*	.11
Promotion x Prevention					-.13*	.06	.13*	.07
Self-liking							.16	.11
Self-competence							-.00	.09
Random								
Level 1 - σ^2	.79	.08	.59	.06	.58	.06	.58	.06
Level 2 - τ_{00}	.08	.05	.02	.03	.01	.03	.01	.03
ICC	9.1%							
Deviance	701.17		613.85		604.99		602.88	
χ^2			(3) 87.32***		(1) 8.86*		(2) 2.11	
"Pseudo R^2"			.25		.27 (+.02)		.27 (no change)	

Note: $N = 262$. Intraclass Correlation = 9.1%. Model C.3 – Identification = $\gamma_{00} + \gamma_{10}\text{Positive}_{ij} + \gamma_{40}\text{Promotion}_{ij} + \gamma_{50}\text{Prevention} + (\gamma_{40}\text{Promotion}_{ij}\gamma_{50}\text{Prevention}) + u_{0j} + r_{ij}$. There were no random effects and no effects of gender or type of department.
* $p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 12

Gender Salience as an Outcome Variable

	Model 1 Unconditional		Model 2 RMs		Model 3 Primary		Model 4 Secondary	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed								
Intercept	2.22	.08	2.21	.07	2.21	.07	2.21	.07
Positive			-.05	.11				
Negative-W			.21	.12				
Negative-C			.44**	.11	.33**	.10	.31***	.12
Promotion					-.08	.11		
Prevention					-.28**	.11	-.26**	.11
Self-liking							-.04	.10
Self-competence							.02	.10
Random								
Level 1 - σ^2	.86	.08	.73	.07	.69	.07	.69	.07
Level 2 - τ_{00}	.13	.06	.09	.05	.10	.05	.11	.05
ICC	13.1%							
Deviance	732.32		684.85		672.90		676.69	
χ^2			(3) 47.47***		(1) 11.95***		(2) -	
"Pseudo R^2"			.15		.20 (+.05)		.20	

Notes: $N = 262$. No random effects or cross-level interactions were found.
Model 4: *Gender salience*$_{ij} = \gamma_{00} + \gamma_{30}$Negative-competence$_{ij}$ + + (γ_{50}Prevention) + u_{0j} + r_{ij} . Model 4 n.s.
* $p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 13

Gender as a Predictor

Outcome Variable	Grand *M*	*SE*	Female *M*	Male *M*	Gender Estimate	*SE*
Positive RMI	3.59	.05	3.53	3.65	-.12	.08
Negative-warmth RMI	1.85	.06	1.92	1.78	.14	.08
Negative-competence RMI	1.83	.04	1.96	1.70	.25**	.08
Inappropriate (single item)	1.22	.03	1.29	1.15	.14*	.06
Promotion	3.68	.06	3.54	3.81	-.27**	.10
Prevention	3.82	.06	3.59	4.04	-.45***	.10
Self-liking	3.84	.06	3.73	3.95	-.23*	.11
Self-competence	3.76	.05	3.59	3.92	-.33***	.09
Identification with department	3.93	.07	3.89	3.97	-.08	.11
Gender salience	2.31	.07	2.71	1.91	.80***	.12
Perceived departmental support	3.71	.08	3.58	3.84	-.27*	.14
Perceived departmental support: gender with positive and negative-competence messages as predictors	3.73	.06	3.70	3.75	-.05	.10

Note: $N = 262$. *Inappropriate*, a single RM item, was analyzed separately and is not part of any RM scale. * $p < .05$. ** $p < .01$. *** $p \leq .001$.

Table 14

Association of Positive Messages Predominately with Females, Males, or Equally with Both Genders

Gender Association	Females' Observed	Females' Expected	ASR	Males' Observed	Males' Expected	ASR	χ^2	V^2
			Collegial					
Females	16	8.5	3.4**	6	13.5	-3.4**	15.06**	.06**
Equal	3	7	-2.0*	15	11	2*		
Males	78	82.2	-1.4	134	129.8	1.4		
No Experience	3	2.3	.6	3	3.7	-.6		
Total *n*	100			158				
			Inclusive					
Females	20	9.7	4.4***	5	15.3	-4.4***	25.72**	.10***
Equal	2	8.2	-2.9**	19	12.8	2.9**		
Males	74	77.8	-1.2	126	122.2	1.2		
No Experience	4	4.3	-.2	7	6.7	.2		
Total *n*	100			157				
			Like-minded					
Females	15	7.7	3.5***	5	12.3	-3.5***	13.18**	.05**
Equal	6	8.1	-1.0	15	12.9	1.0		
Males	73	79	-1.9	133	127	1.9		
No Experience	5	4.2	.5	6	6.8	-.5		
Total *n*	99			159				

Note: *N*s for each variable varied by item, ranging from 257-258, with different participants possibly indicating "No Experience" for different items. For all analyses, $df = 3$. ASR = Adjusted Standardized Residual. V^2 = Cramer's statistic of determination. * $p < .05$ ** $p < .01$ *** $p < .001$.

Table 15

Association of Negative Messages with Females, Males, or Equally with Both Genders

Gender Association	Females' Observed	Females' Expected	ASR	Males' Observed	Males' Expected	ASR	χ^2	V^2
			Patronizing					
Females	2	1.5	.5	2	2.5	-.5	16.39***	.06***
Equal	25	15.8	3.2**	16	25.2	-3.2**		
Males	13	8.8	1.9	10	14.2	-1.9		
No Experience	60	73.8	-4.0***	132	118.2	4.0***		
Total *n*	100			160				
			Condescending					
Females	3	3.1	-.1	5	4.9	.1	6.12	.02
Equal	26	19.6	2.0*	25	31.4	-2.0*		
Males	12	9.6	1.0	13	15.4	-1.0		
No Experience	58	66.6	-2.4*	115	106.4	2.4*		
Total *n*	99			158				
			Aggressive					
Females	2	3.8	-1.2	8	6.2	1.2	2.18	.01
Equal	20	17.7	.8	26	28.3	-.8		
Males	19	17.7	.4	27	18.3	-.4		
No Experience	57	58.8	-.5	96	94.2	.5		
Total *n*	98			157				
			Renders Invisible					
Females	2	3.5	-1.0	7	5.5	1.0	19.60***	.08***
Equal	31	18.4	4.1***	17	29.6	-4.1***		
Males	13	11.1	.8	16	17.9	-.8		
No Experience	53	66	-3.5***	119	106	3.5***		
Total *n*	99			159				
			Controlling					
Females	4	3.9	.1	6	6.1	-.1	9.14*	.04*
Equal	30	21.6	2.6**	26	34.4	-2.6**		
Males	18	15.8	.8	23	25.2	-.8		
No Experience	47	57.8	-2.8**	103	92.2	2.8**		
Total *n*	99			158				

Note: *N*s for each variable varied by item, ranging from 257-258, with different participants possibly indicating "No Experience" for different items. For all analyses, $df = 3$. ASR = Adjusted Standardized Residual. * $p < .05$ **$p < .01$ ***$p < .001$.

Table 16

Gender Association of Positive Relational Messages, Controlling for Gender Representation in Respondents' Departments

Predominant Gender	Females' Observed	Females' Residual	χ^2	Males' Observed	Males' Residual	χ^2
			Collegial			
Females	16	-.2	69.59***	6	1	19.74***
Equal	3	-37.4		15	-24	
Males	78	37.6		134	23	
Total *n*	97			155		
			Inclusive			
Females	20	3.0	67.79***	5	0	14.03***
Equal	2	-38.4		19	-20	
Males	74	34.6		126	20	
Total *n*	96			150		
			Like-minded			
Females	15	-1.2	56.04***	5	0	18.73***
Equal	6	-32.4		15	-23	
Males	73	33.6		133	23	
Total *n*	94			153		

Note: *N*s for each variable varied by item, ranging from 240-252. Cases that indicated no receipt of a particular type of message were excluded, creating a different *n* for males and females for each variable. Based on specific *n*s, expected values in the chi-square tests were derived from respondents' estimates of gender representation in their departments. For all analyses, $df = 2$.
***$p < .001$.

Table 17

Gender Association of Negative Relational Messages, Controlling for Gender Representation in Respondents' Departments

Gender Association	Females' Observed	Females' Residual	χ^2	Males' Observed	Males' Residual	χ^2
			Patronizing			
Females	2	-3	4.26	2	0	21.67***
Equal	25	6		16	10	
Males	13	-3		10	-10	
Total	40			28		
			Condescending			
Females	3	0	5.15	5	4	49.78***
Equal	26	7		25	15	
Males	12	-7		13	-19	
Total	41			43		
			Aggressive			
Females	2	0	0	8	7	64.27***
Equal	20	0		26	11	
Males	19	0		27	-18	
Total	41			61		
			Renders Invisible			
Females	2	-4	18.54***	7	5	22.54***
Equal	31	14		17	7	
Males	13	-10		16	-12	
Total	46			40		
			Controlling			
Females	4	-3	5.28	6	4	21.99***
Equal	30	8		26	11	
Males	18	-5		23	-15	
Total	52			55		

Note: *N*s for each variable varied by item, ranging from 68-102. Cases that indicated no receipt of a particular type of message were excluded, creating a different *n* for males and females for each variable. Based on specific *n*s, expected values in the chi-square tests were derived from respondents' estimates of gender representation in their departments. For all analyses, $df = 2$.
***$p < .001$.

Table 18

Pearson Correlation Matrix of Predictor and Outcome Variables for Females

Variables	1	2	3	4	5	6	7	8	9
1 POSITIVE									
2 NEGWARMTH	-.54(**)								
3 NEGCOMP	-.55(**)	.68(**)							
4 PROMO	.76(**)	-.61(**)	-.59(**)						
5 PREVN	.71(**)	-.54(**)	-.65(**)	.81(**)					
6 SELIKE	.79(**)	-.52(**)	-.68(**)	.85(**)	.84(**)				
7 SECOMP	.57(**)	-.24(*)	-.49(**)	.63(**)	.65(**)	.69(**)			
8 GENSAL	-.36(**)	.28(**)	.48(**)	-.42(**)	-.50(**)	-.42(**)	-.34(**)		
9 SUPER ID	.57(**)	-.30(**)	-.27(**)	.56(**)	.43(**)	.52(**)	.50(**)	-.15	
10 SUPPORT	.70(**)	-.43(**)	-.59(**)	.78(**)	.77(**)	.84(**)	.65(**)	-.44(**)	.59(**)

Note: $n = 101$. * $p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 19

Pearson Correlation Matrix of Predictor and Outcome Variables for Males

Variables	1	2	3	4	5	6	7	8	9
1 POSITIVE									
2 NEGWARMTH	-.53(**)								
3 NEGCOMP	-.44(**)	.59(**)							
4 PROMO	.68(**)	-.60(**)	-.48(**)						
5 PREVN	.52(**)	-.47(**)	-.52(**)	.74(**)					
6 SELIKE	.78(**)	-.56(**)	-.52(**)	.77(**)	.64(**)				
7 SECOMP	.45(**)	-.21(**)	-.38(**)	.59(**)	.64(**)	.53(**)			
8 GENSAL	-.12	.39(**)	.24(**)	-.26(**)	-.20(**)	-.25(**)	-.01		
9 SUPER ID	.51(**)	-.21(**)	-.11	.41(**)	.25(**)	.47(**)	.16(*)	-.01	
10 SUPPORT	.63(**)	-.57(**)	-.48(**)	.63(**)	.51(**)	.75(**)	.40(**)	-.29(**)	.47(**)

Note: $n = 161$. * $p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 20

Mediation Model of Perceived Departmental Support for Females

	Unconditional Model 1		Relational messages Model 2		Primary Model 3		Secondary Model 4		Super ID Model 5		Gender salience Model 6	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed												
Intercept	3.57	.11	3.69	.08	3.79	.07	3.77	.06	3.70	.06	3.75	.06
Positive			1.02***	.14	.31	.16						
Negative-warmth			.16	.14								
Negative-comp.			-.55***	.15	-.14	.12						
Promotion					.46***	.15	.22	.14				
Prevention					.43***	.15	.20	.14				
Self-liking							.66***	.14	.94***	.08	.87***	.08
Self-competence							.16	.09				
ID with department									.23***	.07	.24***	.07
Gender salience											-.12*	.06
Random												
Level 1 - σ^2	1.17	.17	.46	.08	.36	.07	.30	.04	.30	.05	.29	.05
Level 2 - τ_{00}	.00	.00	.06	.06	.01	.05	.00	.00	.01	.03	.00	.03
Model Fit												
Deviance	302.86		218.71		186.27		166.97		166.61		161.88	
χ^2			(3)84.15***		(2) 32.44***		(1)19.77***		(1) .36		(1) 4.73	
"Pseudo R^2"			.61		.69(+.08)		.74(+.05)		.74(+.0)		.75 (+.01)	

Note: n = 101. * $p < .05$; ** $p < .01$; *** $p \leq .001$.

Table 21

Mediation Model of Perceived Departmental Support for Males

	Unconditional Model 1		Relational messages Model 2		Primary Model 3		Secondary Model 4		Super ID Model 5	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed										
Intercept	3.81	.10	3.71	.07	3.78	.07	3.71	.06	3.72	.06
Positive			.71***	.11	.52***	.12	.14	.13		
Negative-warmth			-.47*	.14	-.35*	.14	-.30*	.12	-.42***	.11
Negative-comp.			-.24	.12						
Positive x Neg-warmth					.31*	.16	.21	.14		
Promotion					.31*	.13	.05	.12		
Prevention					.07	.11				
Self-liking							.63***	.11	.64***	.08
Self-competence							-.00	.10		
ID with department									.20***	.06
Random										
Level 1 - σ^2	.97	.13	.52	.07	.48	.06	.39	.05	.37	.05
Level 2 - τ_{00}	.12	.10	.04	.04	.04	.04	.04	.04	.05	.04
Model Fit										
Deviance	468.51		362.25		350.36		320.94		313.86	
χ^2			(3)106.26***		(1)12.11***		(1)29.42***		(1) 7.08	
"Pseudo R^2"			.46		.51(+.02)		.60(+.09)		.62(+.02)	

Note: n = 101. * $p < .05$; ** $p < .01$; *** $p \leq .001$. Gender salience was not significant for males; Model 5 is the final model.

APPENDIX A:

The conceptual framework for the present study

This study was designed to investigate faculty members' mental models of interaction with department colleagues, what Harwood (1998) and Harwood, McKee, and Lin (2000) called a *communication schema*, a holistic representation of a particular type of interaction that includes the affect, behavior, and outcomes associated with it, i.e., an expectation or prediction in the most general sense. To assist in conceptualizing faculty members' models of interaction with department colleagues, models that are self-referential and unique for each individual, an interdisciplinary framework was adapted from the unified framework of implicit attitudes, self-concept, and self-esteem articulated by Greenwald, Banaji, Rudman, Farnham, Nosek, and Mellott (2002). In Greenwald et al.'s balanced identity model, the self-concept is described as the association of the self with a concept or conceptual attribute, while self-esteem is the association of the self with a valence attribute, with a positive or negative evaluation. The balanced identity design illustrated in Figure 11, Model A, involves three sets of relations, based on Heider (1958): 1) group-attribute, 2) the self-group, and 3) self-attribute relations.

Figure 11. The balanced identity model and the derivative model of relational communication.

These same relations underlie the structure of both the self-concept and self-esteem. Each set of associations in the model may be positive or negative, as indicated by a + or – sign. When the model is considered in terms of the self-concept, positive and negative valence indicate cognitive congruence versus dissonance between associated concepts. When the model references self-esteem, the valence attributes indicate positive or negative affective or evaluative links. Following Heider, Greenwald et al. (2002) considered the three relations between concepts in a model to be balanced when three positively-valenced associations or two negatives and one positive occur. Imbalanced relations are motivational in that individuals strive to avoid or reduce the accompanying cognitive dissonance and/or feelings of discomfort and restore balance.

A derivative model of relational communication would need to describe "the sender-receiver relation, as mediated by communication" (Watzlawick et al., 1967, p. 22). By modifying the balanced identity model, we can represent sender-receiver relations for a particular individual within a social system in terms of three sets of associations, as shown in Figure 11, Model B. We include the self in the adapted model, and add the superordinate group as the attribute, e.g. respondents' academic department in the present study. The third, group position, is now used to represent any social categorization scheme that may be active in social perception and interaction to divide the superordinate group into factions or sub-groups. For example, gender is the sub-grouping variable in the present study, which examined qualitative differences in the relations between self and department for male and female faculty members.

Modeling sub-group differences. This adapted model can be helpful in conceptualizing an interaction system from a particular individuals' point of view, and determining the relations that need to be operationalized and measured to understand that person's self-concept and self-esteem in context of the larger group. In the present study, the quality of the self-department relation was examined in terms of the pattern of relational messages received, identification with department, and perceived departmental support. The self-gender relation was represented by gender salience in interaction and the gender that respondents' associated with different types of relational messages. Aggregated results on the latter items provided information regarding the third, gender-department relation, which was also predicted based on the literature review.

Using the present study as an example, Figure 12 illustrates the expected identity relations for male and female faculty members in the context of collegial interaction.

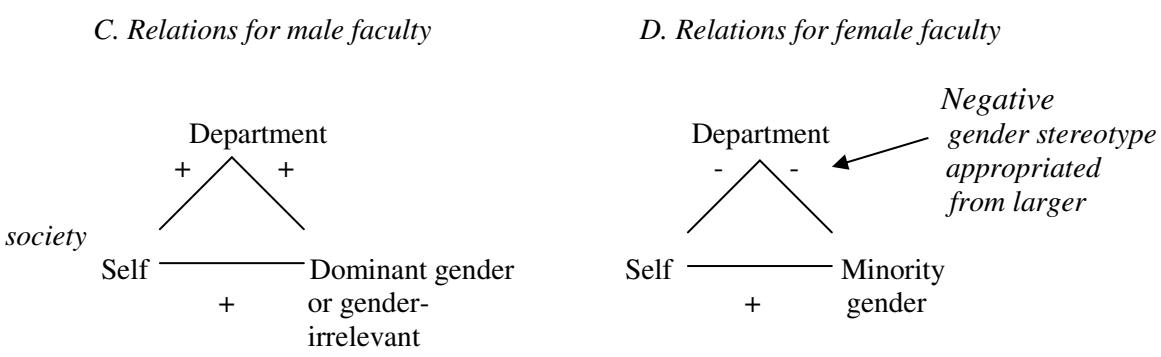

Figure 12. Potential influences of sub-group memberships on intradepartmental interaction and relationships.

The set of uniformly positive and balanced person-environment relations in Model C would be expected for most individuals in a department where the interaction

climate is cooperative and gender identity does not privilege or handicap group members. Reported experiences in interaction would vary among individuals, but not systematically according to gender. In departments where gender sub-grouping does exist, Model C would predict identity relations for members of the higher status sub-group—males in the present study. Hence, the hypotheses predicting more positive experiences in interaction and a higher level of perceived departmental support for males. In contrast, Model D depicts illustrates the identity relations for women in the present study, which found significant gender differences in perceived departmental support, receipt of negative-competence messages, all of the appraisal variables, and the degree of gender salience in interaction. Although relations in Model D are balanced, the negative self-department and gender-department relations potentially have negative consequences for women's self-concept and self-esteem.

APPENDIX B: Deans' Site Authorization Letter

University of Arizona Human Subjects Protection Program
Site Authorization Letter

April 5, 2007

Judith Anderson
Principal Investigator, Collegial Communication Study
ABD, UA Department of Communication
2517 E. Helen St.
Tucson, AZ 85716

Dear Ms. Anderson:

I have reviewed your request regarding your study and am pleased to support your research project entitled "Collegial Communication Study". Your request to use the College of [ ] as a research or recruitment site is granted.

The research will include an anonymous, 10-15 minute online survey of tenure track faculty in the College of [ ] and six other UA colleges. The UA Human Subjects Protection Program has reviewed the project, granted exempt status, and approved recruitment procedures.

Faculty participants will be recruited via an email from the PI to department heads that includes study information and a URL to access the survey. Heads will be asked to forward the email to eligible faculty. The PI will follow up with a recruitment flyer and possibly an email to faculty in departments where participation is low. Based on the information given, faculty members will self-select for participation.

The project is a study about the types of communication that faculty members experience in everyday interactions with colleagues. In order to insure anonymity, participants' identities will not be tracked by email address or any other identifying information. Results regarding individual departments will not be reported.

This authorization covers the time period of [ ]. We look forward to working with you.

Sincerely,

[ ], Dean
College of [ ]
University of Arizona

APPENDIX C: Initial Letter to Department Heads

Dear Professor [ ]:

I would appreciate your help in recruiting tenure-track faculty in your department to participate in a 10-minute, anonymous online survey. The purpose of the study is to better understand everyday communication among faculty colleagues. Participation should be interesting and will provide important insights into how faculty members establish productive and satisfying collegial relationships.

Participation will be anonymous. No results will be reported regarding individual departments. The identities and email addresses of respondents will not be tracked. Demographic information and participants' department affiliation will appear in the data file only as numbers.

I will send a recruitment email on Wednesday, April 18th with study information and a URL to access the survey. I would appreciate your forwarding the recruitment email to all tenure track faculty in your department or passing it on in another way. I hope that you will participate as well. About 1,100 UA tenure track faculty in the Colleges of Agriculture & Life Sciences, Education, Engineering, Fine Arts, Humanities, Science, and SBS are being asked to participate. A very large sample is needed to conduct multilevel modeling analyses of the data.

This introductory email is being sent to allow time for you to contact me, Judith Anderson, with any questions you may have at jlander@email.arizona.edu or by phone at 327-5674. You may also contact the Human Subjects Protection Program office at 626-6721. The study is my dissertation research in Communication and is being supervised by my advisors Jake Harwood, Joe Bonito, and Michael Dues from the Department of Communication, and Toni Schmader from Social Psychology.

Thank you very much for your consideration and assistance!

Judith Anderson
Ph.D. Candidate, Department of Communication
University of Arizona

APPENDIX D: Recruitment Email to Faculty

[Specific Department] tenured and tenure-track faculty:

[Specific Department] faculty are invited to participate in a 10-minute, anonymous online survey. The purpose of this study is to better understand everyday communication among faculty colleagues. Participation should be interesting and will provide important insights into how faculty members establish productive and satisfying collegial relationships.

Participation is anonymous. No results will be reported regarding individual departments. UA faculty in seven Colleges are being asked to participate. The identities and email addresses of respondents will not be tracked, and demographic information will appear in the data file only as numbers.

I appreciate your taking the time to participate, any time between April 24-May 11 2007, by entering this URL into your Web browser:

[Department-specific URL]

Online, you will be given information about the study and asked to respond to a permission form by clicking ACCEPT. Participants can exit the study at any time.

This Collegial Communication Study is my dissertation research, supervised by my advisors Jake Harwood, Joe Bonito, and Michael Dues from the Department of Communication, and Toni Schmader from Social Psychology. If you have questions about the study, please contact me, Judith Anderson, at jlander@email.arizona.edu or by phone at 327-5674; or, you may contact the Human Subjects Protection Program at 626-6721.

Thanks very much for taking the time to participate!

Judith Anderson, Doctoral Candidate
UA Department of Communication

APPENDIX E: Final Recruitment and Thank You Letter

[Specific Department] faculty:

Thanks to faculty members who have taken the survey on faculty communication. Your participation is greatly appreciated.

If you have not yet taken this anonymous 10-minute survey, I hope you will participate, any time between May 3-11 2007. The email addresses of respondents will not be tracked, and demographic information will appear in the data file only as numbers. No results will be reported regarding individual departments.

I appreciate your taking the time to participate by entering this URL into your Web browser:

[Department-specific URL]

Online, you will be asked to respond to a permission form by clicking ACCEPT. Participants can exit the study at any time.

This Collegial Communication Study is my dissertation research, supervised by my advisors Jake Harwood, Joe Bonito, and Michael Dues from the Department of Communication, and Toni Schmader from Social Psychology. If you have questions about the study, please contact me at jlander@email.arizona.edu or by phone at 327-5674; or, you may contact the Human Subjects Protection Program at 626-6721.

Thanks again for taking the time to participate! Have a great summer.

Judith Anderson, Ph.D. Candidate
Department of Communication
University of Arizona

APPENDIX F: Collegial Communication Survey

Informed Consent Document

Collegial Communication Study

You are being invited to participate anonymously in a research study that will take about 10 minutes to complete. Approximately 1,100 tenure-track faculty at UA are being asked to participate.

If you decide to participate, CLICK ACCEPT at the bottom of this page to sign the consent form.

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND THE COMMUNICATION DYNAMICS OF EVERYDAY INTERACTIONS AMONG FACULTY COLLEAGUES.

Your participation in the study is anonymous. No one, including the researchers, will know that you participated or did not participate in the study.

To insure confidentiality, administration of the survey was designed so that the identities of respondents, including their email addresses, will NOT be tracked. Demographic information and participants' departmental affiliation will appear in the data file only as numbers. Results regarding individual departments will NOT be reported.

What will happen during this study? After you click ACCEPT, you will go immediately to the survey questions. If you decide to discontinue participating after beginning the survey, you may do so at any time, simply by exiting the study Web site. If, after reading information about the study, you choose not to participate, simply exit the Web site. If, after reading information about the study, you choose not to participate, simply exit the Web site. No information about your choice to participate or not participate will be recorded.

How long will I be in this study? About 10-15 minutes.

Are there any risks to me? Although we have tried to avoid risks, you may feel that some questions we ask will be stressful or upsetting. At any time you feel uncomfortable and decide not to continue participating, you can stop participating immediately, for any reason, at any time, by exiting the survey Web site.

Are there any benefits to me? You will not receive any benefit from taking part in this study other than the opportunity to reflect on your communication with faculty colleagues.

Will there be any costs to me? NO.
Will I be paid to participate in the study? NO.

Will video or audio recordings be made of me during the study? NO.
Will the information that is obtained from me be kept confidential? YES.
You may obtain a copy of this page by printing it now.
May I change my mind about participating? YES.

Your participation in this study is voluntary. You may or may not choose to participate in the study. No one, including the PI, will have information on whether or not you have participated. If you begin the survey and then decide to discontinue, you can exit the survey at any time. Because participation is anonymous, refusing to participate or not completing the study has no negative repercussions. Any new information discovered about the research that could affect your willingness to continue participation will be provided to you.

Whom can I contact for additional information?

You can obtain further information about the research or voice concerns or complaints about the research by calling the Principal Investigator, Judith Anderson, Ph.D. Candidate at (520) 327-5674. If you have questions concerning your rights as a research participant, have general questions, concerns or complaints or would like to give input about the research and can't reach the research team, or want to talk to someone other than the research team, you may call the University of Arizona Human Subjects Protection Program office at (520) 626-6721. (If out of state use the toll-free number 1-866-278-1455.) If you would like to contact the Human Subjects Protection Program by email, please use this email address: http://www.irb.arizona.edu/suggestions.php.

STATEMENT by person obtaining consent:

I certify that I have explained the research study to the person who has agreed to participate, and that he or she has been informed of the purpose, the procedures, the possible risks and potential benefits associated with participation in this study. Any questions raised have been answered to the participant's satisfaction.

Judith Anderson, Ph.D. Candidate — Date: March 22, 2007
Name of study personnel

Jake Harwood, Ph.D. — Date: March 22, 2007
Dissertation advisor

GIVING YOUR CONSENT

By clicking on ACCEPT, I affirm that I have read the information contained in the consent form, that the study has been explained to me, that my questions have been answered and that I agree to take part in this study. I do not give up any of my legal rights by clicking ACCEPT and agreeing to participate.

1. Do you accept the terms of the study and agree to participate?
   ___ ACCEPT ___ DECLINE (Individuals that checked DECLINE exited the study.)

2. What is your position at UA?
   ___ Department head
   ___ Full professor
   ___ Associate professor
   ___ Assistant professor – tenure track

3. ___ Select the best description of your long-term goals as a scholar.

1. RESEARCH – You publish 1-2 articles/book chapters and make one or more presentations/year.
2. RESEARCH – A prominent scholar, you publish 2-3 articles/year and regularly present at major conferences.
3. RESEARCH – You are one of the greats, with considerable output and major influence on your field.
4. ARTS/NON-RESEARCH – You are a respected scholar in your field.
5. ARTS/NON-RESEARCH – You are prominent, productive, and have influence in your field.
6. ARTS/NON-RESEARCH – You are one of the greats, with considerable output and major influence in your field.

4. ____ Write in the number of articles that you published in peer-reviewed journals during the last two calendar years

Interaction with department colleagues

Take a moment to think about your everyday interactions with faculty colleagues in your department—including conversations in the hallway or over lunch, committee and meetings, discussions about research and teaching, etc.

Considering the range of interactions you might have over several weeks with colleagues in your department, TO WHAT EXTENT DO YOU ENCOUNTER THE FOLLOWING TYPES OF COMMUNICATION WITH FACULTY COLLEAGUES**?**

Choices:	1	2	3	4	5
	Not at all	Rarely	Sometimes	Often	Almost always – the norm

5. FRIENDLY – communicates a genuine liking for you.
6. WITHDRAWN – avoids communicating with you.
7. HELPFUL – offers assistance gladly when asked.
8. UNFRIENDLY – communicates dislike or animosity.

9. NOT INTERESTED – does not listen, looks bored, or changes the subject when you speak.
10. INCLUSIVE – includes you in informal discussions in the hallway or a colleague's office.
11. CONDESCENDING – talks down to you, as if you have less ability or intelligence.
12. LIKE-MINDED - voices agreement with your contributions in discussions and meetings.
13. ENCOURAGING – encourages you to take on challenges; expects you to succeed.
14. CRITICAL – overly-critical about your work in a way that demeans your ability.
15. RENDERS YOU INVISIBLE – ignores your contributions in meetings and/or professional discussions; may say the same thing later or agree with someone who does
16. AGGRESSIVE – attacks your ideas or your work in discussions and/or meetings.
17. LIGHT-HEARTED - jokes with you a great deal; makes your working environment fun.
18. INSULTING – makes rude comments or jokes about you or a group you belong to; claims (s)he "didn't mean anything by it."
19. INFORMATIVE – shares information that helps advance your career in some way.
20. UNDERMINING – others tell you that s(he) puts down your work or your ability when you are not present.
21. SOCIAL - joins you in meals, sports, or social activities outside the department.
22. COLLEGIAL – treats you as an equal; values your professional opinion
23. DISTANCING - directs talk "over your head" with technical language or topics with which you are unfamiliar.
24. CONTROLLING – tries to "boss you around"; controls the flow of conversation.
25. BOLSTERING - expresses positive comments your work or your ability to others
26. CONSTRUCTIVE CRITIC – gives well-meaning suggestions to help you improve
27. PATRONIZING – helpful in a way that emphasizes your lower status or ability; may be over-helpful
28. COLLABORATIVE – agrees to collaborate on research, co-author a paper, or do a professional project together
29. INAPPROPRIATE – sexualizes conversation or makes unwanted advances

30. FRIENDLY RIVALRY – competes with you in a good-natured way; gives praise when due.
31. DISCOURAGING – cautions you against doing research that is too ambitious or cutting-edge.

Feelings interacting with colleagues

You have considered the different types of communication that you encounter with department colleagues in professional discussions, meetings, and informal conversations. Now, please think about how you often feel during these everyday interactions.

Everyone has different experiences with different colleagues, good days and bad days, but you are likely to have a general idea about how you feel interacting with colleagues during a typical work week, e.g., more tense or more relaxed.

The feelings listed below range from very negative to very positive. Numbers between the positive and negative "poles" indicate the range of feelings between them.

PLEASE INDICATE HOW YOU MOST OFTEN FEEL INTERACTING WITH FACULTY COLLEAGUES IN YOUR DEPARTMENT.

32. Completely Relaxed	1	2	3	4	5	Extremely tense
33. Fully Accepted	1	2	3	4	5	Rejected
34. Very Successful	1	2	3	4	5	Unsuccessful
35. Hesitant	1	2	3	4	5	Eager, enthusiastic
36. Incompetent	1	2	3	4	5	Highly Competent
37. Calm	1	2	3	4	5	Anxious
38. Powerless	1	2	3	4	5	Powerful
39. Very Discouraged	1	2	3	4	5	Very Optimistic
40. Cheerful	1	2	3	4	5	Depressed
41. Well-liked	1	2	3	4	5	Disliked
42. Extremely Talented	1	2	3	4	5	Untalented
43. Praised	1	2	3	4	5	Criticized
44. Very Sad	1	2	3	4	5	Very Happy
45. Very Uncomfortable	1	2	3	4	5	Totally at ease

46. Appreciated	1	2	3	4	5	Ignored
47. Very secure	1	2	3	4	5	Insecure

Short Questions

TO WHAT EXTENT DO YOU AGREE WITH THE FOLLOWING STATEMENTS?

1-Strongly Agree 2-Somewhat Agree 3-Neither Agree nor Disagree
4-Somewhat Disagree 5-Strongly Disagree

48. The successes of my department colleagues reflect upon me.
49. Being a member of my department is an important part of who I am.
50. My department treats all faculty fairly in assigning teaching and service workloads,
51. My department cares about my well-being.
52. I am a very good fit with my department.
53. My department treats all faculty fairly in allocating research equipment, space, and personnel.
54. My department values my contributions.
55. My department treats all faculty fairly in giving rewards such as salary and award nominations.
56. My department is very supportive of my career advancement.
57. Being a member of my department is important in defining who I am.

Descriptive Information

To ensure anonymity, demographic information is recorded only as numbers in the data file. Results will NOT be analyzed or reported by department.

58. Your gender: ___ Male ___ Female

59. Your ethnicity: ___African-American ___ Asian-American
___ European American (White) ___ Hispanic American
___ Native American ___ Pacific Islander
___ Other ethnicity or scholar from outside the U.S.

60. Please indicate your UA department: _____ (Choice from list of departments)

Short Questions

TO WHAT EXTENT DO YOU AGREE WITH THE FOLLOWING STATEMENTS?

1-Strongly Agree 2-Somewhat Agree 3-Neither Agree nor Disagree
4-Somewhat Disagree 5-Strongly Disagree

61. I mostly interact with department colleagues who are the same gender as I am.
62. I communicate the same way with male and female colleagues.
63. I often think of faculty colleagues as males or females in order to understand their behaviors.
64. I usually use different words and ways of speaking with female colleagues than with male colleagues.
65. I am very aware of being male or female when interacting with department colleagues.
66. There are different unspoken rules of behavior for male and female faculty in my department.
67. ___ Approximately what percentage of the tenure-track faculty in your department is male?

Communication partners

Please consider some of the types of communication mentioned above and think about whether the faculty colleagues interacting with you are more likely to be male, female, or equally likely to be male or female.

Your experiences, and therefore your answers, are necessarily influenced by the number of male and female colleagues in your department as well as the mix of faculty with whom you interact more often. So it is not unusual if you find that many or most types of communication are associated with one sex or the other. Or, you may find that your answers range across all four response choices.

In the following types of communication, are the faculty colleagues interacting with you more likely to be male, female, or equally likely to be male or female?

Answer choices: a-Male or female equally likely b-Female c-Male
d-Do not encounter this type of communication

68. COLLABORATIVE - asks you to collaborate on a project or co-author a paper
69. PATRONIZING – helpful in a way that emphasizes your lower status; may be over-helpful
70. BOLSTERING – expresses positive comments about your work or your ability to others
71. CONDESCENDING – talks down to you as if you have less ability or intelligence
72. COLLEGIAL – treats you as an equal; values your professional opinion
73. AGGRESSIVE – attacks your ideas or your work in discussions and/or meetings
74. INCLUSIVE – includes you in informal discussions in the hallway or a colleague's office
75. RENDERS YOU INVISIBLE – ignores your contributions in meetings and/or professional discussions; may say the same thing later or agree with someone who does
76. CONTROLLING – tries to "boss you around"; controls the flow of conversation
77. LIKE-MINDED – voices agreement with your contributions in meetings and discussions

THANKS VERY MUCH FOR COMPLETING THIS SURVEY!

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