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Dissertation

THE ROLE OF CARING BEHAVIOR AND PEER FEEDBACK IN CREATING TEAM EFFECTIVENESS

by

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This research is about the importance of relationships in team effectiveness. It is indirectly about the relationships that contribute to the completion of a major piece of work. Relationships influence the content and quality of the work as well as provide a source of energy and inspiration as one undertakes such an arduous task. It is fitting that a work about relationships recognize the many people who have played a role in the completion of this work.

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THE ROLE OF CARING BEHAVIOR AND PEER FEEDBACK IN CREATING TEAM EFFECTIVENESS

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ABSTRACT

In today's business environment teams have become an important dimension in the organizational landscape. As people work more closely and interdependently, the nature of relationships becomes increasingly important. Current research on teams examines the characteristics of effective teams but does not examine the mechanism by which these characteristics emerge in the team. This research takes an interpretive frame to build and test a model that links individual caring behavior and peer feedback to team effectiveness.

The study was conducted with 67 self-managed teams in an MBA course. The findings suggest that caring behavior has a pervasive impact on a team. It was found to positively affect how safe members feel in the group, cohesion, satisfaction, and the degree to which members are engaged with the task. Through these factors, caring behavior is connected to team task outcomes and individual learning. Peer feedback was tested as an intervention to increase caring behavior and team effectiveness. The results of this study show that peer feedback increases caring behavior, creates a safer climate, and directly impacts individual learning, which then affects team task outcomes.

The study makes a number of important contributions to theory and practice. It extends work done on caring behavior into the group domain. This study clearly demonstrates the importance of relational behaviors on team effectiveness and develops a model that illustrates the mechanism by which characteristics of effective teams emerge from caring behavior. This has implications for the way we go about building teams. We must consider not only the performance strategies of effective teams but also the relationships that facilitate group members to fully engage in those strategies.

This study also extends our knowledge of peer feedback systems to incorporate an understanding of the effect of peer feedback on team dynamics. Although previous work examines peer feedback for the purpose of individual development, this study demonstrates that such systems also have an impact on team dynamics. This impact should be taken into consideration when a peer appraisal system is designed.

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OVERVIEW

Teams Produce Valued Outcomes for Organizations. . .

Organizations are increasingly using team structures as a mechanism for coping with today's complex business environment (Katzenbach and Smith, 1993; Lawler, 1992; Lawler, Mohrman et al., 1995). This shift toward teams is driven by evidence that teams can produce important outcomes, e.g., they can empower employees; increase productivity, satisfaction, commitment, flexibility, and quality; and reduce turnover, absenteeism, accidents, and costs (Cummings, 1978; Manz and Sims, 1987; Orsburn, Moran et al., 1990; Trist, Susman et al., 1977). Teams can also enable organizations to navigate the white water (Vaill, 1996) of today's business environment by fostering learning at all levels in an organization (Watkins and Marsick, 1993), which is key to remaining adaptable and flexible in a changing environment (Senge, 1990; Vaill, 1996; Wick and Leon, 1993). For example, teams produce individual learning (Lawler, 1992; Slavin, 1986; Zins, Maher et al., 1988), as well as collective learning at the group and organizational level (Katzenbach and Smith, 1993; Lawler, 1992).

But Highly-Effective Teams are Difficult to Develop

The advantages that teams offer over traditional structures are important for most organizations, however, teams often have difficulty living up to their potential (Donnellon, 1996; Hackman, 1990; Katzenbach and Smith, 1993). Researchers have studied groups for over half a century, yet, we are becoming increasingly aware that our knowledge is insufficient to guarantee the success of any particular team. We simply do not have "definitive answers" to how we should manage teamwork (McIntyre and Salas, 1995).

Nevertheless, with teams becoming such an important factor in the success of many organizations, there is keen interest in understanding how to build effective teams (Blake, Mouton et al., 1987; Donnellon, 1996; Tjosvold and Tjosvold, 1991).

Research on Team Effectiveness

Recent studies of team effectiveness have identified many factors that differentiate highly effective teams from others. These factors can be classified into three categories: external factors, collective behavior, and qualitative factors. External factors are not within control of team members. These are generally factors that management can manipulate to facilitate team performance, e.g., group size, or organizational support. Collective behaviors are patterns of behavior within the group. These patterns of behavior can represent routines, e.g., problem-solving techniques, or they can represent characteristic patterns of interaction, e.g., open communication. Qualitative factors represent observed characteristics of effective teams, e.g., trusting, or committed to each other's growth. These factors are usually observed but little insight is given into how they are achieved. Sometimes they are described as though they were a mystery:

> "It is not obvious how people can be managed or even led into caring about one another's personal success and growth. Certainly, such bonds do not arise from team-building exercises or training programs."
> (Katzenbach and Smith, 1993, p. 66.)

Figure 1 shows a summary of these factors for a sample of research on effective teams. Although the research is valuable in advancing our understanding of effective teams, it does little to connect our understanding of effective teams to the specific behaviors of

individual team members. Nor does it help us understand how the "mysterious" qualitative factors associated with effective teams emerge.

Figure 1: Summary of Factors Contributing to Team Effectiveness

STUDY	Collective Behaviors	Qualitative Findings	External Factors
(Katzenbach and Smith, 1993)	• Learn each other's jobs • Take advantage of unplanned events and failures • Take risks • Seek outside information to challenge the team	• Not afraid to fail • Interpersonal commitment • Performance norms	• Size • Purpose • Goals • Skills • Accountability
(Larson and LaFasto, 1989)	• Effective communication • Monitoring individual performance • Providing feedback	• Clear roles • Fact-based judgments • Unified commitment • Collaborative climate • Trust • Honesty, openness, consistency, respect • High standards	• Clear elevating goal • Competent members • External support • Leadership
(Druskat, 1996)	• Attention to feedback • Proactive problem solving • Confronting members that break norms • Self evaluation • Support and concern for each other	• External awareness • Flexible • Unified effort and cooperation	
(Watkins and Marsick, 1993)	• Constructive controversy • Experimentation • Crossing boundaries/ seeking feedback and soliciting help	• Reframing perspectives	• Support for operation of teams • Support for cross-functional work

Unless we understand the micro-acts that lead to the macro-properties of highly effective teams (e.g., safety, trust, and commitment), we will remain somewhat mystified about the processes that lead to highly effective teams. For example, Hackman et al. (1990, p. 2) seek to find answers to the question, "Why do groups that appear to be similar often vary so much in effectiveness?" Larson and LaFasto (1989) say that "the important, but often elusive fourth factor—unified commitment— has a qualitatively different character to it. Thus, while unified commitment is often the most clearly missing feature of ineffective teams, it is difficult to know precisely what it is" (p. 73).

To fully understand effective teams we must integrate a dynamic perspective into the knowledge outlined in Figure 1. We must go beyond cataloguing collective behavior and team characteristics and explore the mechanisms by which the behaviors and qualities of effective teams emerge. The interpretive framework (Layder, 1994) that guides this research suggests that characteristics such as commitment, trust, openness, etc., emerge from individual action within the group. The emergent group climate then provides an environment within which collective behavior takes place. The nature of the group climate will affect the nature of the collective behaviors exhibited by the group.

One set of individual behaviors particularly relevant to effective teams are those that build relationships among team members (Fletcher, 1994). These behaviors are marginalized in organizations (Fletcher, 1994) and they are often not fully explored in research on effective teams (McIntyre and Salas, 1995). An examination of the findings outlined in Figure 1, at best, shows a recognition of the outcomes of relational behavior, e.g., commitment and trust. However, as illustrated above, these outcomes may seem elusive when we marginalize the relational behaviors that produce them.

One class of relational behavior likely to be particularly relevant to group effectiveness is caring behavior. These behaviors have a powerful impact on relationships (Kahn, 1993), yet their impact on team effectiveness has not been directly studied. The main research question of this study, therefore, is:

> *Research Question #1*
> What is the role of caring behavior on team effectiveness?

Understanding the effect of caring behavior requires an understanding of the mechanism by which it impacts team effectiveness. In the next section I present a framework that serves as a conceptual guide for understanding this connection. In the next chapter I fill in this framework with greater detail and develop propositions concerning the theoretical connection between relational behavior and team outcomes.

Understanding the role of caring behavior on team effectiveness is only half the battle in generating practical information for developing effective teams. It is also important to understand how caring behaviors can be stimulated. One tool that is hypothesized to stimulate caring behavior, and thus ultimately impact team effectiveness, is a structured peer feedback exercise. Peer feedback has been studied mainly as a tool for evaluation (e.g., Kane and Lawler, 1978). Some research has examined acceptance of peer feedback when used for developmental purposes (e.g., Farh, Cannella et al., 1991; McEvoy and Buller, 1987), however, only one study has examined the connection between peer feedback and its long-term effect on group dynamics (Druskat and Wolff, forthcoming). The second research question, therefore, is:

> *Research Question #2*
> What is the role of structured peer feedback on caring behavior and team effectiveness?

Guiding Framework

Before moving on to a more detailed discussion of the literature, it is important to understand the conceptual framework that guides this research. There are three general features of the framework (see Figure 2). First, I view group functioning as a complex phenomenon involving multiple interacting levels, thus, individual-level behavior is connected to group outcomes via the group-level constructs of group cognition and group behavior. Although Figure 2 shows a linear connection between the individual level and group outcomes, this should be recognized as a simplification. Second, I take a cognitivist perspective on behavior, i.e., behavior is influenced by cognition. This occurs at both the individual level (not shown in Figure 2) and the group level where patterns of behavior emerge from shared cognitions. Finally, I take an open systems perspective and view the group as a system embedded in an organizational environment.

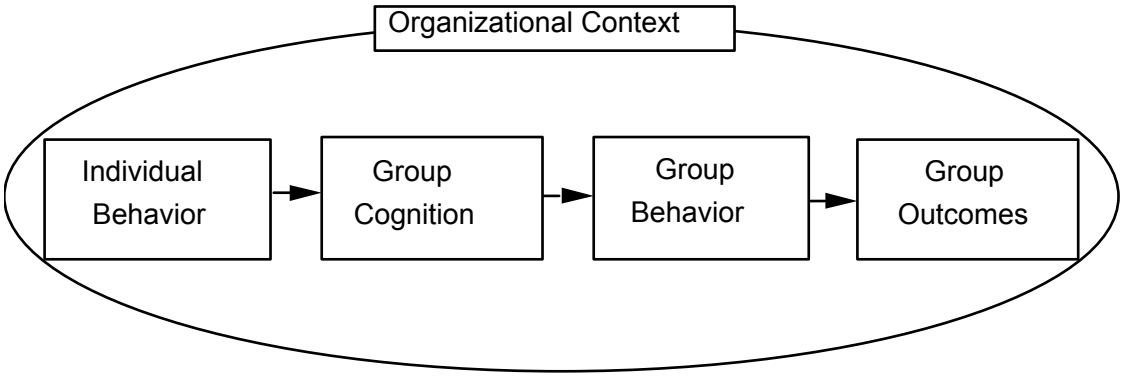


Figure 2: General Framework for Understanding Group Dynamics

Group phenomena begin with individual actions—the first level shown in the model. As team members observe and interpret individual behavior, they develop a sense of the group. Through processes of social information processing and sensemaking (Weick,

1993), these understandings of the group become shared, thus, the second level in the model is group cognition. Group-level patterns of behavior are shaped by this shared sense of the group. Whether we call it group culture, norms, or roles, the shared beliefs, assumptions, and understanding of "the way we do things," shape patterns of group behavior. The resulting patterns of behavior are represented by the box labeled group behavior. Finally, group outcomes are directly connected to group processes and include both task and process outcomes (e.g., group cohesion and satisfaction).

In the next chapter I develop the theoretical basis for the framework presented above. A set of propositions outlining the major relationships among theoretical constructs is presented. Once the theoretical basis for connecting individual behavior to team outcomes is established, the following chapter takes a more detailed look at team effectiveness. I integrate the model I develop into previous work on team effectiveness and develop a set of testable hypotheses.

A BROAD VIEW OF TEAM EFFECTIVENESS

This chapter develops a theoretical explanation of the mechanism by which individual actions are connected to team outcomes. The discussion expands on the general framework presented in Figure 2 by taking a detailed look at the constructs associated with each of the boxes and developing propositions concerning their theoretical interconnection. In the next chapter I look at measurable variables associated with each construct and develop testable hypotheses concerning their relationship.

What do I mean by a team?

Before developing the framework connecting individual behavior to team effectiveness, it is necessary to define what I mean by a team. The terms *team* and *group* are often used interchangeably. For example, Hackman (1987) entitles his chapter in the *Handbook of Organizational Behavior* "The Design of Work Teams" but uses the term "group" as a catch-all for the many different possible forms of team such as "quality circles, autonomous work groups, project teams, and management task forces" (p. 315). He does not make a distinction between groups and teams. Other authors do make a distinction. Teams are sometimes differentiated from groups by their structure and/or their effectiveness and ability to create synergy. For example, Cook, Hunsaker, and Coffey (1997, p. 335) define the following differences between groups and teams. They say groups have formal established leadership, individual accountability, and diverse skills. Teams, on the other hand, have shared roles, shared and individual accountability, and complementary skills. Furthermore, the performance of groups is the sum of individual outputs, while the performance of teams is collective and synergistic.

I will use the terms *group* and *team* interchangeably, however, I limit the scope to the following definition: "a distinguishable set of two or more individuals who interact

interdependently and adaptively to achieve specified, shared, and valued objectives" (McIntyre and Salas, 1995, p. 13). This definition has three main components: interdependence, common goals, and adaptiveness.

Outline of the Argument

I start by examining the connection between collective behavior and team effectiveness. Current research tends to treat collective behavior as a set of routines. There is an implicit assumption that once group members know a routine, the behaviors required to implement the routine will follow. Behaviors, however, are mediated by cognition. A group member's behavior depends on that person's perceptions of the group. I argue, as does Edmondson (1996), that group members often perceive the collective behaviors characteristic of effective groups as risky. As such, group members must share a sense that the group is a safe place and that they can trust their colleagues, otherwise they will not be willing to engage in the type of behavior characteristic of high-performing groups.

A shared understanding of the group as safe and trusting is developed through a sensemaking process whereby group members interpret individual actions to create an understanding of the group. Every action in a group contains information about the nature of relationships within the group (McGrath, 1984). For example, the group may be following a problem-solving procedure, however, the manner in which ideas are treated can vary widely from group to group. One group may embrace minority opinions while another may dismiss them. Although both groups are engaged in problem solving, the information about the worth of individual ideas is markedly different. Group members make sense of this information to develop an understanding of how safe it is to present minority opinions. Understanding how a sense of safety and trust are developed, requires an understanding of the relational behaviors likely to make a person feel safe and trusting.

I argue that caring behaviors represent a set of behaviors likely to generate a shared sense of safety and trust.

Caring behaviors represent choices, either conscious or not, that group members make about the character of their actions. When they choose to act in a caring manner, their teams are more likely to develop characteristics found in highly effective teams, e.g., commitment, trust, openness, and synergy. Since people will tend to reciprocate caring behaviors, caring is self-amplifying, i.e., a small act of caring can build to make a large difference in a group.

Because caring behaviors can be chosen, and when chosen they can be magnified, interventions can be designed to inject caring behaviors and kick start a cycle of caring that spirals in a positive direction. One such intervention is a structured peer appraisal. Peer appraisals offer many opportunities to display caring behavior, e.g., providing constructive feedback that shows concern for the recipient's growth is an act of caring, thus, they have the potential to start a cycle of increasing displays of caring behavior.

Collective Behavior and Effective Teams

In this section I focus on the connection between group level behaviors and effective teams. The purpose of this section is to establish a connection between collective behavior and team effectiveness, and examine the types of collective behavior associated with highly effective teams. In later sections I argue that many of the observed characteristics of collective behavior in highly effective teams are properties that emerge from individual level action.

Katzenbach and Smith (1993) studied 47 teams and interviewed hundreds of people in a comprehensive study of teams. They found that highly effective teams learn each other's

jobs, thereby increasing flexibility. Highly effective teams take advantage of unplanned events and failures to learn and mobilize themselves to move forward. They are willing to take risks and are not afraid to fail. They seek outside information to challenge the team and prevent them from getting into a rut; and they recognize and value conflicting views.

Larson and LaFasto (1989) studied 27 teams in depth. They found that effective teams have a system for raising issues not on the agenda. The implication of this statement is that team members engage in raising and discussing issues as they arise. Another collective behavior identified by Larson and LaFasto is a constant pursuit of continuous improvement, which includes reflection on past performance.

Druskat (1996) studied 20 self-managed teams in depth. She was looking for patterns of behavior, which she called competencies, that distinguish highly effective teams from average teams. She found that team members confronted members that broke group norms. Although conflict resolution did not distinguish between highly effective and average teams, the permission to engage in conflict was found to make a difference. In the superior teams, members felt free to raise issues while the average teams felt that they had to maintain harmony. One of the most important behaviors distinguishing high-performing teams was attention to feedback. This included behaviors that involved seeking and processing feedback about the job as well as providing feedback to each other. Highly effective teams were concerned about self evaluation as evidenced in the feedback seeking behaviors above as well as in behaviors such as observing other teams and comparing themselves. Highly effective teams also displayed supportive behaviors, were concerned about each other, and would help each other out.

Based on the study of teams in two Fortune 100 companies, Watkins and Marsick (1993) identified team behaviors characteristic of high-performing teams. High-performing teams

engaged in constructive controversy where they were able to surface and integrate differing perspectives. They also engaged in experimentation. Teams were not afraid to move forward without all the knowledge and expertise they needed. They proceeded by trial and error. The highly effective teams engaged in activities that extended beyond their boundaries, e.g., they sought feedback and solicited help from outside the team. They observed others as well as taught others what they had learned.

There are some common threads in collective behavior across these studies. Highly effective teams reflected on their performance. They sought and used feedback to learn and continually improve. They were not afraid to experiment or take risks. They were able to discuss their failures and weaknesses openly and viewed them as opportunities to learn and improve. Finally, they were able to confront each other and engage in constructive controversy, which helped surface and integrate differing perspectives.

These collective behaviors correspond well with those defined as learning-oriented behaviors by Edmondson (1996). In a study of team learning, Edmondson identified the following collective behaviors as representative of learning: asking questions, seeking feedback, discussing errors, planning subsequent actions, and monitoring results. For the sake of simplicity, I will use Edmondson's terminology and refer to the collective behaviors associated with highly effective teams as *learning-oriented behaviors*. This discussion leads to the following proposition:

> P1: The performance of self-managed teams is directly related to the degree to which they engage in learning-oriented behaviors.

Behavior is Mediated by Cognition

Having established a connection between learning-oriented, group-level behaviors and effective teams, this section now examines the effect of group cognition on learning-

oriented behaviors. Researchers often discuss collective behaviors as though they were routines that effective teams can implement; there is little attention paid to the mediating effects of cognition on behavior in small groups (Fiske and Goodwin, 1994). For example, Watkins and Marsick (1993, p. 115) make the following suggestion for improving team learning:

> The best approach to enhancing team learning is real-time feedback while teams are working together. Teams can do this on their own, by generating a list of practices they want to improve and then stopping their work periodically to look at what they are learning. Real-time feedback, however, is not effective unless members learn how to give and receive feedback without getting defensive. Outside facilitators usually make real-time feedback sessions more effective, because they can help team members learn these feedback skills and because they can often raise difficult issues that are undiscussable.

Watkins and Marsick suggest that implementing a routine that (1) lists practices to be improved, and (2) examines those practices periodically, will help increase team learning. They also acknowledge that some issues may be undiscussable and suggest an outside consultant to help raise those issues. There are two assumptions that underlie this suggestion and those of other researchers: 1) collective behavior, in this case reflection and processing feedback, can be carried out by following the steps in a prescribed routine; and 2) that imperfections in carrying out the routine are the result of skill deficits.

Although both these assumptions may be reasonable to some extent, they do not recognize that people can engage in routines to varying degrees. Cognitive factors play a role in determining the quality with which a routine will be implemented (Edmondson, 1996).

For example, Kahn (1990) found that psychological safety contributes to the degree to which a person engaged in their work. Thus, group members may go through the motions of the prescribed routine without being fully engaged; e.g., they may withhold information. From a cognitive perspective, this deficiency is not necessarily connected to a skill deficit. People may withhold information because the perceived costs of providing it are too high. For example, Tesser and Rosen (1975) provide evidence that people will withhold bad news if they fear being evaluated negatively as a result of communicating this news.

Effective Behaviors May be Perceived as Risky

Understanding the collective routines of highly effective teams is insufficient to create an effective team because participating in these routines poses a number of potential costs to group members that may keep them from becoming fully engaged. For example, seeking feedback and reflecting on performance are behaviors associated with learning (Senge, 1990; Vaill, 1996). To process the feedback and improve as a result, requires that group members engage in discourse that challenges tacit beliefs and meaning systems and replaces them with new meaning systems based on shared information and understanding (Barrett, Thomas et al., 1995). Engaging in this type of discourse is not necessarily an easy thing for people to do. Argyris (1990) has studied defensive routines for over two decades and has repeatedly documented a reluctance to confront assumptions, beliefs, and actions that perpetuate errors; because doing so can lead to embarrassment or threats to one's self concept.

Besides the threat of embarrassment posed by reflective discourse, there are also potential costs associated with delivering "bad news" (Tesser and Rosen, 1975). Tesser and Rosen (1975) identify guilt, fear of negative evaluation, and negative affect as potential costs. When the transmission of bad news results in an "inequitable fate" of the recipient, the

sender may feel guilty and thus may be reluctant to provide such information. People also avoid providing bad news when they believe that doing so will result in being evaluated negatively. Finally, people adopt a more negative mood when delivering "bad news" and thus are more likely to avoid doing so. Thus, engaging in reflective discourse is risky in the sense that it imposes potential psychological costs on the participant.

Highly effective groups are also willing to experiment and take risks. These behaviors involve the potential for failure, which poses a possible threat to one's identity (Birney, Burdick et al., 1969). From a social interactionist perspective, we derive our identity through social interaction (Hormuth, 1990). When a person acts, he or she evaluates that action by examining the reaction of others. Some people may anticipate that others will view failure negatively, thus, engaging in behaviors that are new and which might result in failure, may be perceived as a potential threat to one's self-concept (Birney, Burdick et al., 1969; Teevan and Smith, 1975).

Finally, highly effective groups are able to confront each other and engage in constructive controversy to surface and integrate differing perspectives. Constructive controversy requires a willingness to expose one's point of view (Senge, 1990; Tjosvold, 1995). Doing so, however, brings the possibility that group members will challenge one's point of view. Since we build our perspectives over a lifetime, we often become committed to them (Hormuth, 1990). They become a part of our identity. Exposing these perspectives poses two threats. First, there is the threat that others will evaluate us based on our perspective; e.g., they may see us as ignorant, radical, prejudiced, etc. Second, there is a threat that others will challenge our perspectives. Our view of the world, which we spent a lifetime developing, may be called into question (Argyris, 1990).

The costs discussed to this point represent psychological threats. These are mainly costs involving one's identity or psychological state. It is also possible to incur political costs. These represent costs associated with one person attempting to gain an advantage over another. Engaging in learning-oriented behaviors requires discussion of potentially sensitive and damaging information. If one teammate attempts to gain personal advantage, engaging in learning-oriented behaviors could literally pose a threat to one's career.

A cognitive perspective suggests that group members will weigh the perceived risks of engaging in learning-oriented behaviors before acting. To the extent that group members perceive the group as imposing minimal costs, they will more fully engage in these behaviors. This leads to the following proposition:

> P2: The extent to which group members are willing to engage in learning-oriented behaviors depends on the perceived costs imposed by the group.

Macro cognitions emerge from micro behavior

Having established a connection between group cognition and group behavior, I now examine the mechanism by which group cognition emerges from individual behavior. From a social-interactionist perspective (Layder, 1994), collective cognitions are emergent phenomena, as are the collective behaviors they influence. Characteristics of a group are not something we can magically infuse into the group, developing them requires work on the part of each group member. Louis and Yan (1996) describe the work of creating an environment that poses minimal threat (i.e., creating a sense of safety) as bringing up a boundary. The image is one of group members actively constructing a sheltered space

within which they can function effectively. This happens act by small act through a process of sensemaking (Weick and Bougon, 1986). Weick explains:

> Action and mapping have a close relationship. When people build cognitive maps, they start with outcomes, small experiments, and consequences that are produced either by one's own action or by that of someone else. These perceived regularities form the raw materials for cognitive maps (p. 105).

A familiar example of how one's sense of another person emerges out of a series of interactions can be found in the relationship building process (Gabarro, 1987; Golembiewski and McConkie, 1975). Self-disclosure is important to building relationships and involves a series of reciprocated risk-taking behaviors (Jourard, 1971; Luft, 1984). One person takes the risk to self-disclose, a second person responds in a way that demonstrates the self-disclosure will not result in harm and reciprocates by making a self-disclosure. The cycle repeats with each person growing to trust the other more with each iteration, thus, he or she becomes more willing to disclose information that is potentially damaging. Although this is a dyadic example, the same process of developing a cognitive map occurs from the interactions within a group. Group members develop cognitive maps by either participating in an interaction, or through social learning (Bandura, 1977) whereby one only need observe the interaction of other team members.

This perspective has implications for the way we understand teams in organizations. Much of the literature on teams has an underlying assumption that it is management's responsibility to create the conditions for an effective team. Although this cannot be denied, a social-interactionist perspective suggests that it is only half the picture. A number of researchers have called for more attention to the responsibilities of group

members for determining their outcomes (Fuhriman and Burlingame, 1994). For example, work on substitutes for leadership at the individual level recognizes each individual as being responsible for self leadership (Manz and Sims, 1980); and, in her recent study of self-managed teams, Druskat (1996) finds that there is a "need for self-managing teams to take ownership of their development and performance" (p. 34). She also recognizes that we need to understand the processes by which the competency to do so arises. This discussion leads to the following proposition:

> P3: Characteristics of a group such as a mutually shared sense of safety and trust emerge from the individual acts of group members.

Individual Behavior

The question now becomes, "What are the behaviors that lead to characteristics of highly effective teams?" To understand this, this section takes a closer look at behavior in a group. Any action in a group is a communication that contains a task component and a relationship component (McGrath, 1984). The task component of a communication represents the content of what is being done or said, while the relationship component represents the interpersonal aspects. For example, a group member may engage in decision making with the team, however, the manner in which he or she does so will relay information about this person's relationships with teammates. If contributions are short and body language conveys annoyance with the process, teammates may perceive this as lack of interest in the work of the team—an inference that will have consequences for relationships within the team.

Before continuing, I need to define what I mean by relationship. This term can be confusing since it is often associated with some form of attraction. The term relationship,

as I use it, refers to *working* relationships. Gabarro (1987) defines a working relationship as, "an interpersonal relationship that is task-based, nontrivial, and of continuing duration" (p. 173). Thus, *relationship* refers to the ability of group members to work together to accomplish their task.

The relational component of behavior should not be confused with maintenance behaviors. Maintenance behaviors typically represent actions that focus on facilitating group process, e.g., gatekeeping, harmonizing, and compromising (Cook, Hunsaker et al., 1997). As mentioned above, each of these behaviors contain a relational component that is interpreted to develop a sense of *team* (Fletcher, 1994), whereas the task component of these behaviors is to maintain the team process. One way of understanding the relational component of a behavior is that it represents the quality and interpersonal characteristics of the behavior.

Much research on teams in organizations focuses on the team's patterns of task behavior (McIntyre and Salas, 1995). Decision making and problem solving represent two very common areas of research on patterns of collective behavior focused on the task component (McGrath, 1984). This research tends to focus on the procedures by which problems are solved or decisions made. Researchers sometimes recognize that relational factors affect these processes, however, they often mention these factors in a very cursory manner and discuss the outcomes of effective relationships rather than the behaviors that produce the outcomes. For example, Hackman (1987) discusses group synergy and defines it as group interaction processes that reduce process losses and increase process gains. Creating synergy, which is a relational process, is seen to moderate the link between inputs and task performance processes. Although Hackman (1987) recognizes

the importance of this process, he offers little insight into the behaviors by which synergy is created.

Hackman is not alone in recognizing the importance of relational processes but failing to explain how they develop in effective teams. Katzenbach and Smith (1993) do not distinguish between task and relational communication per se, but they do distinguish between real teams and highly effective teams. The difference between these two types of team appears to be that highly effective teams have also mastered the relational work, e.g., the highly effective team has members that are committed to each other's growth and development. Although the importance of relationships is implied, the discussion focuses on the outcomes of the relationships (e.g., commitment), and quite openly acknowledges that they do not know how those outcomes develop.

Druskat (1996) identifies two categories of process related to team effectiveness, performance strategies that affect the accomplishment of the task, and interpersonal behaviors (i.e., relationship building processes). Although she identifies competencies in each of these areas, she does not provide insight into the behaviors by which the effective teams developed these competencies and recognizes this as an area for future research.

Recognizing the need for research focused on the relational factors of effective teamwork, McIntyre and Salas (1995) set out to define the behaviors that represent the relational factors as well as conditions that enable their expression. They define the relational aspect of teams as "teamwork," which consists of the "activities that serve to strengthen the quality of functional interactions, relationships, cooperation, communication, and coordination of team members" (p. 15). They go beyond other researchers and define specific relational behaviors that comprise teamwork (e.g., providing feedback, support, and effective communication) and show the connection to team effectiveness.

McIntyre and Salas' (1995) study is one of the few that attempt to relate individual behavior to team effectiveness. Nevertheless, we do know that relationships play an important role in generating characteristics associated with effective teams. For example, the nature of relationships has been associated with building trust (Golembiewski and McConkie, 1975), cooperation (Tjosvold, 1995), the level of individual energy available to work on the task (Kahn, 1990), and the degree of mutual commitment (Altman and Taylor, 1973). Relational behaviors, thus, are not only a nicety but are likely to be a necessity from which the sometimes "mysterious" characteristics of effective groups emerge.

This discussion leads to the propositions that follow. Based on the above discussion, proposition 4 expands on proposition 3 by stating the specific element of individual behavior (i.e., the relational component) that is associated with effective teams. Proposition 5 expands on propositions 3 and 4 by recognizing that, in addition to being the source of emergent characteristics, relational behaviors are likely to be associated with the level of engagement in group processes.

> P4: Group characteristics typical of highly effective teams emerge from the relational component of individual acts.

> P5: The more a group's members exhibit relationship building behaviors, the more highly engaged they will be in collective behaviors that promote team effectiveness.

The Role of Peer Feedback

At first thought we might conclude that it would be difficult for managers to influence the relational component of behavior in a team because it is, in part, a function of personality.

For example, Goleman (1995) shows that empathy is related to a person's emotional intelligence, which varies among people. Berry and Hansen (1996) studied people who experience life with differing amounts of positive affect. They found that positive affect people were more likely to engage in social interaction. Simpson, Rholes, and Phillips (1996) studied people with differing attachment orientations. Avoidant people tend to withdraw from intimacy, ambivalent people are conflicted about relationships, and secure people use relationships as a base of comfort. They found that avoidant men were likely to be less warm and supportive in a conflict situation.

Although it is true that people have different propensities to exhibit positive relational behaviors, a fortunate property of these behaviors is that they beget similar behaviors. The influence of personality can potentially be overcome by the social dynamics of the situation. Social exchange theory (Homans, 1973) suggests that relational behaviors are likely to be reciprocal in nature, i.e., when someone receives a positive relational behavior it is likely to be perceived positively and thus matched with a similar act. Empirical research has indeed found such an effect. For example, Krebs (1970) found that people were more likely to exhibit altruistic behavior soon after they had observed someone else engage in a similar behavior. Kahn (1993) found that workers in a social services agency were more willing to care for their clients when their supervisors showed caring behaviors. These examples demonstrate that positive relational behaviors form a self-amplifying loop.

We should be able to take advantage of the self-amplifying property to generate positive relational behaviors of increasing frequency by injecting a small amount of these behaviors into the system. Certainly, factors such as individual propensity and capacity for engaging in these behaviors will affect the rate at which they are amplified in the group, however,

they are not likely to completely counteract the amplifying effects of social exchange. The question now becomes, how do we inject positive relational behaviors into a group?

The Use of Peer Feedback to Increase Positive Relational Behavior

A number of behaviors defined above can be elicited by structuring a peer feedback exercise for the group. Feedback in itself is a behavior that builds relationships (Luft, 1984). By focusing team members on providing feedback aimed at promoting individual development, rather than evaluation, a structured peer feedback intervention injects this element of building relationships. Peer feedback can also build relationships in other ways. Taking responsibility for one's actions and providing support to teammates both serve to strengthen relationships (Lewicki and Bunker, 1996). These can both be encouraged through the design of the peer appraisal process. For example, team members can be asked to work together on a plan for assisting each other with behavior change. Another relationship building behavior, validation (Gabarro, 1987), can be built into the process by emphasizing the importance of a balance between positive and negative feedback. This discussion leads to the following proposition:

> P6: Over time, an appropriately designed peer feedback exercise increases the level of positive relational behaviors displayed within a group.

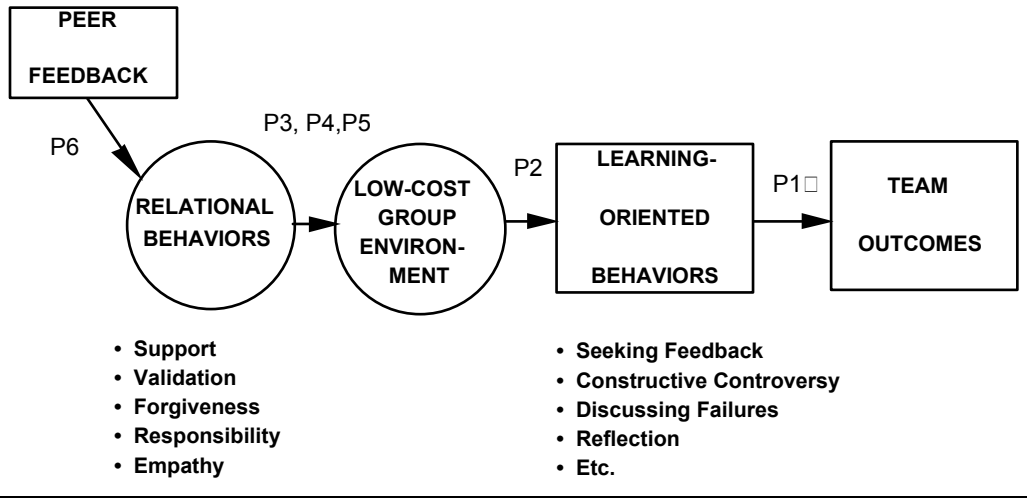
Summary and Research Model

Figure 3 summarizes the discussion to this point. Positive relational behaviors lead to a sense of being safe, i.e., a climate is created where people feel they can be themselves and trust their teammates. A climate that does not pose undue costs to one's identity or career, enables group members to engage in learning-oriented behaviors, which may

otherwise be perceived as too risky. Studies of highly effective teams have shown that learning-oriented behaviors are key to their success, thus, we would expect teams with more frequent caring behaviors to also be more effective.

Based on social exchange theory (Homans, 1973) combined with social learning theory (Bandura, 1977), positive relational behaviors are expected to be self-amplifying. Each time a group member displays a positive relational behavior that is reinforced, it increases the propensity of others to display such behaviors. Because these behaviors are self-amplifying, it should be possible to effect change in a group by injecting positive relational behaviors into the dynamics of the group. A structured peer feedback exercise is one possible mechanism for "kicking" the cycle in a positive direction.

Figure 3: General Research Model



A DETAILED LOOK AT TEAM EFFECTIVENESS

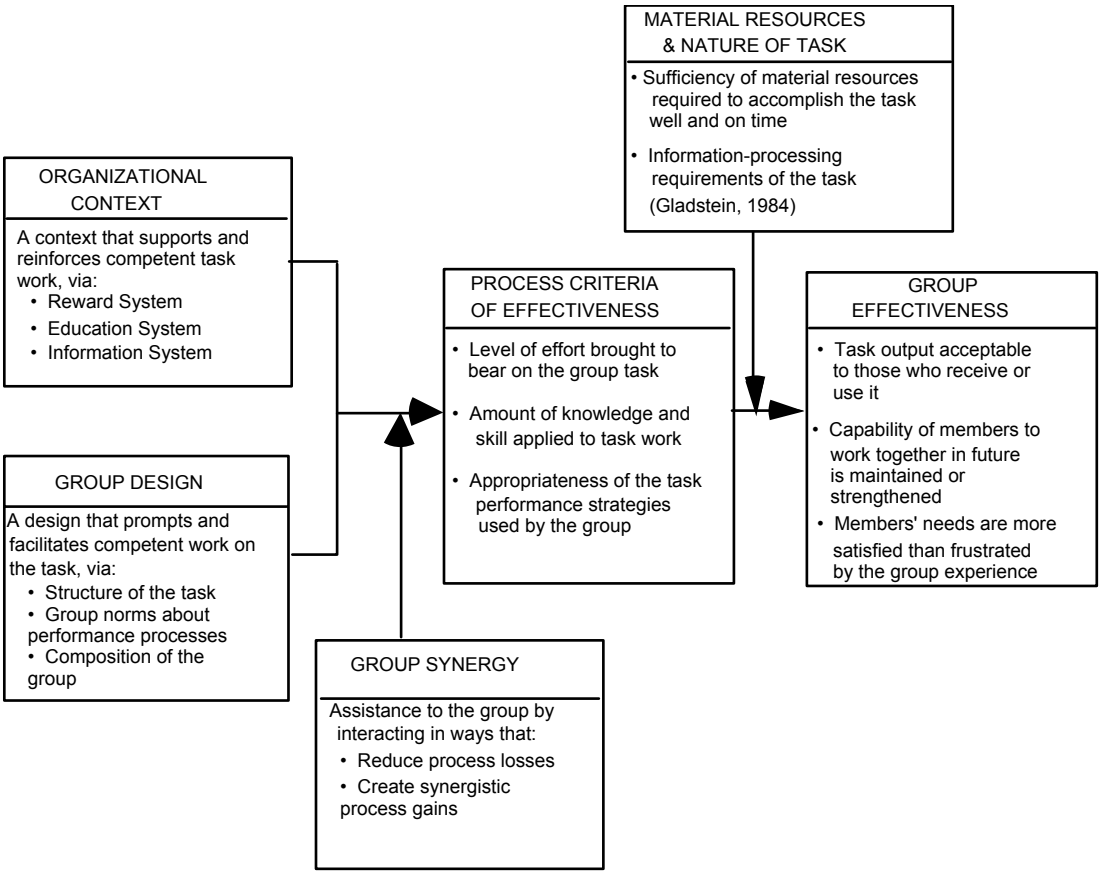
The previous chapter provides a broad overview of the theoretical connection between individual behavior and team effectiveness. In this chapter I look more closely at team effectiveness. The purpose of this chapter is to examine specific variables identified as important to each of the theoretical constructs outlined in the general research model shown in Figure 3. Once the specific variables are defined, I look at the relationships among them and develop a set of hypotheses that form the basis of this research.

Team Effectiveness

One goal of this research is to understand the connection between individual action and team effectiveness. Thus, it is important to define what is meant by team effectiveness and identify its antecedents. A widely accepted model of team effectiveness was developed by Hackman (1987) and is shown in Figure 4. I use this model as a starting point for a discussion that leads to a revised model of effectiveness which integrates the framework presented in the previous chapter. The purpose of developing such a model is to clearly lay out the variables of interest in this study. Once this is accomplished I discuss the hypothesized relationships among the variables in the model.

Hackman's (1987) model considers the external factors of (a) organizational context and (b) group design, as inputs to group effectiveness. These are mediated by group processes, which directly affect group outcomes. The ability of the group to turn inputs into outputs is moderated by what Hackman calls group synergy as well as the nature of the task and available resources.

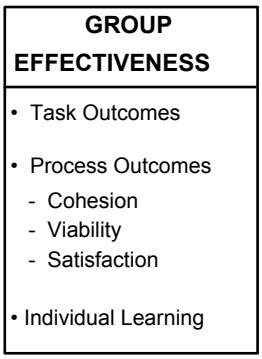
Figure 4: Model of Group Effectiveness (Source: Hackman, 1987)



Hackman (1987) identifies three indicators of group effectiveness: task outcomes, ability of the team to continue working together (viability), and member satisfaction. For purposes of this discussion, I have chosen to categorize these indicators into task outcomes and process outcomes. Task outcomes are those directly related to the quality of the group's product and process outcomes are those related to the group's dynamics. The ability to continue working together and satisfaction, thus, are process outcomes. In addition to these two process outcomes, I consider an additional outcome of group

cohesion. Cohesion has been widely studied and is considered an important outcome of group processes (Roark and Sharah, 1989).

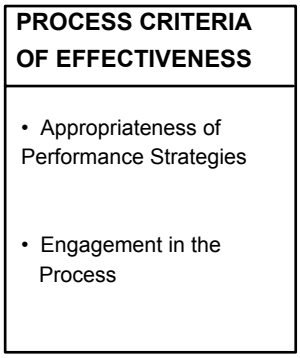
In addition to task and process outcomes, an important category of effectiveness, not explicitly considered by Hackman, is the ability of a team to produce individual learning. Teams have been widely studied in the educational literature for their ability to enhance individual learning (Slavin, 1986), yet this outcome is often not considered in the organizational literature. In today's business environment learning at all levels is a necessity (Hall, 1996; Vaill, 1996), thus, I include it as an important outcome of an effective team. This discussion leads to the revised set of outcomes that characterize group effectiveness, shown here:



Process Criteria of Effectiveness

Team outcomes are produced through effective group processes. Hackman (1987) identifies three elements of process effectiveness: effort, application of skill, and appropriateness of the routines for accomplishing the task. The degree of effort and application of skill to the task are analogous to the concept of engagement discussed in the previous chapter. Under conditions that foster individual engagement, people will become more involved in their work and apply more of their full selves to the task (Kahn, 1990). As depicted below, I characterize the process criteria of effectiveness in terms of

appropriateness of the strategies used and the degree to which group members are engaged in these processes.



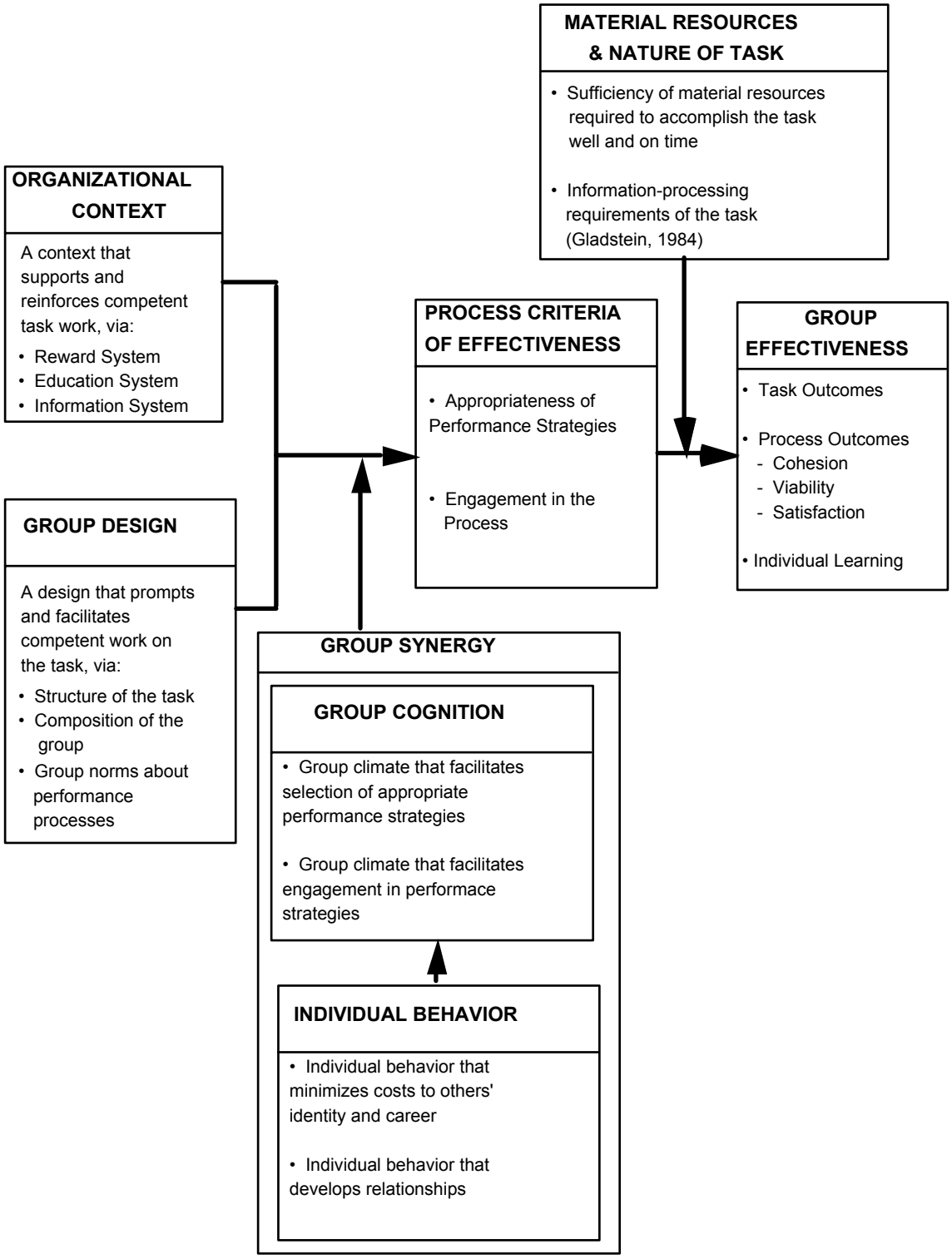
Antecedents to Process Effectiveness

In defining antecedents to process effectiveness I offer a refinement of Hackman's (1987) model that integrates the discussion from the previous chapter and focuses on individual action. Hackman's (1987) model views group synergy as moderating the effect of organizational context and group design. In his description of the model, Hackman (1987) offers much insight into external factors that can be manipulated by management but offers little insight into group synergy. The discussion of the previous chapter suggests that group synergy can be thought of as individual action leading to a group climate that facilitates the selection of appropriate group processes and engagement of group members in those processes. Combining this discussion with the above discussion leads to a revised model of group effectiveness as shown in Figure 5.

Learning-Oriented Behavior and Group Effectiveness

In this section I develop hypotheses concerning the relationship between group outcomes and the group processes discussed in the previous chapter as learning-oriented behaviors, which are appropriate strategies for complex tasks requiring interdependence among group members.

Figure 5: Revised Model of Group Effectiveness



Task Outcomes

The appropriate processes needed for a group to be effective in its production of task outcomes depends on the nature of the task (Gladstein, 1984). Tasks that are complex and require a high degree of interdependence will require processes that match the information processing requirements of the task (Gladstein, 1984). Learning-oriented behaviors as described in the previous chapter represent processes with high information processing capacity. We would expect learning-oriented behavior to be appropriate when the task requires a high degree of interdependence and is complex. Furthermore, group members can devote varying degrees of energy and themselves to these behaviors, i.e., they will be variously engaged (Kahn, 1990). This leads to the following hypotheses:

> H1: When the group task is complex and requires interdependence among group members to complete, groups that participate in more learning-oriented behaviors will produce products that are more highly rated by those who receive or use them.
>
> H2: The greater the degree to which group members are engaged in completing their task, the more highly rated will be the products produced by the team.

Learning

Many learning-oriented behaviors have also been found to foster individual learning. A team that engages in constructive controversy is integrating multiple perspectives through discussion. Johnson and Johnson (1985) found that the discussion process "promotes the discovery and the development of higher quality cognitive strategies" (p. 115), i.e., the exposure to different perspectives promotes cognitive development (Nastasi and

Clements, 1991). Organizational research has also shown that exposure to others' perspectives can lead to a more cognitively complex understanding. For example, Bartunek et al. (1996) found that people who participated in a change process, and thus were exposed to various perspectives on the change, developed a more complex understanding of the situation and were more able to delineate and differentiate the issues involved with the change. In a study that explores workplace design, Penn (1989) found that members of self-managed teams operate at a higher level of cognitive and social development than those who work as individual contributors. The increased level of cognitive development is a result of the exposure to teammate's perspectives through the discussion process.

Learning-oriented behaviors also involve reflecting on group process and processing feedback. Both of these are associated with individual learning and adult development (Vaill, 1996). Kolb (1984) has developed a widely accepted model of the process by which people learn from their experiences. Reflecting on experience and placing that experience into a framework are important processes involved in learning. As a group reflects on its processes and discusses its failures, each group member is provided an opportunity upon which they can reflect and learn.

The above discussion shows that learning-oriented behaviors are directly related to behaviors that promote individual learning (Johnson and Johnson, 1985). It seems reasonable to expect that individual learning would be greater in teams that are more highly engaged in learning-oriented behaviors. Also, it seems reasonable to expect that teams where individual learning is greater would be more effective at producing task outcomes. This discussion leads to the following hypotheses:

H3: Individual learning within a group is directly related to the level of learning-oriented behavior displayed by the group.

H4: The team's effectiveness at producing task outcomes is positively related to individual learning.

Group Climate and Learning-Oriented Behavior

Proposition 2, developed in the previous chapter, suggests that learning-oriented behaviors develop in a group climate that minimizes the potential costs of engaging in these behaviors. In this section, I discuss two characteristics of a group's climate that reduce costs, a sense of safety and trust. This discussion provides an explanation for the link between group synergy and group process criteria of effectiveness shown in Figure 5.

Although group members may intellectually know which behaviors lead to effectiveness, their assessment of the risks involved will determine their willingness to engage in those behaviors. The previous chapter identified two types of risk associated with engaging in learning-oriented behavior, psychological and political. Each type of risk requires an independent assessment of the group before team members will engage in learning-oriented behaviors. First, a person must assess how safe it is to be oneself in the group (Kahn, 1990). If perspectives are exposed and weaknesses surfaced, one needs to assess how the group will evaluate them. Will they make negative evaluations and diminish one's standing within the group, or will they be empathetic, understanding, and value one's perspective and efforts. In other words, how much of a threat will they pose to one's self-concept.

Second, a person must assess the degree to which he or she can trust that other group members will not attempt to achieve personal gain as a result of engaging in the behavior,

i.e., they will not use information or potential failures to gain personal advantage or to diminish the standing of a group member in the eyes of others outside the group.

Group Climate of Safety and Trust

Safety refers to group members' beliefs about whether they can be themselves without fear of negative consequences to self-image, status, or career (Kahn, 1990). Edmondson (1996, p. 26) defines *safety* as the degree to which "the social climate is conducive to interpersonal risk." These understandings of safety imply a cognitive component in the calculation of risk. Group members use a mental model of the group that relates behaviors to their consequences when deciding whether to engage in a particular behavior.

There is little research that addresses the link between a sense of safety and the degree to which group members are able to engage in learning-oriented behaviors. Nevertheless, there is some evidence that a sense of safety leads to more effective behaviors. Kahn (1990) found that when people feel safe, they are able to bring more of themselves into their work. Burningham and West (1995) found that group climate was an important predictor of innovation. One element of group climate they measured was a feeling of safety to participate. They found that higher levels of safety led to higher levels of innovation. Finally, in a study designed to directly measure the effect of a sense of safety on the frequency of learning-oriented behaviors, Edmondson (1996) found that safety was a strong predictor of learning-oriented behaviors within the group.

Trust is often considered an integral part of a safe group climate that facilitates group member engagement in learning-oriented behaviors. Empirical evidence indicates that trust is an important ingredient in generating the type of behaviors characteristic of effective teams. For example, McAllister (1995) found that trust is important for developing cooperative relations. Trust affects the development of interpersonal

relationships (Gabarro, 1979; Gabarro, 1987), patterns of behavior in groups (Golembiewski and McConkie, 1975), and an individual's motivation, perception, and ability to solve problems (Gibb, 1978). Research on effective teams has also found that trust is a critical factor that distinguishes them from lower-performing teams. The above discussion leads to the following hypothesis:

> H5: The more a group's climate is characterized by a shared sense of safety and trust, the more it will engage in learning-oriented behaviors.

Individual Behavior and Group Climate

Propositions 3 through 5 address the connection between individual action and group climate. These propositions suggest that the relational component of individual interaction is an important factor in generating group climate and contributes to the degree to which group members will engage in group processes. In this section I develop hypotheses concerning the relation between caring behavior and the development of a shared sense of safety and trust. I also develop an hypothesis concerning the relationship between caring behavior and the degree to which group members will be engaged in learning-oriented behaviors.

Safety and Trust are Built Through Teamwork

Teamwork is about relationships within the group, and safety and trust are both precursors and outcomes of team member relations (Golembiewski and McConkie, 1975); they are integrally woven into the fabric of developing relations. Relational work is often devalued in organizations, however, the importance of relational work (i.e., teamwork) is beginning to receive heightened attention (Fletcher, 1994). We are beginning to recognize that it is through our interconnection (i.e., relationships) that we begin to develop a sense of safety and trust. For example, Kahn (1996), arguing from an attachment theory perspective,

points out that employees need a "secure base" from which they can "venture into uncharted territory, [and] create ways to add value and to innovate. . ." (p. 161). Such a secure base, where people feel they are allowed to take risk without fear of abandonment, is rooted in the quality of an employee's relationships and is most likely to be found in work groups (Kahn, 1996).

Louis (1996) discusses the need for collective safe havens, which she says involves cultivating "an ethos of respect in the way group members hold the task and treat one another (and themselves) as they do the group's work" (pp. 233-234). She explicitly points out that this does not imply *personal* relationships. Nevertheless, treating each other with respect is an element of teamwork and will affect working relationships.

Relationships, in the context of this discussion, are perhaps best understood as the quality of the interactive process, e.g., the extent to which interactions are respectful, supportive, and non-threatening. All actions within the group contain a component that conveys messages about the nature of relationships within the group (McGrath, 1984). As group members interpret these messages they develop a sense of the group as being safe and/or trustworthy. Thus, working relationships are built or destroyed, little by little, as every interaction is interpreted; i.e., the quality of interaction creates or destroys the sense of *team* (Fletcher, 1996). For example, if one exposes a feeling of fear about one's capability to complete a task and this is met with acceptance and support, the person's perception of the group as a place where it is safe to be oneself is likely to be increased.

One does not have to be a direct participant in an interaction to develop an image of the team's safety and trustworthiness. Social learning theory (Bandura, 1977) suggests that merely observing an interaction is sufficient for developing knowledge about the cause-and-effect between behavior and outcome. Since interactions within the group are public

events, they are observed by all team members and are likely to generate a shared sense of the group (Weick, 1993).

Caring Behaviors Generate Safety and Trust

To this point I have argued that characteristics of a group such as a climate of safety and trust are emergent from the quality of interaction within the group. The question now becomes, what specific behaviors generate a sense of the group as being safe and trustworthy?

Proposition 4 suggests that the relational component of individual behavior plays a role in developing a group climate that minimizes the cost of engaging in learning-oriented behaviors. A number of researchers have recognized the importance of relationship building actions to the effectiveness of teams (Smith and Comer, 1994; Smith and Gemmill, 1991; Tjosvold, 1995). For example, Louis and Yan (1996) say, "Edmonson's [sic] (1995) work [demonstrates] an association between groups in which members share a mental model of the group as a safe place and members engaging in learning-oriented behavior. We add to this the hypothesis that what leads to a sense of safety is a way of being with one another that is mutually respectful and self-respecting (Louis, 1996)" (p. 32). This provides us with an understanding of the general quality of behaviors that lead to safety but not the specific behaviors.

Other studies show specific behaviors associated with highly effective teams although they do not empirically show a connection to safety or trust. For example, people are more willing to be themselves, i.e., feel safe to take off their masks, when they feel they are being attended to and the listener is empathetic (Albrecht and Adelman, 1987). Druskat (1996) found that high-performing teams showed interpersonal understanding. This was evident in behaviors that demonstrated that members were perceptive and sensitive to

other members' attitudes, feelings, or situations. For example, team members would try to understand uncooperative members.

Rao, Thornberry, and Weintraub (1987) in a study of 48 self-managed teams in an organization that manufactured soft contact lenses found that high-performing groups had leaders that scored high on the "consideration" dimension of a leadership profile. The consideration dimension included items such as: "he is friendly and approachable, he does little things to make it pleasant to be a member of the group; he puts suggestions made by the group into operation; . . . he looks out for the personal welfare of group members. . ." Although this study focuses on leadership behaviors, I argue that these behaviors are instrumental in the team's outcome because they create an appropriate learning climate. There is no data provided concerning the behaviors of the team members, however, it is likely that the leader's behavior fostered similar behaviors among the team's members (Altman and Taylor, 1973; Krebs, 1970), thereby fostering greater productivity.

Podsakoff, Ahearne, and MacKenzie (1997) examined three components of organizational citizenship behavior on the performance of 40 teams in a paper mill. One component of citizenship behavior labeled "helping" consists of items such as: "Help each other out if someone falls behind in his/her work; and, Willingly give of their time to help crew members who have work-related problems" (p. 266). They found that helping behaviors were significant predictors of performance outcomes.

Burningham and West (1995) found that the level of enacted support in a team predicted levels of innovation. They found that the support had to be demonstrated through action. When support was verbalized but not enacted, it did not affect the group's innovation.

Butler (1991) interviewed 84 managers to develop a list of the conditions that lead toward trust. He then developed and validated a scale that tested these conditions of trust. Some of the conditions of trust were availability, consistency, and receptivity, all relationship building behaviors. Shaw (1997) argues that trust is vital to business success and defines three factors that lead to a sense of trust within an organization: concern for performance, acting with integrity, and showing concern for people.

The above research provides support for a connection between relationship building behaviors, the development of safety and trust, and team outcomes. The behaviors identified correlate closely with behaviors that Kahn (1993) identifies as caring behaviors, e.g., being supportive, showing empathy, and validating one's teammate (caring behaviors are identified more thoroughly in the next section). Kahn (1996) argues that caring behaviors build workplace relationships that provide a "secure base" for workers. This provides a possible explanation for the above research findings. The behaviors identified are caring behaviors that help build relationships and foster a sense of safety and trust. This sense of safety and trust permit team members to engage more comfortably in risky learning-oriented behaviors associated with highly effective teams.

Definition of Caring Behaviors

Caring behaviors are, thus, one of the micro-acts from which collective cognitions and behaviors of highly effective teams emerge. Attempts to affect group outcomes without considering the relational component of group interaction is like trying to adjust the intensity and character of a flame without considering the fuel source. Because caring behaviors are akin to the fuel source of highly effective teams, I now take a closer look at them. The definition of caring behaviors that follows draws heavily on Kahn's (1993) work, which describes the essence of caregiving as follows:

> The eight dimensions sketch a portrait of the caregiving process implicit in previous research, namely, that caregivers help others to help themselves toward growth and healing by simultaneously staying in relation with and keeping themselves apart from those others. Caregiving is a balancing act of attachment to and detachment from others, who are neither abandoned nor intruded upon as they go about their growth and healing.

In an empirical study of caregiving in a social service agency Kahn (1993) identified eight behavioral dimensions of caregiving: accessibility, inquiry, attention, validation, empathy, support, compassion, and consistency. These are briefly defined here. For a detailed description see Kahn (1993).

Accessibility is being available. In the context of a team this means attending group meetings, not being distracted during meetings, and being accessible outside of scheduled meetings.

Inquiry is asking about the needs and feelings of others.

Attention is actively taking an interest in others; listening to them, making eye contact, and showing that others are understood.

Validation is letting others know they are worthwhile, that their ideas and thoughts are valued.

Empathy is being able to take the perspective of others, putting oneself in their place.

Feedback is Kahn's dimension of support. As will be discussed below, I have chosen to break his support dimension into two areas. The first is providing feedback and useful

information that aid individual understanding and development. The second is instrumental support, which is described below.

Compassion is displaying warmth, and showing kindness.

Consistency is maintaining a caring posture over time. One is more than just a "fair weather" friend.

In addition to Kahn's (1993) eight dimensions of caring, I add the following three: forgiveness, taking responsibility, and instrumental support. If group members are to engage in learning-oriented behaviors they are likely to fail occasionally. When mistakes are made or behavior is unknowingly detrimental to the group, members must be willing to accept responsibility for their actions; they must attempt to change the behaviors that are harming the group. On the other hand, group members must, to some extent, be willing to forgive mistakes of their colleagues (Lewicki and Bunker, 1996). Lewicki and Bunker (1996) argue that these two behaviors are instrumental for creating resilience in trust, i.e., the ability to repair trust should it be inadvertently broken. Finally, most research on highly effective teams recognizes a need to provide instrumental support, i.e., to help each other out with the task when needed, in addition to support in the form of feedback as mentioned above (McIntyre and Salas, 1995). Thus, I add the following three definitions:

Forgiveness is a willingness to forgive mistakes and unintended behaviors that are harmful to the group.

Instrumental Support is help provided to teammates to help them with their task if they are having difficulty. This is one dimension of organizational citizenship behavior described by Organ (1988).

Responsibility implies that a person is willing to take responsibility for their behaviors and change them to help the group more effectively meet its goals.

Caring allows group members to feel connected while not being smothered—an important balance for effective groups (Smith and Berg, 1987). Thus, caring behaviors are instrumental in building relationships (Bennis, Berlew et al., 1973; Fletcher, 1994; Golembiewski and McConkie, 1975), and it is the nature of the relationships (i.e., do people feel safe and can they trust one another) within the team that determines whether group members will engage in the interactive process. The above discussion leads to the following hypotheses:

> H6: There is a positive relationship between the degree to which group members perceive caring behaviors as present in a group and the development of a group climate characterized by a shared sense of safety and trust.

> H7: There is a positive relationship between the degree to which group members perceive caring behaviors as present in a group and the degree to which they are engaged in group processes.

One final caution before moving on to the next section. The word caring often elicits images of intimacy and making someone feel good. Although these images may be associated with caring, caring does not necessarily imply either. Caring means treating others with respect and being concerned for their well being, this does not imply we must like the person. We can also act in a caring manner without making a person feel good. An excellent example of this is a person who refuses to engage in the often destructive

dance of co-dependence. Thus, a very caring behavior may be to kick an alcoholic out of the house.

Caring Behavior and Cohesion

As discussed above, caring behaviors serve to build working relationships within the team, thus, we would expect the level of group cohesion to increase with increased levels of caring behavior. For example, cohesion has been shown to result from behaviors such as empathy and acceptance (Roark and Sharah, 1989), both are dimensions of caring behavior. This leads to the following hypothesis:

> H8: There is a positive relationship between the degree to which group members perceive caring behaviors as present in a group and the level of group cohesion.

Consequences of Cohesion

Cohesion has a number of potential consequences For example, cohesion has been shown to be connected to group task motivation and satisfaction with the group (Greene, 1989). Cohesion has also been shown to contribute to individual learning in groups (Gabbert, Johnson et al., 1986). This leads to the following hypotheses:

> H9: There is a direct positive relation between cohesion and group task motivation.
>
> H10: There is a direct positive relation between cohesion and satisfaction.
>
> H11: There is a direct positive relation between cohesion and individual learning.

The Role of Peer Appraisal

In the previous sections I discussed caring behaviors as a class of relational behaviors that foster a safe and trusting group climate. These behaviors are ultimately under the control of each individual group member and very difficult for management to create as noted by Katzenbach and Smith (1993). This, however, does not mean that management cannot provide the group with tools they can use to manage their own performance. Proposition 6 suggests that a peer appraisal process is such a tool.

What Do We Know About Peer Feedback?

Feedback has been a widely studied phenomenon. Much of the research, however, is done in the context of a manager/employee relationship where the manager provides feedback to the employee for the purposes of motivation and improved performance (Cusella, 1987). Research done with groups generally takes two forms: either it is performance related and attempts to determine the characteristics of manager-delivered feedback that enhance team performance (e.g., Matsui, Kakuyama et al., 1987; Pritchard, Jones et al., 1988), or it attempts to determine the factors that affect the ability of peers to provide feedback about teammates (e.g., Fox, Ben-Nahum et al., 1989; Kane and Lawler, 1978).

Recent developments in the feedback process have seen innovations such as 360-degree feedback, which collects information from subordinates, peers, and superiors (London and Beatty, 1993). This type of system is mainly for individual management development and does little to promote team effectiveness. It also does not maximize the value of a team for promoting individual growth.

There is very little research on peer feedback systems designed to promote team effectiveness. There are some studies on peer feedback given for developmental purposes (Farh, Cannella et al., 1991; McEvoy and Buller, 1987), but these focus primarily on

individual satisfaction with the process. These studies do not provide insight into the connection between the peer feedback process and team dynamics.

Using the Peer Appraisal to Promote Caring Behavior

An outcome of the peer appraisal process that has not received attention is its potential to increase the level of caring behavior within a group. As discussed in the previous chapter, there are many aspects of the peer appraisal process that can elicit caring behaviors. For example, providing honest feedback demonstrates a concern for the growth and development of the recipient, this is a caring behavior that builds trust (Cooper, 1997). Because caring behaviors are self-amplifying, a peer appraisal designed to promote them should initiate a positive a cycle whereby they are increasingly reciprocated.

Even with a well-designed peer appraisal process, however, it is reasonable to assume that groups will engage in the process to varying degrees. To execute the peer appraisal effectively requires that the group take it seriously, which implies preparation, honesty, and a desire to improve. If the feedback is avoided to reduce tension, as is sometimes done (Blumberg, 1972), then caring behavior has been avoided and the ability of the peer review to promote caring behavior will be diminished. Furthermore, helpful feedback requires that the feedback giver be prepared to provide examples, answer questions, and present a balanced perspective (Stockton and Morran, 1981); these require thought and preparation. Finally, if group members do not treat the appraisal process as a means to learn and improve the team's effectiveness, then the benefits of the peer appraisal are likely to be diminished. This discussion leads to the following hypothesis:

> H12: Groups that engage in a peer appraisal and take it seriously, show a greater increase in caring behavior than groups that perform a peer appraisal but do not take it seriously.

Other Consequences of the Peer Appraisal

The impact of the peer appraisal goes beyond increasing the level of caring behavior within the group. Providing honest feedback is important for building relationships, which should lead to a greater attraction to the group. In a study that examined the effects of a peer appraisal on group dynamics Druskat and Wolff (forthcoming) found that the peer appraisal resulted in an immediate increase in cohesion.

The peer appraisal is also likely to affect the climate in the group. When the process is taken seriously and feedback given in a supportive manner, people will likely feel safer in the group and more trusting of their teammates. This discussion leads to the following hypotheses:

> H13: Groups that engage in a peer appraisal and take it seriously, show a greater increase in cohesion than groups that perform a peer appraisal but do not take it seriously.

> H14: Groups that engage in a peer appraisal and take it seriously, show a greater increase in group climate characterized by a shared sense of safety and trust than groups that perform a peer appraisal but do not take it seriously.

Finally, the peer appraisal process should directly affect group outcomes. Feedback is a critical component of performance at both the individual and group level (Matsui, Kakuyama et al., 1987; Zander, 1963). This leads to the following hypotheses:

> H15: Groups that engage in a peer appraisal and take it seriously, produce higher quality task outcomes than groups that perform a peer appraisal but do not take it seriously.

H16: Groups that engage in a peer appraisal and take it seriously, show higher levels of individual learning than groups that perform a peer appraisal but do not take it seriously.

Inputs to Group Effectiveness

The model of group effectiveness shown in Figure 5 shows a number of inputs to the group process that have been found to be associated with group effectiveness. These inputs include the group's structure (e.g., size, goal clarity, task, etc.) composition (e.g., heterogeneity, skills, etc.) and organizational level variables (e.g., rewards, support, degree of autonomy, resources, etc.) (Gladstein, 1984; Hackman, 1987). These variables will be controlled for by measuring them (McGrath, Martin et al., 1982).

Summary and Final Research Model

The above hypotheses are summarized in Figure 6 and Table 1. Caring behavior and the peer appraisal process are hypothesized to be important antecedents to other indicators of group effectiveness such as climate, group processes, and outcomes.

Figure 6: Research Model of Group Effectiveness

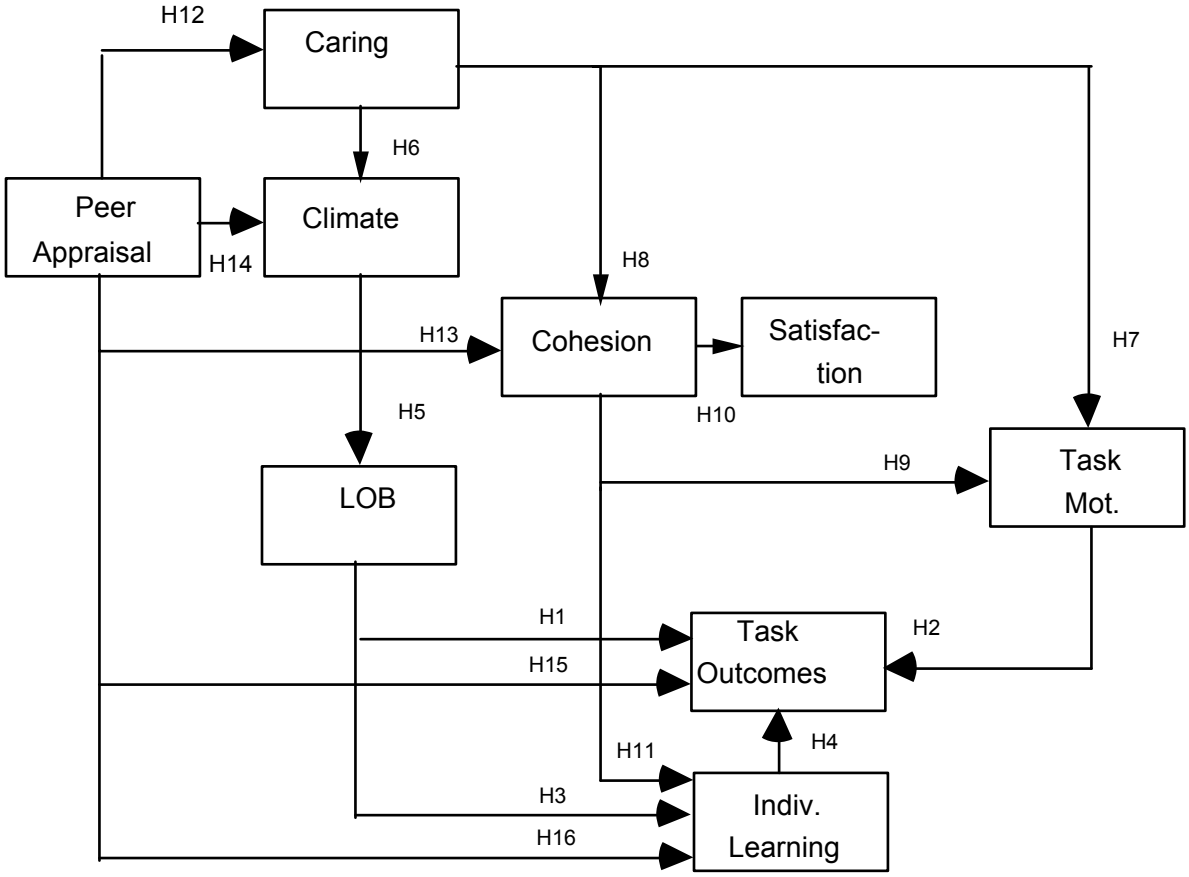


Table 1: Summary of Hypotheses

Hypothesis	Independent Variable	Dependent Variable
H1	Learning-Oriented Behavior	Task Outcomes
H2	Task Motivation	Task Outcomes
H3	Learning-Oriented Behavior	Individual Learning
H4	Individual Learning	Task Outcomes
H5	Climate	Learning-Oriented Behavior
H6	Caring Behavior	Climate
H7	Caring Behavior	Task Motivation
H8	Caring Behavior	Cohesion
H9	Cohesion	Task Motivation
H10	Cohesion	Satisfaction
H11	Cohesion	Individual Learning
H12	Peer Appraisal	Caring Behavior
H13	Peer Appraisal	Cohesion
H14	Peer Appraisal	Climate
H15	Peer Appraisal	Task Outcomes
H16	Peer Appraisal	Individual Learning

METHOD

The research was conducted in two phases. The first phase was designed to pilot test the survey instrument used for data collection and strategies for achieving desired response rates. The survey instrument and strategies were modified as a result of the pilot test. The second phase represented the main study and used the revised survey instrument and procedures. Data from the first phase were not pooled with data from the second phase.

Phase I

The purpose of phase I was to pretest the survey instrument and response rates for a strategy that had students take the survey home and return it in the next class.

Sample

Participants were 76 graduate students (31 males, 33 females, and 12 unspecified) enrolled in a required multi-discipline course (CD710). The age of the students ranged from 21 to 56 with an average of 27.6. The combined disciplines course includes components of organizational behavior, information systems, and policy.

Survey Administration

One goal of the pre-test was to determine if response rates would be sufficient if the survey were not filled out in class. Two surveys were administered to participants approximately 3 weeks apart. The surveys were handed out in class, however, students were to complete them at home and hand them in during the next class. Students were told that they would be eligible to win $50 for their participation. A name would be drawn at random from all participants in the class who filled out both surveys. This procedure proved inadequate as less than 40% of the students returned the survey.

Measures of Caring Behavior

I could find no behaviorally oriented scales of caring behaviors that were applicable to this study. Most existing measures of social support, which is a component of caring behavior, focus on the existence of support rather than the actual behaviors that constitute that support (e.g., (Cohen and Hoberman, 1983). Measures that do focus on behaviors are geared toward general behaviors that reduce life stress rather than behaviors that might be evident in a work team. For example, Barrera et al. (1981) developed a 40-item scale with items such as, "Looked after a family member while you were away"; and, "Gave you over $25."

Butler (1991) examined conditions that lead to trust and developed validated scales for measuring them. Some of these conditions overlap with Kahn's (1993) dimensions of caregiving. For example, Butler (1991) includes the following conditions of trust: availability, consistency, and receptivity (i.e., listening or paying attention). These dimensions directly correspond to Kahn's (1993) dimensions of accessibility, consistency, and attention. Unfortunately, Butler's scales are geared toward a dyadic relationship and cannot be used directly for a group situation, nevertheless, some of the items in his scales were adapted for this study. Since scales for caring behaviors applicable to a work team were not available, they were developed based on Kahn's (1993) findings illustrating the behavioral dimensions of caregiving. The measures developed represent individual perceptions of the team and are shown in Appendix A.

The Phase I study was used to gauge the quality of the scales developed for the study. I was looking to identify poorly worded questions as well as questions that did not clearly measure the intended dimension of caring. A principal components factor analysis with oblique rotation along with informal conversations with students provided information for refining the scales to be used in phase II. The factor analysis revealed only five dimensions

of caring with eigenvalues greater than one, which were interpreted as follows: support, forgiveness, validation, responsibility, and empathy. Based on this information, the scales were refined for the final study (see Appendix B for the revised scales).

Phase II

Sample

MBA student groups at Boston University were used as subjects for this study. Students were enrolled in one of seven sections of a required combined disciplines course (CD710: organizational behavior, information systems, and policy) during the Fall semester of 1997. Students were required to work in teams to complete a group project described below. Out of a total of 385 students enrolled, 340 students completed the first survey and 329 completed the second survey, representing a response rate of approximately 86%. These students formed 69 teams. Three sections had groups with mainly 6 and 7 people, three had groups with mainly 5 and 6 people, and one section had groups of 4 and 5 people.

One issue that arises when using student teams is external validity. Although I recognize this limitation, a number of measures were taken to improve the generalizability of the results. According to Locke (1986), generalizability of a laboratory study to a field setting depends upon the similarity between settings on key attributes. The teams in this course were chosen because they are similar to self-managed teams in organizations. They were responsible for completing the group project by a given deadline and had autonomy to determine the means by which they carried out their tasks. The project requires interdependence among team members for successful completion (Saavedra and Kwun, 1993), requires the team to be together over an extended period of time, and teams were responsible for managing their own performance (Hackman, 1987). Finally, this study

examines a model that is likely to be universal in task groups (e.g., the connection between caring behavior and group climate). In sum, because key attributes in the setting were similar to those of self-managed work groups in work settings, the study results are likely generalizable.

Group Project

Groups worked together on two projects during the course. The first project was ungraded. This project asked students to make a presentation applying the McKinsey's 7S Model to a case study of Calyx & Carolla. The second project was more comprehensive and accounted for 20% of the course grade. The student team had to develop a strategic initiative in electronic commerce for a company assigned to the team. The team then prepared a 30-minute presentation to the class. Students were required to develop an understanding of electronic commerce, perform a strategic analysis, identify and describe business processes, and develop a plan for implementing the change in organization design.

The task was complex enough that the students were interdependent on each other for completion. Students could divide the task into individual responsibilities, however, to complete the overall project the pieces must be integrated. The teams were responsible for managing themselves to complete the project. All members of the team received one team grade, although there were some individual adjustments to this grade based on team member evaluation of the member's contribution to the team.

Research Design

A quasi-experimental design, shown in Figure 7, was used for this research. All sections completed a series of exercises culminating in an in-class peer appraisal (see peer feedback design section below for more details). Each section completed a survey

Figure 7: Research Design

O_1 X_1 O_2

X_1 = Peer review conducted

O_1= Immediately prior to X

O_2 = Class following completion of group projects

two times (see next section for exact timing). The first measurement was immediately before the in-class peer appraisal. The second measurement was taken after all project presentations were completed.

Timeline

CD710 sections met either on Tuesday/Thursday or Monday/Wednesday. The research timeline for a Monday/Wednesday section is shown in Figure 8. All sections were within 1 or 2 days of the times shown. The experimental instructions were handed out as students began preparation for the in-class peer review. The pre-test was done immediately prior to the in-class peer review. Final presentations were due approximately two weeks after the peer review. This time period allows the group to take advantage of the peer feedback session to improve team performance. The post-test was done in the class period immediately after all presentations had been completed.

Figure 8: Timeline for Monday/Wednesday Sections

10/27	11/5	11/17-11/19	11/24
Hand out Additional Instructions	Pre-test followed by Peer review	Presentations	Post-test

Pre-test

The pre-test survey (see Appendix D for the actual instrument) was handed out in the class of the peer appraisal and completed before the exercise began. The survey was administered by the researcher. Surveys were collected by the researcher and placed in an envelope. Students were told the following before they completed the survey: 1) the purpose of the study was to examine the dynamics of teams over time; 2) the survey was voluntary; 3) it was not connected in any way to the course; 4) their answers would remain completely confidential, i.e., no one in the class including their instructors would see their responses; and 5) that the survey asked for the last four digits of their ID# which would be used to match their answers on the two surveys and obtain their final grade. Since the last four digits of the ID# is not enough for anyone except the instructor to identify the student, their confidentiality was maintained.

Post-Test

The post-test was a slightly modified version of the pre-test (see Appendix E for the instrument). The post-test included the identical questions as the pre-test but added questions about the peer feedback session and perceptions of group outcomes. The

instructions recognized that students filled out the survey before. They were told that groups change over time and that they should answer based on their group as it is that day. The post-test was handed out in the class following completion of all group projects.

Peer Feedback Design

The peer feedback process consists of a series of exercises that build upon each other and culminate with an in-class feedback session (for a copy of the exercise see (Wohlberg, Gilmore et al., 1998, pp. 285-299). The assignments are designed such that they increase the likelihood of caring behaviors being displayed during the face-to-face peer feedback session.

The first exercise is a group formation exercise. Groups are asked to meet outside class to get to know one another and discuss their expectations. The second exercise asks students to develop a contract. In the contract they discuss performance expectations and policies and procedures for addressing behaviors that fall outside the agreed upon expectations. Finally, the students are asked to observe the performance of their teammates, prepare for and conduct an in-class peer feedback session.

The design of this process includes the following features:

1. Group members complete a contract based on expectations of what will be necessary to complete the group task. This helps focus members on the task and makes expectations explicit.

2. Students are given a form that focuses them on observing behaviors, both positive and negative, and noting the effects of those behaviors on the group's ability to accomplish its task. This helps the students provide a balanced and helpful discussion rather than focusing on judgments.

3. Feedback is collected from all teammates and summarized by one team member who is selected to summarize the group's input and provide the feedback. This helps depersonalize the feedback, which makes it more likely to be delivered in a caring manner. It also tends to reduce defensiveness because the information is less likely to be perceived as an attack by a particular individual. This procedure reinforces the group nature of the process.

4. Also reinforcing the group nature of the process is that the feedback is delivered in front of the entire group. Although one person delivers the feedback, the other group members are there to observe and join the discussion once the feedback has been delivered. This allows the recipient to seek clarification and it allows the group to discuss ways in which it can help. It also allows the group to accept responsibility for its part in creating the particular dynamics under discussion.

5. The instructions explain that the intent of the feedback is to be helpful. This focuses students on being supportive and empathetic. Students are also instructed that the process should be a two-way communication. This allows the recipient of feedback to seek information and clarification about the concerns of team members.

6. Students are asked to develop a performance appraisal form that summarizes the dimensions they have agreed to in their performance plan. They are instructed to include plenty of room for comments and areas to discuss both strengths and weaknesses. This form is then used to structure the feedback. This helps students present balanced feedback that is

thorough and grounded in the agreements they have previously made. A good degree of thought and time is required to fill out their appraisal forms, thus, the recipients gain a sense that their teammates are available to them.

7. Group members are given signed copies of the feedback from each team member. This provides detailed data and encourages the person giving the feedback to be constructive since his or her name is on it.

Measures

A survey instrument was used to measure caring behaviors, the degree of safety and trust that exists within the group, learning-oriented behaviors, group task motivation, as well as outcome measures such as cohesion, satisfaction, group viability (Hackman, 1987), and individual perceptions of the group's product and the contribution of the group to individual learning. Standardized individual and group grades were used as outcome measures. See Appendix B for the scales, Appendix D for the actual survey pre-test instrument, and Appendix E for the post-test instrument. The original measures are briefly discussed below. The final measures used for analysis were derived from these measures based on factor analyses of the data. The development of the final scales used for analysis is discussed in Appendix G.

Caring Behaviors

As discussed above, there were no previously validated measures for caring behavior. The results of the pilot study were used to develop the scales used in phase II. As is discussed in Appendix G, these scales were further factor analyzed to develop the final scales used in the analysis.

Process Outcomes

Cohesion (Stokes, 1983), satisfaction, and group viability (Hackman, 1988) were used as process outcome measures. These were all based on previously validated scales. The scales used were slightly modified from their original versions so that they would agree with previous work done on peer appraisals by Druskat and Wolff (forthcoming).

Learning-Oriented Behaviors

The scale for learning-oriented behaviors was based on work done by Edmondson (1996). Her scales were slightly modified for this study and an additional three questions were added based on Tjosvold's (1986) measure of constructive controversy.

Climate of Safety and Trust

These scales were also based on work done by Edmondson (1996), however, they needed to be modified for this study. Some questions were reworded and others added to capture the essence of a climate of safety and trust as conceptualized in this study.

Group Task Motivation

Group task motivation (or group drive) is based on the previously validated scale by Zaccaro & McCoy (1988). This scale measures the degree to which the group is motivated to accomplish its task. I use this measure as an approximation to the degree to which group members are engaged in group processes.

Task Outcomes

I use the team grade on the project as an objective measure of task outcomes. The grades are standardized within each section to provide a uniform measure across all sections. There is also a question on the survey that asks for perceived quality of the group's outcome ("Please evaluate your team's final product?). This question used a 7-point

Likert scale anchored as follows: 1=acceptable, 3=good, 5=very good, and 7=outstanding. The choice of anchors was based on learning from the pilot study. When the lowest score was "poor" the variability in the answers was small because answers were skewed toward the high end of the scale.

Learning

Individual learning was measured by final course grade. Similar to the team grades, the individual grades were standardized within each section. In addition to this measure students were asked to rate their learning as a result of working in the team. ("How did working on your team affect your learning compared to what it would have been working alone?) A 7-point Likert scale was used and anchored as follows: 1=learned much less, 3=no difference, 5=learned more, 7=learned much more.

Seriousness with which Group Conducted Peer Review

This measure was added to the post-test survey and consisted of 5 questions scored on a 7-point Likert scale. Questions were randomly interspersed with the pre-test measures, although the order of questions was kept constant. These additional questions account for the difference in question numbers between the pre-test and post-test survey instruments. The questions were derived using informal observations of students conducting the peer review as a guide to the type of issues that differentiate teams on the quality with which they conduct the review.

Control Variables

Student grades will be influenced by their general level of ability, thus, students were asked for their undergraduate GPA to act as a control variable for outcome measures. Inputs to group effectiveness as discussed in the previous chapter were either measured or constant across sections. Group size was measured by asking students how many people

were in their group. This was cross-checked with data supplied by instructors. The clarity of goals and nature of the task were constant across sections. All students received the same instructions and did the same project. The composition of the group was measured on a number of dimensions including: gender, composition of foreign students, GPA (an approximation of skill levels), part-time or full-time status, and age. Organizational level variables were constant across sections. The project counted for the same percentage of the total grade in all sections. Resources and support were not measured and assumed to be similar across sections. Instructors in all sections were available to answer student questions but did not provide additional resources or support.

RESULTS

The following results are based on group-level data. Individual responses were aggregated to the group level by taking the mean of all respondents in a given group. Two groups were deleted from the analysis because fewer than 50% of the members responded to the survey.

Table 2 shows correlations among variables at both Time 1 and Time 2, including control variables. The model shown in Figure 6 was tested for goodness of fit to the data using LISREL8. Control variables significantly correlated with either independent or dependent variables were added to the initial model and then removed if the path coefficient was not significant.

The model in Figure 6 shows expected relationships among variables but does not take the passage of time into consideration. Because data were collected at two separate times, it is possible to distinguish between relations among variables measured at the same time and variables measured at different times. For example, it is possible that group climate has an immediate effect on a group member's willingness to engage in learning-oriented behaviors but caring behavior takes time to develop into a sense of safety. In this case we would expect that group climate and learning-oriented behaviors are associated at any given time but not necessarily across time periods. On the other hand, for this example we would expect that caring behavior would be associated with climate across time.

The model in Figure 6 was tested by incorporating both Time 1 and Time 2 data into a longitudinal model. The test model replicated Figure 6 for both measurement times. Additionally, three paths were added to test for effects across time periods: (1) dependent variables at Time 2 received paths from independent variables at Time 1; (2) , each

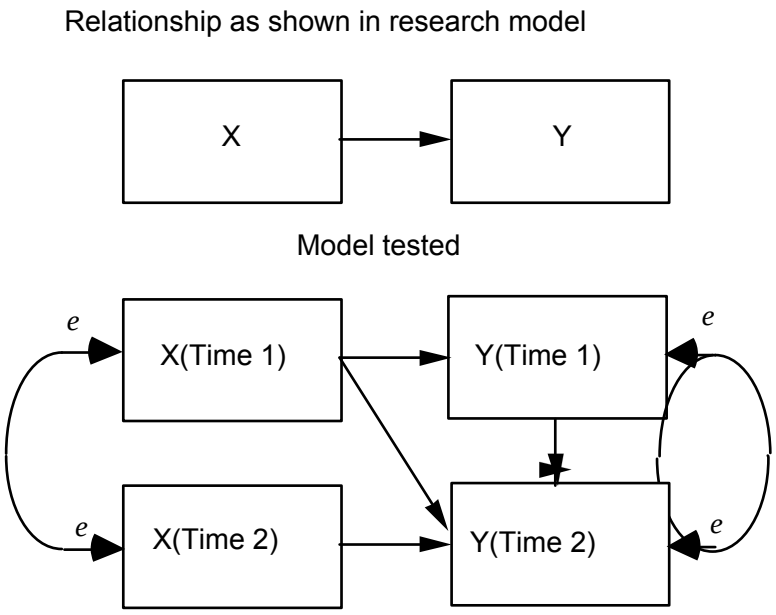
Table 2: Correlations of Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1 GENDER1	1.00																																	
2 CITIZEN1	-.05	1.00																																
3 LANG1	-.27	.77	1.00																															
4 STATUS1	.03	-.61	-.63	1.00																														
5 HOURS1	-.01	.41	.39	-.58	1.00																													
6 GPA1	.12	-.07	.06	-.14	.15	1.00																												
7 AGE1	-.10	-.24	-.19	.15	-.12	.00	1.00																											
8 NUMBER2	.09	-.38	-.29	.20	-.04	.16	.12	1.00																										
9 GENDER2	.68	.14	-.10	.06	-.09	.07	-.38	.06	1.00																									
10 CITIZEN2	-.06	.80	.63	-.73	.56	.06	-.22	-.38	.02	1.00																								
11 LANG2	-.24	.60	.84	-.71	.49	.17	-.23	-.28	-.14	.75	1.00																							
12 STATUS2	.03	-.60	-.62	.99	-.58	-.15	.16	.21	.05	-.73	-.69	1.00																						
13 HOURS2	.01	.42	.36	-.57	.77	.09	-.15	.18	-.03	.44	.36	-.55	1.00																					
14 GPA2	.05	-.05	-.05	-.13	.07	.71	.06	.05	.00	.02	.00	-.17	-.01	1.00																				
15 AGE2	.00	-.29	-.28	.30	-.30	-.13	.75	.15	-.26	-.45	-.42	.32	-.18	-.05	1.00																			
16 CARING2	.12	.22	.16	.01	.11	.04	-.37	-.10	.20	.09	.09	.01	.12	-.05	-.31	1.00																		
17 CLIMATE2	.18	-.03	-.15	.27	-.05	-.13	-.13	.09	.19	-.16	-.20	.29	.00	-.24	-.07	.71	1.00																	
18 LOB2	.07	.21	.12	-.04	.32	-.01	-.15	.00	.11	.08	.00	-.03	.26	-.04	-.16	.50	.42	1.00																
19 COHESN2	.19	.06	.07	.15	.13	-.01	-.32	.13	.21	-.02	.03	.15	.12	-.13	-.25	.74	.61	.48	1.00															
20 SAT2	.20	-.09	-.10	.29	-.02	.00	-.25	.12	.24	-.16	-.11	.28	.02	-.13	-.15	.74	.73	.44	.84	1.00														
21 DRIVE2	.01	-.08	.00	.28	.10	.04	-.16	.15	.06	-.16	-.02	.30	.06	-.09	-.07	.65	.57	.49	.63	.76	1.00													
22 PEER	.11	.18	.13	-.35	.34	.05	.08	.02	.03	.19	.14	-.33	.37	.15	.03	.16	.16	.36	.14	.14	.10	1.00												
23 CARING4	.29	.05	-.06	.05	.01	.09	-.11	.23	.28	-.01	-.07	.05	.11	.03	-.09	.72	.64	.34	.64	.63	.52	.38	1.00											
24 CLIMATE4	.21	-.04	-.17	.13	.02	.06	.06	.26	.08	-.07	-.15	.14	.17	.04	.08	.49	.67	.34	.53	.65	.44	.40	.68	1.00										
25 LOB4	.26	.07	.06	-.05	.20	-.03	.00	.16	.16	.08	.02	-.03	.30	.00	.03	.38	.35	.54	.50	.43	.42	.43	.54	.58	1.00									
26 COHESN4	.36	-.02	-.10	.06	.17	.09	-.14	.30	.20	.02	-.04	.05	.22	.08	-.10	.52	.53	.41	.74	.71	.55	.36	.74	.76	.64	1.00								
27 SAT4	.30	-.10	-.15	.18	.07	.01	-.09	.27	.17	-.13	-.13	.16	.13	.02	.04	.56	.55	.30	.71	.77	.60	.32	.78	.75	.55	.88	1.00							
28 DRIVE4	.21	-.13	-.15	.24	.08	.05	-.01	.21	.06	-.18	-.16	.24	.09	.03	.07	.57	.46	.32	.58	.62	.69	.34	.67	.59	.56	.65	.74	1.00						
29 OUTPUT	.14	-.14	-.08	.04	.10	.17	.15	.18	-.13	-.08	-.01	.03	.08	.12	.17	.11	.12	.11	.26	.26	.33	.36	.36	.38	.33	.46	.51	.60	1.00					
30 LEARNING	.11	-.23	-.23	.28	-.07	.16	-.01	.15	.12	-.25	-.22	.27	-.07	.08	.11	.28	.27	.18	.46	.42	.36	.10	.47	.44	.34	.56	.56	.57	.50	1.00				
31 TMGRADE	.10	-.14	-.16	.07	.11	-.06	.04	.15	.09	-.21	-.28	.05	.13	.05	.05	.05	.05	.23	.16	.16	.14	.24	.15	.20	.15	.21	.24	.33	.40	.33	1.00			
32 INDGRADE	-.03	-.19	-.28	.54	-.37	-.34	.02	-.30	.07	-.20	-.36	.53	-.35	-.14	.09	.10	.21	-.04	.16	.24	.13	-.10	.04	.13	.12	.04	.12	.12	.00	.18	.04	1.00		
33 STTMGR	.06	-.10	-.14	.02	.11	-.04	.05	-.01	.01	-.14	-.25	-.01	.09	.08	.03	-.01	-.02	.13	.08	.08	.04	.22	.07	.07	.02	.12	.15	.21	.35	.21	.92	.06	1.00	
34 STINDGR	.19	-.16	-.23	.05	.05	-.08	.13	-.08	.06	-.24	-.30	.02	.04	.12	.24	.15	.14	.21	.15	.26	.22	.40	.26	.25	.15	.24	.37	.43	.47	.31	.77	.12	.77	1.00

p<.05 for correlations greater than or equal to .24
p<.01 for correlations greater than or equal to .30
p<.001 for correlations greater than or equal to .39

dependent variable at Time 2 received a path from itself measured at Time 1 to test for persistence from Time 1 to Time 2; and (3) error terms were assumed to be correlated for the same variable across time (although these paths were not included in the initial model tested). Figure 9 provides a simple illustration of how the final model was constructed.

Figure 9: Illustration of Longitudinal Model Construction



The full model with all control variables and longitudinal paths had $\chi^2 = 338$ with 188 degrees of freedom. All non-significant paths related to control variables and longitudinal paths were then removed. The resulting model had $\chi^2 = 288$ with 160 degrees of freedom. This is significant with $p < .000$, indicating the model is a poor fit to the data.

This research is exploratory in its definition of the model, thus, it is not surprising that the original model did not fit the first time. In this case, I followed a model generating

approach to develop a model that fits the data (Jöreskog and Sörbom, 1993). This approach must be used with caution, since one runs the risk of developing a model that is not generalizable. For this reason the model generating process must be based on theory and have a "substantively meaningful interpretation" (Jöreskog and Sörbom, 1993, p. 115).

A series of modifications were made to the model to improve fit. Each modification was made only if it was theoretically grounded and interpretable. These modifications are detailed in Table 3 along with their theoretical and statistical justification. A number of statistics indicating the goodness of fit are also shown in Table 3**.** The chi-squared statistic along with the degrees of freedom and *p*-value are shown in the first three columns. A good fitting model has a χ^2 value approaching the degrees of freedom and a non-significant *p*-value. This measure, however, assumes that the model fits perfectly in the population and it does not take parsimony into account. The Root Mean Square Error of Approximation (RMSEA) is a measure that does not assume perfect fit in the population. It examines the error per degree of freedom. A good fitting model is considered to be one where RMSEA is less than .05 (Jöreskog and Sörbom, 1993). AIC and CAIC are goodness of fit indicators that are based on information theory and take parsimony into account. The better fitting model is the one with the smaller value of these indices. The final two measures, the goodness of fit index (GFI) and the parsimony goodness of fit index (PGFI) compare how much better the model fits than no model at all. Larger numbers indicate a better fit.

Table 3: Model Fitting Process

Model	χ^2	df	p	RMSEA	AIC	CAIC	GFI	PGFI
1. Full model	338	188	0.00	.12	664	1187	.75	.40
2. Removed non-significant control variable and longitudinal paths	288	160	0.00	.11	430	658	.73	.51
3. Based on modification indices the following paths were added: - climate to cohesion (both times) - satisfaction to drive (both times) Both of these are theoretically justified. A climate where people feel safe should also make them more cohesive. The more satisfied with the group the more likely a member is to be engaged in group behaviors.	240	160	0.00	.095	393	637	.76	.51
4. Deleted non-significant paths. Also deleted path from caring at Time 1 to cohesion at Time 2.	256	158	0.00	.10	402	636	.75	.51
5. Based on modification indices an error covariance was added between cohesion at Time 1 and Time 2. This makes theoretical sense since errors are often correlated in longitudinal data. In fact, all error covariances are added later on.	239	157	0.00	.093	387	624	.76	.52
6. Deleted insignificant paths. Examination of residuals suggested to add a path from satisfaction at Time 1 to cohesion at Time 2. This makes theoretical sense since satisfaction with the team is likely to increase cohesion over time.	237	157	0.00	.092	385	622	.76	.52
7. Examination of residuals suggest to add a path from cohesion at Time 2 to learning-oriented behaviors at Time 2. This was also added for Time 1. This makes theoretical sense since it is possible that cohesion mediates the effect of climate on LOB.	217	155	0.00	.081	370	613	.78	.52
8. Deleted non-significant paths. Added error covariances between Time 1 and Time 2. This makes theoretical sense since these are longitudinal data. The same errors at Time 1 are likely to be at Time 2.	210	151	0.00	.081	370	627	.79	.52

Table continues on next page

Table 3: Model Fitting Process Continued

Model	χ^2	df	p	RMSEA	AIC	CAIC	GFI	PGFI
9. Modification indices suggest to add path from climate at Time 1 to satisfaction at Time 1. The path was also added at Time 2. This makes theoretical sense since a safer climate is likely to increase satisfaction.	199	149	0.00	.075	364	626	.8	.52
10. Non-significant paths were deleted from the model.	206	155	0.00	.074	359	602	.8	.54
11. Examination of residuals suggest to a path from satisfaction at Time 1 to Climate at Time 2. This makes theoretical sense since it is reasonable that the more satisfied one feels with the group the safer one will feel in the group.	199	154	0.00	.069	353	599	.81	.54
12. Delete insignificant paths and based on residuals added control variable of part-time or full-time status to satisfaction at both times.	186	141	0.00	.072	324	545	.81	.54
13. Modification index suggested to add an error covariance between satisfaction and cohesion. These two constructs loaded on the same factor, thus, it seems reasonable they would be influenced by the same source of error.	175	139	0.02	.065	317	545	.82	.54
14. Changed two control variables to make them more appropriate to the variables they influence. This is really fixing an error in the original specification.	179	154	0.08	.052	333	580	.82	.54
15. Examination of residuals suggested adding a path from task motivation to learning-oriented behavior. This makes theoretical sense since a group that is more task motivated is likely to use more appropriate behaviors for accomplishing the task.	170	152	0.15	.044	328	581	.82	.54
16. Insignificant paths and control variables deleted, as well as control variables that do not have a readily available theoretical explanation.	178	157	0.12	.047	326	563	.82	.56

The final model fits quite well and care was taken to ensure it is theoretically justifiable. This model is shown in Figure 10. Table 4 summarizes the hypotheses and whether the final model supports them. Table 5 shows the standardized total effect of each variable, treated as an independent variable, on consequent variables taken as dependent variables. This allows us to compare the effect of any variable with that of another. For example, the total standardized effect of caring at Time 1 on average individual grade is .19 while the effect of the peer appraisal is .39 indicating that, overall, the peer appraisal has a greater impact than caring on average individual grade. We can also see that group task motivation (drive) at Time 2 has a much greater impact on average individual grade (.28)

Table 4: Summary of Findings

Hypothesis	Independent Variable	Dependent Variable	Finding	Comment
H1	Learning-Oriented Beh.	Task Outcomes	Not Supported	LOB at Time 1 affects peer appraisal, which affects perceived output only
H2	Task Motivation	Task Outcomes	Partial Support	Affects perceived output not objective measure (i.e., team grade)
H3	Learning-Oriented Beh.	Individual Learning	Not Supported	LOB at Time 1 affects peer appraisal, which affects objective individual learning (i.e., average individual grade)
H4	Individual Learning	Task Outcomes	Supported	For both perceived and objective measures
H5	Climate	Learning-Oriented Beh.	Direct Relation Not Supported	Relation is mediated by cohesion
H6	Caring Beh.	Climate	Supported	Both at Time 1 and Time 2
H7	Caring Beh.	Task Motivation	Partial Support	Supported at Time 2 only
H8	Caring Beh.	Cohesion	Supported	Both at Time 1 and Time 2
H9	Cohesion	Task Motivation	Direct Relation Not Supported	Relation is mediated by satisfaction
H10	Cohesion	Satisfaction	Supported	Both at Time 1 and Time 2
H11	Cohesion	Individual Learning	Partial Support	Affects perceived learning but not object individual learning
H12	Peer Appraisal	Caring Beh.	Supported	
H13	Peer Appraisal	Cohesion	Direct Relation Not Supported	Relation is mediated by caring behavior and group climate
H14	Peer Appraisal	Climate	Supported	
H15	Peer Appraisal	Task Outcomes	Partial Support	Affects perceived output but not objective measure (i.e., team grade)
H16	Peer Appraisal	Individual Learning	Partial Support	Affects objective learning (i.e., avg. individual grade) but not perceived learning

Figure 10: Illustration of Final Model

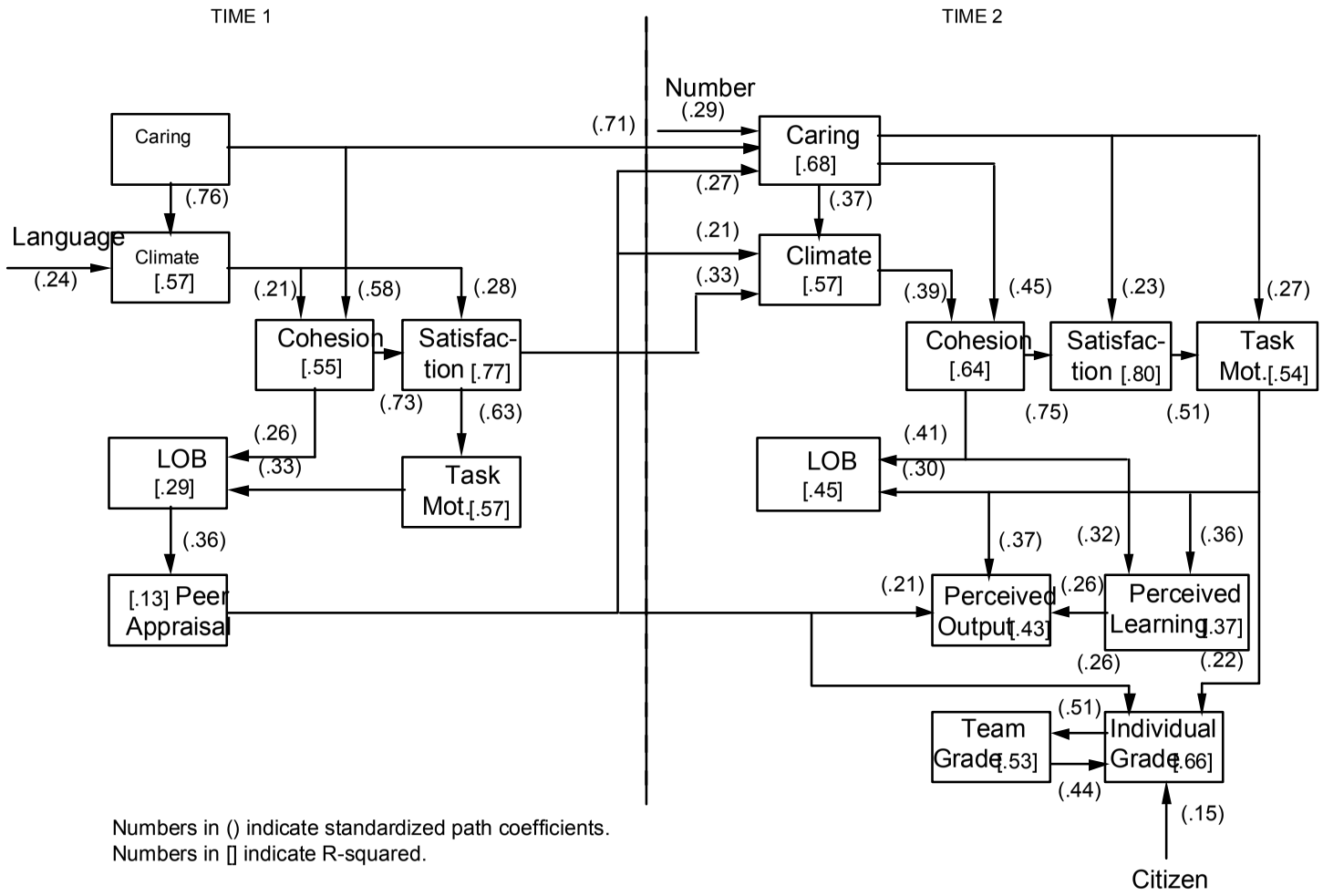


Table 5: Standardized Total Effects

	INDEPENDENT VARIABLE					
Dependent Var.	CARING1	CLIMATE1	LOB1	COHESN1	SAT1	DRIVE1
CLIMATE1	.76	- -	- -	- -	- -	- -
LOB1	.40	.14	- -	.41	.21	.33
COHESN1	.74	.21	- -	- -	- -	- -
SAT1	.75	.43	- -	.73	- -	- -
DRIVE1	.63	.27	- -	.46	.63	- -
PEER	.15	.05	.36	.15	.07	.12
CARING2	.75	.01	.10	.04	.02	.03
CLIMATE2	.56	.16	.11	.29	.36	.04
LOB2	.38	.04	.06	.07	.08	.02
COHESN2	.55	.07	.09	.13	.15	.03
SAT2	.58	.05	.09	.11	.11	.03
DRIVE2	.50	.03	.07	.06	.06	.02
PER.OUTPUT	.31	.03	.11	.07	.06	.04
PER.LRNING	.35	.03	.05	.06	.07	.02
TEAM GRADE	.09	.01	.07	.03	.02	.02
IND. GRADE	.19	.03	.14	.07	.04	.05

	PEER	CARING2	CLIMATE2	COHESN2	SAT2	DRIVE2
CARING2	.27	- -	- -	- -	- -	- -
CLIMATE2	.31	.37	- -	- -	- -	- -
LOB2	.16	.43	.20	.53	.15	.30
COHESN2	.24	.59	.39	- -	- -	- -
SAT2	.24	.67	.29	.75	- -	- -
DRIVE2	.19	.61	.15	.38	.51	- -
PER.OUTPUT	.32	.33	.10	.26	.24	.47
PER.LRNING	.14	.40	.18	.45	.18	.36
TEAM GRADE	.20	.08	.02	.05	.07	.14
IND. GRADE	.39	.17	.04	.10	.14	.28

than drive at Time 1 (.05), and that caring at Time 1 has a large effect (.50) on drive at Time 2. The only variable with a greater effect on drive at Time 2 is caring at Time 2 (.68).

Hypotheses Testing Results

In the following sections, which are organized around the major links of the general framework guiding this research (see Figure 2), I provide a detailed discussion of the results for each hypothesis. In this section I present an overview of the findings.

The results support the hypotheses that caring behavior directly impacts group climate (H6) and cohesion (H8), and that the peer appraisal directly affects caring behavior (H12) and group climate (H14). These hypotheses are supported at both Time 1 and Time 2. The results also support the hypotheses that individual learning is related to group outcomes (H4) and that satisfaction results from cohesion (H10).

The hypothesis that caring behavior affects group task motivation (H7) was supported at Time 2 but not Time 1. Three hypothesized relationships were found to be mediated by a third variable. The relationship between climate and learning-oriented behaviors (H5) was found to be mediated by cohesion; the relationship between cohesion and task motivation (H9) was found to be mediated by satisfaction; and the relationship between the peer appraisal and cohesion (H13) was found to be mediated by safety and caring behavior. Hypotheses involving outcomes were supported for either perceived or objective outcomes but not both. Task motivation affects only perceived task output (H2); cohesion affects only perceived individual learning (H11); and the peer appraisal affects only perceived task output (H15) and objective individual learning (H16).

Finally, the hypotheses suggesting learning-oriented behaviors affect task outcomes (H1) and individual learning (H3) were not supported. As will be explained later, it appears that learning-oriented behaviors may not have represented appropriate performance strategies for this task.

The Role of Caring Behavior on Team Effectiveness

Caring behavior was hypothesized to impact team effectiveness through the mediating variables of group climate (H6), cohesion (H8), and engagement with the task (H7). The results show that caring behavior does impact climate at both time periods as well as cohesion at both time periods. An unexpected finding, however, is that the influence of caring behavior appears to increase over time. For example, caring does not have a direct influence on task motivation or satisfaction at Time 1, but it does directly impact these variables at Time 2. Furthermore, the predecessor of satisfaction appears to shift from climate at Time 1 to caring at Time 2.

The shift in influence from climate to caring may be a reflection of the fact that, as time goes on, there is more behavioral information that group members can use to assess the nature of their team. In the early stages of a group, there is little accumulated behavioral information, thus, first impressions and individual characteristics may hold more influence in an assessment of the nature of the group. Given little initial information to go on, group members have various propensities for feeling safe and trusting in their team (Golembiewski and McConkie, 1975). As group members interact, behaviors will either confirm or refute the initial sense of the group (Weick, 1993). Thus, it seems reasonable that the impact of behavior grows in importance the longer the group works together.

To test this explanation I conducted a post hoc analysis that split the Time 1 and Time 2 data into two groups based on hours spent together. I performed a regression analysis for satisfaction on caring, climate, and their predecessors as independent variables. To test for the total effect of climate and caring on satisfaction, mediating variables were not included in the analysis. The results of this analysis for caring and climate coefficients are shown in Table 6. As the number of hours increases, the relative impact of climate decreases. The

impact of caring appears to increase until approximately 30 hours and then remains relatively constant. This analysis provides support for the explanation that, over time, behavior becomes more directly important than cognition for determining the degree of satisfaction within the team.

Table 6: Regression of Satisfaction on Climate, Caring, and Predecessors

	Time 1				Time 2			
	Mean Hours = 11(n=34)		Mean Hours = 29(n=33)		Mean Hours = 34(n=44)		Mean Hours = 63(n=23)	
Variable	Beta	p	Beta	p	Beta	p	Beta	p
Caring	.37	.07	.58	.00	.57	.00	.58	.03
Climate	.43	.04	.32	.04	.21	.08	.03	.84

The Role of Climate on Learning-Oriented Behaviors

The mechanism by which caring behavior was hypothesized to influence team effectiveness was through a group climate of safety, which in turn facilitated learning-oriented behaviors. Climate did not directly impact learning-oriented behaviors as hypothesized (H5), however, this relationship is mediated by cohesion at both time periods. Thus, it appears that a shared sense of safety serves to draw members closer together, and through this closeness they are more apt to engage in learning-oriented behaviors. Feeling safe may not be enough to foster learning-oriented behaviors as Edmondson (1996) concludes and this study hypothesizes. The sense of safety serves to strengthen the relationship among team members but it appears to be the nature of the relationships (cohesion being one indication) that directly affects the collective behaviors in which group members will engage. Supporting this perspective is the

unanticipated finding that task motivation also influences learning-oriented behaviors. Task motivation was shown to partially result from the relational aspect of behavior in the group. Thus, caring behavior results in both greater cohesion and the desire to engage with team members around the task. These outcomes of relational behavior then combine to produce learning-oriented behaviors.

One explanation for this result comes from attachment theory (Bowlby, 1988). As Kahn (1996) explains, a sense of attachment is required to provide a "secure base" from which people can venture out and experiment with new behaviors. The results of this study show that a climate of safety contributes to the development of cohesive relationships (an important dimension of a "secure base"), however, engaging in learning-oriented behaviors is facilitated by the "secure base" provided by these relationships and not directly by a sense of safety.

Learning-Oriented Behaviors and Task Motivation

The effect of learning-oriented behaviors on group outcomes was not supported as hypothesized in this study (H1, H3). Learning-oriented behaviors were hypothesized to directly affect group outcomes and individual learning. The results show that learning-oriented behaviors at Time 2 are not directly associated with either perceived or objective outcomes. However, learning-oriented behaviors at Time 1 do affect the quality and seriousness with which the peer appraisal was carried out. This in turn has an effect on perceived group output and average individual grades within the group.

The process criteria of effectiveness, shown in Figure 5, suggests that groups must (1) use appropriate performance strategies and (2) be engaged in these processes. It was hypothesized that engaging in learning-oriented behavior would be an appropriate strategy for the team's task, however, this is not supported by the data. Since there is strong

evidence that learning-oriented behaviors are characteristic of effective teams (Druskat, 1996; Edmondson, 1996; Katzenbach and Smith, 1993), it is likely that other factors explain the failure to find a connection between learning-oriented behaviors and team effectiveness.

Learning-oriented behaviors are appropriate performance strategies when the task is complex and group members are interdependent. Although this was believed to be the case with the class project, informal conversations with students suggest the possibility that the task could be accomplished through a "divide and conquer" approach. Students would need to work together to integrate their work, however, the type of reflection and dialogue typical of learning-oriented behavior would not be necessary for successful completion of the task.

The importance of individual work to the team's task outcome is further supported by the finding that team outcomes were only dependent upon average individual performance. If the task were accomplished through a "divide and conquer" approach, it seems reasonable that the team outcome would depend mainly on individual performance, rather than learning-oriented behaviors, which may be an inappropriate strategy for accomplishing this particular task.

Since "divide and conquer" was not measured as a performance strategy in this study, the degree to which team members are engaged with the task is the only process criteria of effectiveness (see Figure 5) that would be expected to impact outcomes. The findings do show that group task motivation (a measure of the degree to which group members are engaged with the task) directly affects individual performance, which in turn affects the team's outcome.

A second factor that may help explain the lack of a link between learning-oriented behaviors and team outcomes is that these behaviors take time to affect outcomes. The findings show that a higher level of learning-oriented behaviors at Time 1 result in the group doing a more thorough and serious job at conducting the peer appraisal. This, in turn, has a moderate effect on objective measures of individual learning, an effect consistent with Yager's (1986) finding that discussing group process increases individual learning in cooperative learning groups. Thus, even though engaging in learning-oriented behaviors may not have been an appropriate task performance strategy, over time they still lead to more effective team outcomes through their effect on individual learning.

Task Outcomes and Individual Learning

Both task outcomes and individual learning were measured via two methods. One method was a perceptual measure obtained through the questionnaire and the second method was an objective measure obtained via team and individual grades. The hypotheses assume that both measures have similar relationships with antecedents, however, the findings show that the two are different. The only antecedent related to both perceived and objective measures was the effect of group task motivation on individual learning, however, this relationship was not hypothesized, although it does make sense. For example, we would expect that the more highly task motivated the group, the more likely that they would support each other's learning as a means of accomplishing the task (Yeager, 1978).

Hypothesis 11 suggests that cohesion is associated with greater individual learning (Gabbert, Johnson et al., 1986), however, this was only the case for perceived learning. The degree of cohesion did not directly impact the average individual grade of the team. One explanation for this is that cohesion interacts with group drive in producing individual learning, similar to the interaction found in research on task outcomes (Gully, Devine et al.,

1995). To test this explanation I conducted a post hoc ANCOVA as shown in Table 7. The sample was divided into high and low groups for cohesion and group task motivation (drive). The analysis shows that there is a main effect of group task motivation as well as a small but significant interaction effect of group task motivation with cohesion in producing objective learning. However, an examination of the regression lines (see Figure 11) reveals an unexpected pattern. When group drive is high, greater cohesion has very little impact on individual learning; however, when group drive is low, greater cohesion is associated with greater individual learning. This pattern is inconsistent with previous research on team effectiveness (Gully, Devine et al., 1995) where higher cohesion is most beneficial in groups with stronger task motivation.

Although group task motivation (drive) is affected by the dynamics of the group, only 54% of the variance is explained by the dynamics (i.e., caring, climate, cohesion, and satisfaction). A portion of the remaining variance is likely the result of individual characteristics. One explanation for the above finding is that groups with high task motivation may have more motivated individuals who prefer the "divide and conquer" approach, which appears to be an appropriate task strategy for this project.

Since, as discussed above, the group project may have been best accomplished via a "divide and conquer" approach, groups with highly motivated individuals may have been most effective when working individually. Cohesion among group members, therefore,

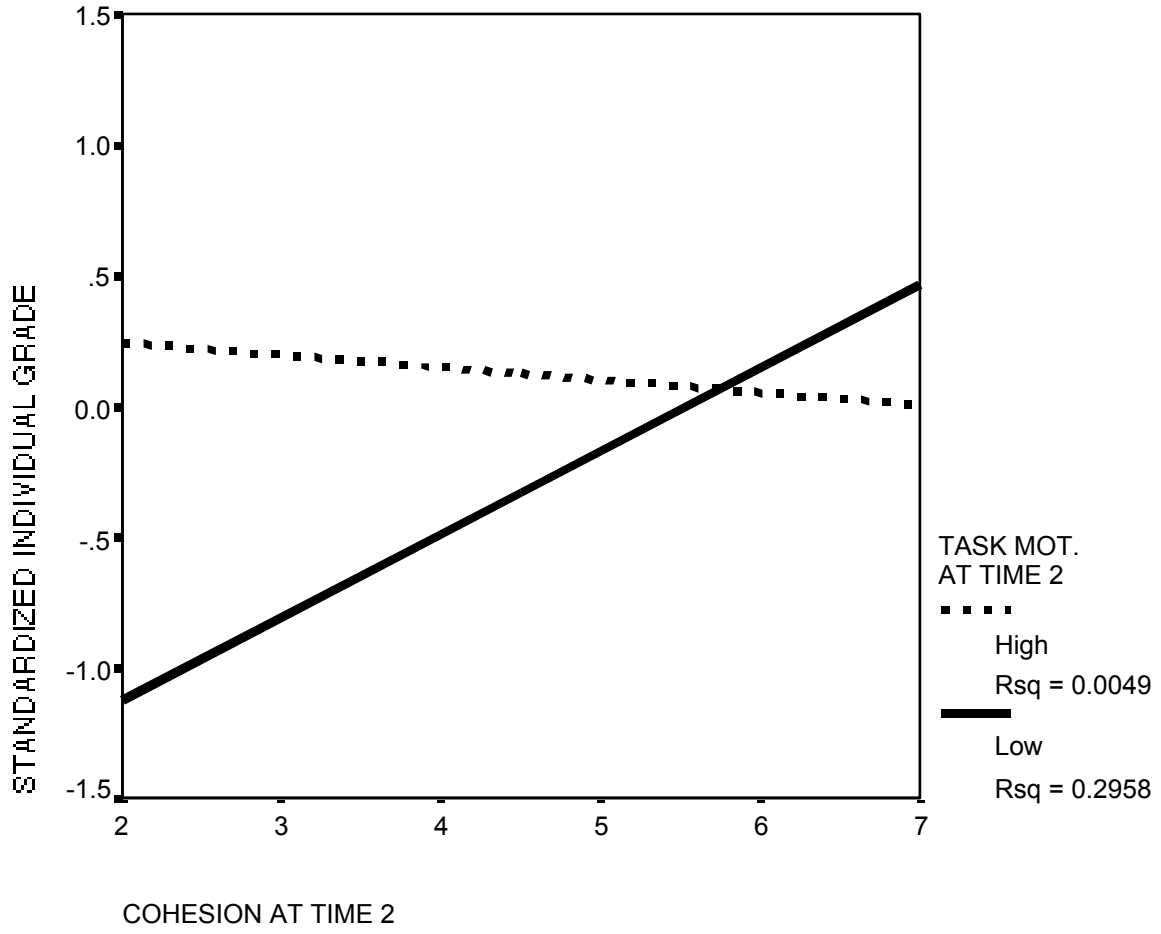
Table 7: ANCOVA for Objective Individual Grade

STANDARDIZED INDIVIDUAL GRADE
by COHESION2
DRIVE2
with CITIZENSHIP

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Covariates	.339	1	.339	1.578	.214
CITIZENSHIP	.339	1	.339	1.578	.214
Main Effects	3.210	2	1.605	7.478	.001
COHESION2	.220	1	.220	1.024	.316
DRIVE2	2.318	1	2.318	10.802	.002
2-Way Interactions	.902	1	.902	4.204	.045
COHESION2 DRIVE2	.902	1	.902	4.204	.045
Explained	3.934	4	.983	4.583	.003
Residual	13.305	62	.215		
Total	17.239	66	.261		

would not have much impact on team effectiveness or the ability of members to learn. Additionally, the combination of high task motivation, high cohesion, and a "divide and conquer" approach to the task, may have resulted in greater trust that teammates would accomplish their piece of the task, thus reducing the need for interaction that would produce a transfer of knowledge. For example, if a team splits the task according to each member's strengths and simultaneously trust is high in the group, then members may not interact in ways that help them learn areas they have not been assigned.

Figure 11: Regression of Standardized Individual Grade on Cohesion at Time 2



On the other hand, groups low in task motivation do show a significant benefit from increased cohesion as hypothesized (H11). One explanation for this is that groups low in task motivation may be less inclined to use the "divide and conquer" strategy and be more inclined to rely on group activity, although not necessarily learning-oriented behaviors. This study did not measure the use of a "divide and conquer" or other performance strategies, however, we might expect that the more highly cohesive groups, having chosen a group-oriented performance strategy, spend more hours working together. Not only would greater

learning come from higher levels of cohesion (Gabbert, Johnson et al., 1986) but the group would also have more time to learn from each other.

A post-hoc *t*-test comparing the total number of hours spent together revealed that for groups low in task motivation, greater cohesiveness is associated with more time spent together. For those groups with low task motivation, the mean hours for low cohesion groups was 35.6 hours ($n = 6$) and high cohesion groups was 58.9 hours ($n = 5$) ($t = 4.0$, $p = .003$). For high-task-motivated groups the mean hours for low cohesion groups was 39.1 hours ($n = 8$) and high cohesion groups was 44.7 hours ($n = 48$) ($t = .8$, $p = .43$). Thus, for groups low in task motivation, those groups with high cohesion spend about 23 hours more together than groups low in cohesion. On the other hand, for high-task-motivated groups the degree of cohesion does not make a statistically significant difference in the number of hours spent together. This analysis supports the assumption that, for low-task-motivated groups, those higher in cohesion spend more time together. It seems reasonable that the increased hours and cohesion would result in greater individual learning.

The Role of the Peer Appraisal

The peer appraisal was hypothesized to influence the development of caring behavior (H12), group climate (H14), group cohesion (H13), task outcomes (H15), and individual learning. The findings show there is a direct connection between the peer appraisal and caring behavior and group climate, however, the other relationships were found to be different than hypothesized.

It was hypothesized that the peer appraisal would have a direct effect on group cohesion (H13). Although the peer appraisal does affect cohesion, the effect was found to be mediated by group climate and caring behavior. This is consistent with the previous finding that showed a sense of safety (climate) leads to cohesiveness among team members. One

way to understand the mediating effect of climate on the peer appraisal/cohesion relationship is that the peer appraisal process demonstrates to team members that it is safe to provide feedback and to discuss seemingly sensitive issues. It is through this building of safety that the sense of cohesion builds.

The peer appraisal also affects cohesion by increasing the level of caring behavior within the team. The mediating effect of caring behavior is consistent with research on interpersonal attraction and the development of working relationships where such behaviors are found to be important to the development of the relationship (Gabarro, 1987; Golembiewski and McConkie, 1975). Thus, by increasing the degree of caring behavior in the group we would expect the peer appraisal to positively impact the development of working relationships (i.e., cohesion). The finding that the peer appraisal impacts cohesion through caring behavior and climate is consistent with previous research showing that the peer appraisal impacts cohesion (Druskat and Wolff, forthcoming), however, it provides a refinement in our understanding of the mechanism by which this occurs.

Cause and Effect

When interpreting the results of this study it is important to be careful about attributing cause and effect to the relationships found. Although the longitudinal nature of this study provides the necessary time sequence for attributing cause and effect (Davis, 1985), the results found only four clear relationships where an independent variable at Time 1 affects a dependent variable at Time 2. These relationships involved the effect of the peer review on caring, climate, and outcomes at Time 2 and the effect of satisfaction at Time 1 on climate at Time 2.

Quick Acting vs. Slow Acting Effects

Although the relationship between caring behavior and team effectiveness was as expected, the effect of caring behavior appears to be more immediate than anticipated. What does appear to build over time, as expected, is the level of caring behavior. Since acts of caring will be reciprocated, it makes sense that their level at any given time would be related to their level at prior times. If the relation between caring and climate, cohesion, satisfaction, and task motivation is a cause and effect relationship as hypothesized, the impact appears to be relatively quick acting. Thus, a group member's orientation toward the group is partially influenced by immediate acts of caring. If you display an act of caring today, I feel closer to you, more satisfied, and more engaged, today.

Although it seems reasonable that caring behavior would have an immediate effect, we would also expect some carry-over effects from Time 1 to Time 2. For example, there is a resilience to safety and trust that carry forward across time periods. If safety and trust are high, small disruptions are more likely to be repaired, which helps keep safety and trust high over time (Lewicki and Bunker, 1996). This resilience in safety appears to come through member satisfaction as well as the ability of the group to engage in learning-oriented behaviors that build the group climate over time. For example, groups that engaged in more learning-oriented behaviors at Time 1 were more likely to take the peer appraisal seriously, which then impacted their climate and level of caring behavior at Time 2.

Summary

The findings of this study generally support the hypotheses that caring behavior and the peer appraisal are instrumental for building team effectiveness. As hypothesized, caring behavior directly impacts the sense of safety in the group, cohesion, and task motivation. An unexpected finding is that the role of caring behavior has an increasing influence over time

and that climate's influence decreases. Climate, however, influences the development of relationships (i.e., cohesion), which turn out to have an important influence on team effectiveness. Although the relationship between climate, cohesion, task motivation and outcomes was somewhat different than hypothesized, the hypothesis that caring behavior influences team effectiveness through these variables was supported.

The seriousness and quality with which a team conducts the peer appraisal is the largest single factor influencing team effectiveness. In addition to the effect on team effectiveness, the peer appraisal also affects team dynamics. When done seriously, the peer appraisal directly influences caring behavior and the sense of safety in the group.

DISCUSSION

The two main research questions examined in this study regarded the role of caring behavior and peer feedback on team effectiveness. The premise underlying this research is that working relationships are critical to the functioning of highly effective teams and that caring behaviors represent the individual acts that build working relationships. Furthermore, these behaviors are more than manifestations of individual personalities, they can be stimulated through structured peer feedback. The findings of this study support these assertions and strongly suggest that small acts of caring have effects that permeate the team. Caring behavior was found to be a direct influence on the group's climate, the nature of working relationships, and the desire to put energy into the completion of the group's task.

That working relationships are important to the functioning of groups should not come as a surprise to scholars of teams and organizations. The outcomes of positive relationships have been clearly documented; highly effective teams trust one another, are committed to each other, support each other, and provide feedback (Druskat, 1996; Katzenbach and Smith, 1993). However, the mechanism by which these characteristics emerge is less well understood. One contribution of this research is to illuminate this mechanism and demonstrate that acts of caring do ultimately impact team effectiveness. This study extends work on caring behavior into the domain of teams and begins to balance what we know about management's impact on team effectiveness with an understanding of the responsibility of each team member.

A question that may arise at this point is whether caring behaviors are able to be stimulated within a group. Although understanding the importance of caring behavior to the functioning of groups adds to our empirical knowledge about teams, it does little to

assist the practice of facilitating effective team performance. To build effective teams requires that, in addition to understanding their dynamics, we also understand how to influence those dynamics. If caring behaviors are solely a function of individual personality, they will not serve as a valuable lever for improving team performance. A second contribution of this research is to demonstrate that caring behavior can be stimulated via a structured peer appraisal system. This extends our understanding of peer feedback systems and their impact on group dynamics and effectiveness, and offers a leverage point for influencing team effectiveness.

In the following sections I expand the discussion of these two areas. I integrate the results of this study with current knowledge and examine its unique contributions. I also examine the implications of the findings and areas for future research. I conclude with a discussion of the limitations of this research and suggestions for conducting future research.

Expanding Our Understanding of Effective Teams: The Role of Caring Behaviors

Our current understanding of effective teams focuses mainly on identifying characteristics and routines used by effective teams as well as the organizational and structural factors that management can control to influence team effectiveness (see Pearce and Ravlin, 1987 for a review). Hackman's (1987) model, shown in Figure 4, provides an excellent summary of the research on teams. While most elements of the model are supported by research, our understanding is minimal when it comes to factors that create group synergy and the mechanism by which synergy affects group outcomes. This study begins to fill these gaps.

The findings of this research suggest that caring behaviors are fundamental to the development of synergy, i.e., they create conditions that allow group members to engage in appropriate routines. Prior research has examined competencies of effective teams

(e.g., Druskat, 1996), which helps us understand exactly what effective teams do, however, this may not be sufficient for understanding why one team is effective and not another.

Edmondson's (1996) work on safety is an important first step in demonstrating that there is more to understanding effective groups than knowing what they do, we must know what members think about the group. She shows that collective cognition is an important factor that influences the degree to which a group will engage in learning-oriented behaviors. This study goes one step further and suggests that, not only must we know what the group does as a whole and what members think about the group, we must also understand the subtle relational aspects of individual behavior in the group.

Donnellon (1996) begins to recognize this in her work examining the language of team members. Group processes and collective behavior are important but the language patterns in the group create an atmosphere which impacts the effectiveness of those behaviors. The results of this study demonstrate that caring behaviors (of which speech is a part) act in a similar fashion. They are central to the functioning of groups and appear to become more influential over time. As a group matures, the degree to which caring behaviors are present affects average levels of safety, cohesion, satisfaction, and task motivation within the group, all of which impact team effectiveness.

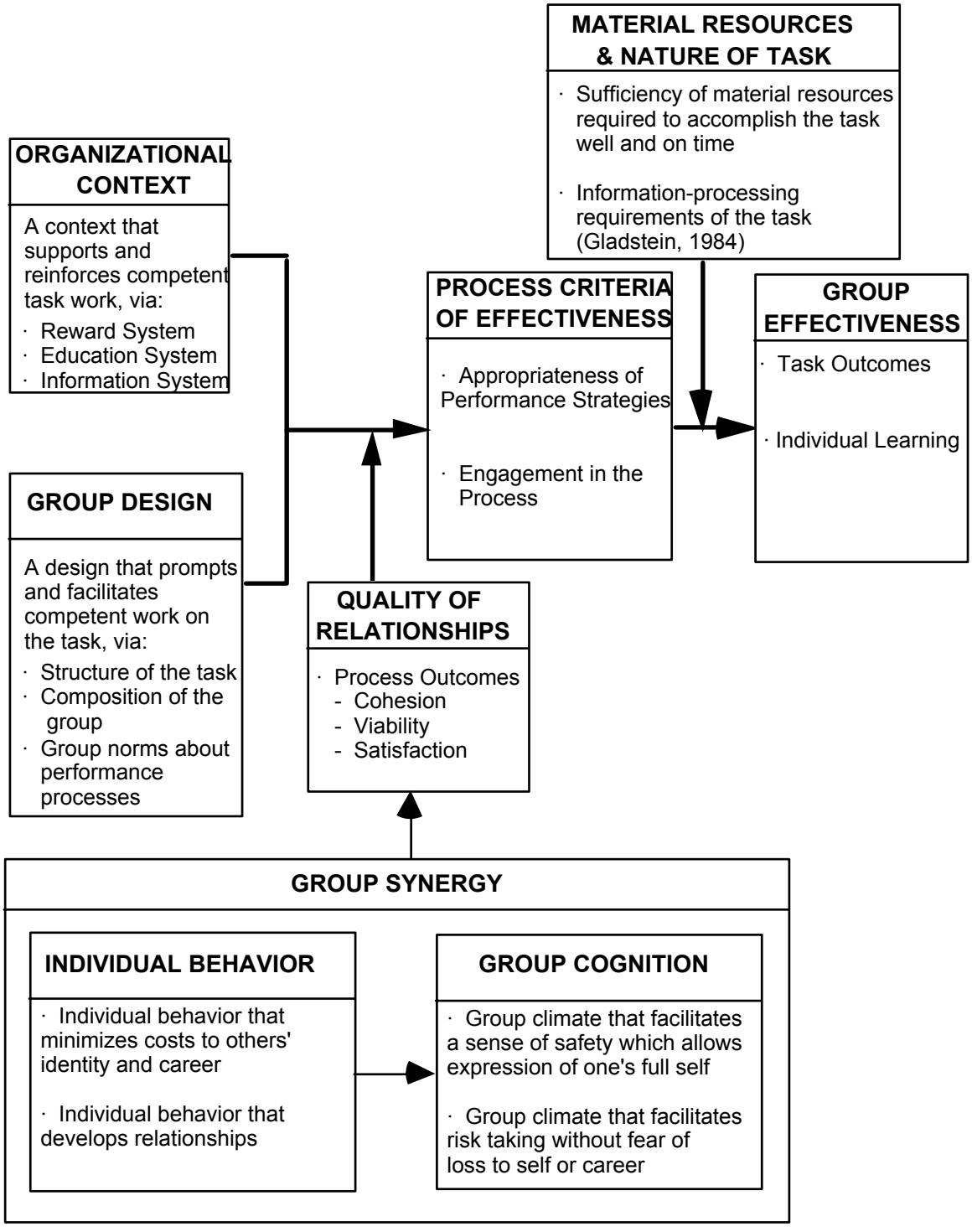
I argue that levels of safety, cohesion, satisfaction, and task motivation are all indicators of the nature of relationships in the group. The conclusion, therefore, is that as caring behavior increases, so does the quality of relationships in the team. And as the quality of relationships improves, so does team effectiveness. This builds on the qualitative work of Fletcher (1994) who found that relational skills contribute to building a sense of team. This study illuminates the mechanism by which relational work creates conditions and

characteristics conducive to effective team performance (see Figure 10) and empirically demonstrates that these conditions are associated with team effectiveness.

The importance of relationships is highlighted by the unexpected finding that learning-oriented behaviors were not directly related to safety as suggested by Edmondson (1996). Instead, safety appears to strengthen relationships as indicated by an increase in cohesion. It is the quality of the relationship (i.e., cohesion) that provides the "secure base" from which group members are willing to take risks involved with engaging in learning-oriented behaviors.

This discussion suggests a modification to the model of group effectiveness presented in Figure 5. The process outcomes (i.e., cohesion, satisfaction, and viability) shown in the model provide an indication of the quality of relationships within the team. This study shows these outcomes emerge from synergistic processes in the group (i.e., individual behavior and related group cognitions) and that the quality of relationships affects the ability of the group to choose appropriate performance strategies and to fully engage in those processes. These findings suggest that process outcomes are indicators of the quality of relationships and are precedent to the process criteria of effectiveness (i.e., choosing and engaging in appropriate performance strategies) not antecedent to it. Furthermore, the findings suggest that the synergistic process involves caring behavior leading to a sense of the group as safe and trusting, and is an input to the development of relationships. A final modification to Hackman's (1987) model is shown in Figure 12.

Figure 12: Relational Model of Group Effectiveness



The model shown in Figure 12 adds detail to our understanding of synergy, showing one mechanism by which it emerges. Synergy can be viewed as a relationship building process affecting the quality of relationships within a team, which in turn influence team effectiveness. The model suggests that we may need to rethink our understanding of relationships in a team. Perhaps relationships are not outcomes of team processes but rather team processes are a manifestation of relationships. Relationships play a critical role in determining whether the team will select and engage in appropriate processes. Instead of being the outcome of group processes, relationships may be better understood as the result of individual processes, e.g., caring behavior. Shifting our perspective on relationships from being a dependent variable influenced by group process to an independent variable that influences group process, has a number of implications.

Implications for Manager-Centric Perspectives of Team Development

Although managers play an important role in setting the environment for their teams, the findings of this study suggest that this is only half the picture. Managers cannot create caring behavior within a team, only the team members are responsible for this. The strong connection between caring behaviors and effectiveness suggests that group members play a large role in controlling their own destiny. It is ultimately the team member who chooses to display a caring behavior or not. The best that managers can hope to do is raise the awareness of team members concerning the choices they are making and provide tools that make it more likely that team members will choose to display caring behavior.

A manager-centric perspective on teams leads to an over reliance on external forces for influencing team effectiveness. Although external forces are important and have been shown to be related to effectiveness (Gladstein, 1984), this research suggests that we need to recognize the responsibility of each team member for the success of the team. An

external perspective can lead to a mechanized and routinized approach to team development. From this perspective, teams are often treated as though they were machines that implement appropriate routines. Relationships are recognized as important to team effectiveness but they are considered to be largely out of a manager's sphere of influence. As a result, the best advice we can give managers is to tend to the external conditions that are most conducive to fostering positive relationships and provide routines to the team that have been shown to be effective for other teams. When the relationships do not develop or the routines are not followed, then we provide training because the team must lack the necessary skills.

Certainly, training is important. However, the findings of this study suggest that the characteristics of effective teams and their ability to be fully engaged in appropriate performance strategies may have more to do with the quality of relational behavior (i.e., caring) than a lack of skill or knowledge. Importing routines shown to be effective in other groups and providing training cannot guarantee that group members will be engaged with those routines rather than half-heartedly going through the motions. This study suggests that the reason such a strategy will work in some groups and not others is related to the relational processes in the group. Managers may be more effective in developing highly effective teams if they take a more balanced approach that focuses on helping team members take responsibility for the character of their behavior in concert with providing the appropriate routines and skills training.

Implications for Training Programs

Training programs suggested for team development often include large doses of interpersonal skills. Although these are undeniably important, this research suggests that they may be focused in the wrong place. Good interpersonal skills translate into caring

behaviors. When people actively listen, they are attending to and validating the speaker. When people raise issues in a non-judgmental way, they are avoiding behaviors that would be perceived as non-caring. Thus, interpersonal skills training will help. This research, however, suggests that this may not be a sufficient focus for training.

Caring behavior does not require much skill. People need to be made aware of the importance of caring behaviors but they do not need much training to implement them. It doesn't take much skill to tell someone you appreciate their efforts, to acknowledge their sacrifices, or to take responsibility for one's own behavior. What this takes is emotional intelligence (Goleman, 1995). People must be self-reflective and they must be able to control their instinctive emotional responses in order to exhibit a caring behavior.

The importance of caring behaviors suggests that people need to be taught the behaviors that are seen as caring and those that are not. Training programs need to teach people to take responsibility for their situation and make effective choices about their individual behavior. Team members must understand that they can have an impact on the team if they understand the appropriate leverage points. Caring behavior provides such a lever.

Implications for Previous Research

Any research that examines relationships among variables runs the potential risk of spurious correlations (Davis, 1985). A spurious correlation occurs when a variable that has not be considered in the research is related to both independent and dependent variables in the study. In this case, observed relationships may actually be the result of the variable that has not been considered. A classic example is the relationship between the number of fire trucks at a fire and the extent of the damage. As the number of fire trucks increases so does the damage, however, the relationship is caused by a third variable—the severity of the fire—that is related to both.

Most research on teams does not take the level of caring behavior into consideration. The findings of this research suggest that caring behavior is central to the functioning of a team and that it precedes, either directly or indirectly, other aspects of team functioning (e.g., climate, cohesion, satisfaction, task motivation etc.). Since much prior research on teams does not take the level of caring behavior into consideration, it is possible that relationships found are in part spurious. The effect of this is that conclusions about the nature of the observed relationships may need to be reevaluated.

Future Research

This research only begins to examine the role of caring behaviors on team effectiveness. This study shows that caring behavior is an important variable in the study of teams, thus, future team research should, at least, control for levels of caring behavior in a team. Beyond this, there are many questions that still need to be explored in more detail. This study suggests that relationships are central to choosing and engaging in appropriate performance strategies and that relationships are the result of caring behavior. It changes relationships from a variable dependent on group processes to an independent variable that influences group processes. Additional research needs to be conducted to more fully understand how relationships impact the selection and engagement in group processes.

This study also suggests that caring behaviors can be chosen by team members. We know from the findings of this study that a peer feedback exercise can serve to stimulate caring behavior, however, it would be useful to explore this in greater detail. If as suggested, our training programs are potentially missing an element related to developing caring behavior, we need to develop more balanced training programs and conduct research that tests their efficacy.

Another area for future research is to better understand the nature of the impact caring behavior has on the team. This study treats caring behavior as a group-level variable. Thus, it examines the impact of the average level of perceived caring in the team. It is conceivable that caring acts on a threshold basis, i.e., one person acting in a caring or non-caring manner might be all that is needed to impact the team. We need to explore the degree to which the effect of caring behavior has a linear effect on the team versus a threshold effect.

Expanding Our Understanding of Effective Teams: The Role of the Peer Appraisal

The second research question involves the role of the peer appraisal on stimulating caring behavior and promoting team effectiveness. The peer appraisal was found to have a double impact on the functioning of the team. Not only does it directly affect objective measures of individual learning, it also affects team synergy (i.e., caring behavior and safety). This double-edged influence of the peer appraisal makes it particularly potent in its influence on team effectiveness. Of all variables studied, the seriousness and quality with which the peer appraisal is conducted has the greatest impact on objective measures of individual learning and team task outcomes (see Table 5).

These findings begin to expand our understanding of peer feedback. Previous research shows peers are accurate judges of their co-workers' behavior (Kane and Lawler, 1978; Lewin and Zwany, 1976; Wexley and Klimoski, 1984), are better than supervisors at evaluating skills that lead to improved performance, and can predict future job performance (Yammarino, 1991). Other studies examine user acceptance (Farh, Cannella et al., 1991; McEvoy and Buller, 1987), but only one study by Druskat and Wolff (forthcoming) examines the effects of a peer appraisal on team dynamics. There are no

previous studies that examine the connection between peer feedback and caring behavior in a team.

Although it is important to understand the accuracy and validity of peer feedback, factors that affect user acceptance, and their ability to predict job performance, we must expand our focus. Traditionally, research on feedback has concentrated on improving motivation and performance of individual workers (Cusella, 1987). As peers became recognized as a potential source of information, the initial interest in peer feedback was to predict future job performance (Roadman, 1964). Research then began to focus on the differences between manager's evaluations and those of peers (e.g., accuracy) (Kane and Lawler, 1978). Research on the effect of peer feedback in non-laboratory settings has been very limited, although there has been research on user acceptance of peer feedback (Farh, Cannella et al., 1991; McEvoy and Buller, 1987).

The findings of the current study help to expand the focus of peer feedback research to include an understanding of its effect on group dynamics. Peer feedback not only affects individual team members, it impacts the development of group synergy (i.e., caring behavior and safety). Contrary to an often expressed fear that peer feedback may harm a team's dynamics (Cederblom and Lounsbury, 1980; DeNisi and Mitchell, 1978), this research suggests that when peer feedback is taken seriously it helps build relationships among members by enhancing the synergistic process. Previous work by Druskat and Wolff (forthcoming) begins to make the connection between peer feedback and group dynamics. The current research extends that line of work by delineating the mechanism by which this occurs (see Figure 10).

Implications for Peer Appraisal Design

With many organizations using self-managing work teams to increase their competitiveness (Lawler, Mohrman et al., 1995), a natural question that arises is how to design a performance appraisal system. Although work has been done around giving feedback (Cusella, 1987), and the design of 360_ feedback (Kaplan, 1993) for improving individual performance, little research exists that helps us understand how to design peer feedback systems that consider both the impact on team dynamics and the impact on individuals.

Although this study did not experimentally examine the design features of a peer appraisal system, it does provide valuable information. The findings clearly show the importance of caring behavior in a team. The features of the peer appraisal system used in this study were designed to promote caring behavior, and did so successfully. The design feature most consistent with producing caring behavior is that the peer appraisal is done face-to-face. Thus, it is not anonymous and the process allows for two-way communication and clarification.

Because the peer appraisal system impacts team dynamics and effectiveness, it is imperative that the system be designed with these outcomes in mind. Peer appraisal systems are often designed to influence individual behavior without considering the impact on the team (Murphy and Cleveland, 1995). Thus, we see many anonymous systems where input is collected from peers and feedback given by a supervisor or human resource representative (Hazucha, Hezlett et al., 1993; Kaplan, 1993). Although this may be helpful to individual development, it may be harmful to the team or work group as a whole. Receiving negative feedback from an anonymous source does not provide the opportunity to display and amplify caring behavior within the team, and may result in

anger and resentment that cannot be worked out with peers. Furthermore, it is also not likely to build a sense of safety that the peer feedback in this study was demonstrated to do. Since caring behavior and safety are two important elements of building cohesion, an anonymous design is also likely to result in lower cohesion than a face-to-face design.

Nevertheless, anonymous designs are usually preferred in organizations because of a fear that face-to-face feedback will result in conflict and a worsening of group dynamics. This research, as well as a previous study by myself and a colleague (Druskat and Wolff, forthcoming), suggest that a structured, developmental, face-to-face peer appraisal can have very positive effects on a team and its effectiveness. Instead of addressing the potential problems of such a design by moving toward anonymity, which precludes the development of caring behavior and a sense of safety, perhaps we should be helping teams address the conflicts in a constructive manner. Not only can doing so have positive consequences for the team (Tjosvold, 1995), it moves the team in a direction that emphasizes individual responsibility for addressing issues that affect the team. The findings of this research show that structured, developmental, face-to-face peer feedback can be a tool that moves a team in this direction.

Future Research

The peer appraisal, as implemented in this study, was focused on the team's process rather than its task. In other words, the feedback was not focused on helping team members improve their work or individual learning, it was focused on behaviors that affect the ability of the team as a whole to accomplish its work. Yet, the peer appraisal had a direct impact on individual learning, which in turn affected team outcomes. Furthermore, the peer appraisal increased caring behavior and the sense of safety within the team, which as discussed above are important factors in team effectiveness. These findings make it clear

that a process-focused intervention such as the peer appraisal provides holistic benefits to the team that influence both process and task criteria of effectiveness. A question that remains for future research is to examine task focused feedback and a combination of task and process focused feedback to see what, if any, differences there are on their effect on the group.

The factors of the peer appraisal design that contributed to its effect on group dynamics were not examined individually. Although this does not pose a problem for examining the effects of the peer appraisal, it does limit our ability to understand the importance of individual design features. Future research should look more closely at the impact of each design feature by manipulating them experimentally.

Expanding Our Understanding of Caring Behavior

In addition to contributions related to the two main research questions, this study also adds to our understanding of caring behavior. Kahn's (1993) work shows that the degree to which workers in a social services agency give and receive care from co-workers and supervisors is related to their ability to fully engage in their work. The current study extends this finding into the arena of groups. Caring behavior was shown to impact the degree to which group members develop cohesive relationships and engage in appropriate performance routines. The fact that caring behavior has an impact at multiple levels in an organization should not be surprising. These behaviors facilitate the formation of relationships, which are fundamental to complex adaptive systems such as groups and organizations (Lewin, 1992). The surprising thing is that caring behaviors haven't received more attention in the organizational and group literature.

Kahn's (1993) work identified eight dimensions of caregiving—to which I added three, however, there were no previous scales to measure team member perceptions of these

behaviors. The scales developed and tested in this study serve as a tool for future researchers wishing to incorporate caring behavior into their research.

In addition to developing measures for caring behavior, this study helps us understand the aspects of caring behavior that group members perceive as distinct. The 11 dimensions of caregiving originally considered in this study were found to be difficult for team members to distinguish from each other. After three iterations of scale development and analysis, it was found that two dimensions of caring behavior could be distinguished (although these were combined in the analysis for this study). These two dimensions can be labeled validation and recognition. The validation dimension is concerned with teammates seeking one's inputs, questioning for understanding, paraphrasing one's perspective, and providing information. These activities provide a feeling that one is important and has a valid perspective that teammates want to understand. The recognition dimension is concerned with teammates expressing appreciation, forgiving, acknowledging sacrifices, accommodating needs, and valuing contributions. These actions serve not only to recognize contributions and sacrifices, but to recognize team member needs and provide support while preserving face.

Future Research

Much more work needs to be done in developing and validating caring scales for use in future research. Although the scales used in this study were carefully developed, they need to be validated in other settings. Furthermore, the scales were developed with the goal of distinguishing them from other variables in this study. This may have limited the number of caring dimensions that could be discriminated.

More work also needs to be done around examining the impact of the various dimensions. The analysis for this research combined the caring dimensions. This provided an overall

indication of caring in the teams but it did not allow a finer analysis of how each dimension affects the team.

Limitations

This research has a number of potential limitations. One concern is the generalizability of the results to an organizational environment. Although the sample was chosen because it has a number of characteristics that are similar to self-managed teams in organizations, the parallel is not perfect. Future research needs to be conducted in organizational settings.

Although the structural equations modeling techniques used for analysis are helpful for dealing with correlated errors in the measurement model, the use of survey techniques and perceptual measures does introduce potential threats to the internal validity of the study. Future research should employ additional methods to collect data on caring behaviors and learning-oriented behaviors within the group. Ideally, observational techniques such as video recording the teams would be used to verify the perceived measures.

The effect of the peer review was measured using an observed partition based on how seriously the teams carried out the peer review. This poses two problems. First, we do not have an answer to the question of what makes the teams do the peer review more or less seriously. Additionally, we need to better understand whether the seriousness with which the teams do the peer review is a natural self-selection process, i.e., those teams that are not ready do it less seriously. The second problem is that we do not have a control group to compare the effects of the peer review against. Future research should attempt to create a control group as well as examine the factors that contribute to the team taking the peer review seriously and whether or not it is advisable to force the issue.

Caring behavior was measured via a survey instrument. Although it is likely that perceptions of caring are more influential than objective measures of caring behavior, there were no objective measures in this study. Future research should examine the correlation between observed caring behaviors and member perceptions. We also need to understand whether objective measures of behavior show the same results as the perceived measures used in this study.

Appendix A: Pilot Test Scales

Scale	# items	Question #s		Items
Accessability	4	1		My teammates do not allow external distractions when we are working together.
		12		My teammates take whatever time is needed to fully understand my needs.
		25	(R)	My teammates do not volunteer to do extra work to help our team during a crunch.
		39		My teammates have rescheduled other commitments so our team could accomplish its work.
Inquiry	3	2		My teammates ask me how I am doing.
		13		My teammates ask about how I am feeling.
		41	(R)	My teammates do not ask me if there is anything upsetting me.
Attention	4	4		My teammates ask me questions to make sure they understand what I have said.
		14	(R)	When I am speaking, my teammates interrupt me to interject their points of view.
		26	(R)	When I am speaking, my teammates do not maintain eye contact.
		42		My teammates paraphrase what I say to make sure they understand me correctly.
Validation	3	15		My teammates tell me that they appreciate my efforts.
		10		My teammates seek my inputs.
		27	(R)	My teammates do not let me know whether they value my contribution to the team.
Empathy	4	6		My teammates express their perceptions of how I am feeling, and they are accurate
		16		When I am feeling troubled, my teammates' facial expressions show concern.
		28		During discussion, my teammates articulate their understanding of my perspective, and they are accurate.
		44	(R)	My teammates do not acknowledge the sacrifices that I make for the team.

Support	3	17		My teammates offer to help me when I ask for it.
		30		My teammates offer to help me get my task done if I am having difficulty.
		45	(R)	When I am having difficulty with my task, my teammates do not offer the support I need.
Feedback	4	7		My teammates provide feedback that helps me improve.
		18		My teammates provide information that helps me see new ways of looking at things.
		31	(R)	When I don't understand something, my teammates do not give me information that clears up my confusion.
		52		My teammates express how they are feeling.
Compassion	4	8	(R)	My teammates do not bend the rules for me when I am having difficulty.
		19		My teammates inject humor when needed to ease tension in our team.
		32		My teammates speak warmly and smile when they talk to me.
		48		When I have personal problems, my teammates ask what they can do to help.
Consistency	3	9		In good times and bad, my teammates are consistent in the way they act toward me.
		20	(R)	My teammates act differently toward me when I make mistakes.
		40	(R)	My teammates act differently toward me when they disapprove of what I say or do.
Forgiveness	4	5	(R)	If I make a mistake, my teammates remind me of it.
		29		My teammates ease my feelings of guilt when I make a mistake.
		36		If I say or do something my teammates don't like, they express their concern about my behavior without judging me as a person.
		46	(R)	If I do or say something my teammates don't like, they remind me of it.
Responsibility		22	(R)	My teammates do not meet the commitments they make to the team.
		34		When I express a need to my teammates, they explore ways to accommodate it.
		47		My teammates accept responsibility when they have made a mistake.
		49		When an ineffective behavior is pointed out to a team member, that team member makes an effort to change it.

Overall	3	23		My teammates act in ways that show they care about me.
		37		My teammates act in ways that show they care about our team.
		50	(R)	My teammates do not act in a caring manner.
Safety	4	53		On our team, team members feel they can be themselves without fear of being viewed unfavorably.
		56	(R)	On our team, there is a sense that making a mistake will be viewed unfavorably.
		58		On our team, team members feel they can raise difficult issues without being viewed unfavorably.
		60	(R)	On our team, asking for help is viewed unfavorably.
Trust	4	54		On our team, team members trust that their efforts will not be undermined.
		55		On our team, team members trust each other to look out for one another's best interests.
		57	(R)	On our team, team members do not trust that sensitive issues will remain confidential.
		59		On our team, team members can be trusted to tell the truth.
LOB	6	3		In this team, we discuss our failures so we can learn from them.
		11		In this team, we take time to explore ways to improve our team's work processes.
		24	(R)	This team handles differences of opinion privately or off-line, rather than addressing them directly as a group.
		35		This team seeks new information that leads us to make important changes.
		38	(R)	In this team, we do not stop to reflect on the team's work process.
		51		People in this team speak up to test assumptions about issues under discussion.
Controversy	3	21	(R)	In this team, people do not express their views fully.
		33		Everyone's view is listened to, even if it is in the minority.
		43		In this team, opposing views aid in the full consideration of the issues.

Cohesion	5	61	(R)	Most of the people in my team are not the kind of people I would enjoy spending time with outside the team.
		65		I wish I had more time for "socializing" with my team members.
		66		If I were to participate in another team like this one, I would want it to include people who are very similar to the ones in this team.
		69		When the semester is over, I still want to see the people in this team as often as I can.
		72	(R)	There are not many people I like as individuals in this team.
Satisfaction	2	62		Generally speaking I am very satisfied with my team.
		67	(R)	I frequently wish I could quit this team.
Viability	6	63		Working with members of this team is an energizing and uplifting experience.
		64	(R)	Sometimes, one of us refuses to help another team member.
		68	(R)	As a team, this work group shows signs of falling apart.
		70	(R)	There is a lot of unpleasantness among people in this team.
		71	(R)	Some people in this team do not carry their fair share of the overall workload.
		73	(R)	Every time we attempt to straighten out a member of our team whose behavior is not acceptable, things seem to get worse rather than better.

Appendix B: Pre-Test Scales

Scale	Pilot Dim.	Question #s		Items
Support	Feedback	1	(R)	When I don't understand something, my teammates do not clear up my confusion.
	Support	9		*My teammates help me when I ask for it.
	Support	20	(R)	When I am having difficulty with my task, my teammates do not help me.
	Support	33		My teammates offer to help me get my task done if I am having difficulty.
	Attention	46		My teammates ask me questions to make sure they understand what I have said.
	Feedback	57		My teammates provide information that helps me look at things in new ways.
Forgiveness	Forgiveness	2	(R)	If I do or say something my teammates don't like, they remind me of it.
	Forgiveness	10	(R)	If I make a mistake, my teammates remind me of it.
	Consistency	21	(R)	*My teammates act differently toward me after I do or say something they don't like.
	New	34		My teammates forgive me when I do something that upsets them.
Validation	Feedback	3		My teammates provide feedback that helps me improve.
	Validation	11		My teammates tell me they appreciate my efforts.
	Accessibility	22	(R*)	*My teammates do not take the time needed to fully understand my needs.
	Validation	35		My teammates seek my inputs.
	Empathy	47		*During discussion, my teammates accurately articulate my perspective.
Responsibility	Responsibility	5	(R)	My teammates do not meet the commitments they make to the team.
	Responsibility	13		*My teammates accept responsibility for their mistakes.
	Responsibility	29		When I express a need to my teammates, they explore ways to accommodate it.
	Responsibility	37		*Team members take responsibility for changing their behavior to improve team effectiveness.
Empathy	Empathy	15	*	*My teammates acknowledge the sacrifices I make for the team.
	Validation	23	(R)	My teammates do not let me know whether they value my contribution.
	Inquiry	38	(R)	My teammates do not ask if there is anything upsetting me.
	New	50		My teammates accommodate my needs.

Overall	16		My teammates act in ways that show they care about me.
	39		My teammates act in ways that show they care about our team.
	58	(R)	My teammates do not act in a caring manner.
Safety	6		On our team, team members feel they can be themselves.
	17	(R)	In this team, making a mistake is viewed unfavorably.
	24		In this team, it is safe to raise difficult issues.
	40	(R)	On our team, asking for help is viewed unfavorably.
Trust	27		On our team, team members trust that their efforts will not be undermined.
	31		On our team, we trust each other to look out for one another's best interests.
	51	(R)	On our team, we do not feel we can trust that sensitive issues will remain confidential.
	59		On our team, we trust that team members will be honest with each other.
LOB	7		In this team, we discuss our failures so we can learn from them.
	18		In this team, we take time to explore ways to improve our work processes.
	25	(R)	This team handles differences of opinion privately or off-line, rather than addressing them directly as a group.
	41		This team seeks information that leads us to make important changes.
	52	(R)	In this team, we do not stop to reflect on the team's work process.
	60		People in this team speak up to test assumptions about issues under discussion.
Controversy	19	(R)	In this team, people do not express their views fully.
	28		Everyone's view is listened to, even if it is in the minority.
	55		In this team, opposing views aid in the full consideration of the issues.
Cohesion	8	(R)	Most of the people in my team are not the kind of people I would enjoy spending time with outside the team.
	30		I wish I had more time for "socializing" with my team members.
	42		If I were to participate in another team like this one, I would want it to include people who are very similar to the ones in this team.
	48		When the semester is over, I still want to see the people in this team as often as I can.
	61	(R)	There are not many people I like as individuals in this team.
Satisfaction	32		Generally speaking I am very satisfied with my team.
	45	(R)	I frequently wish I could quit this team.

Viability	4		Working with members of this team is an energizing and uplifting experience.
	12	(R)	Sometimes, one of us refuses to help another team member.
	36	(R)	As a team, this work group shows signs of falling apart.
	56	(R)	There is a lot of unpleasantness among people in this team.
	49	(R)	Some people in this team do not carry their fair share of the overall workload.
	43	(R)	Every time we attempt to straighten out a member of our team whose behavior is not acceptable, things seem to get worse rather than better.
Gr. Task Mot.	14		Performing well is a top priority for my team.
	26		The members of my team expect a lot of effort and commitment from me.
	44	(R)	My team is not very task-oriented.
	62		In your opinion what is the minimum grade your team feels is acceptable on team projects.
	53		Members of this team care a lot about it, and work together to make it one of the best.
	54		I am generally satisfied with the work I do on this team.

* Indicates question was modified from the wording on the pilot survey

Appendix C: Pre-Test Survey

We are conducting research on teams in management classes and would greatly appreciate your participation. One outcome of this research will be to help design future team experiences that maximize your learning as well as the likelihood that your team will be satisfying and effective. This is the first of two surveys you will be asked to complete this semester. To analyze the data, we must be able to combine your answers on both surveys you complete. For this reason we ask for partially identifying information at the end of the survey. Please remember your answers will be kept completely confidential. No one in your class will see your answers. Your instructor will not see your answers.

Please answer all questions. If you are having trouble with a question, answer it as best you can but please do not leave it blank. Thank you for your participation.

PART 1

For each of the statements below, use the following scale to indicate how much you agree or disagree with the statement. Write your answer in the blank.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

_____1. When I don't understand something, my teammates do not clear up my confusion.

_____2. If I do or say something my teammates don't like, they remind me of it.

_____3. My teammates provide feedback that helps me improve.

_____4. Working with members of this team is an energizing and uplifting experience.

_____5. My teammates do not meet the commitments they make to the team.

_____6. On our team, team members feel they can be themselves.

_____7. In this team, we discuss our failures so we can learn from them.

_____8. Most of the people in my team are not the kind of people I would enjoy spending time with outside the team.

_____9. My teammates help me when I ask for it.

_____10. If I make a mistake, my teammates remind me of it.

_____11. My teammates tell me they appreciate my efforts.

_____12. Sometimes, one of us refuses to help another team member.

_____13. My teammates accept responsibility for their mistakes.

_____14. Performing well is a top priority for my team.

_____15. My teammates acknowledge the sacrifices I make for the team.

_____16. My teammates act in ways that show they care about me.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

_____17. In this team, making a mistake is viewed unfavorably.

_____18. In this team, we take time to explore ways to improve our work processes.

_____19. In this team, people do not express their views fully.

_____20. When I am having difficulty with my task, my teammates do not help me.

_____21. My teammates act differently toward me after I do or say something they don't like.

_____22. My teammates do not take the time needed to fully understand my needs.

_____23. My teammates do not let me know whether they value my contribution.

_____24. In this team, it is safe to raise difficult issues.

_____25. This team handles differences of opinion privately or off-line, rather than addressing them directly as a group.

_____26. The members of my team expect a lot of effort and commitment from me.

_____27. On our team, team members trust that their efforts will not be undermined.

_____28. Everyone's view is listened to, even if it is in the minority.

_____29. When I express a need to my teammates, they explore ways to accommodate it.

_____30. I wish I had more time for "socializing" with my team members.

_____31. On our team, we trust each other to look out for one another's best interests.

_____32. Generally speaking I am very satisfied with my team.

_____33. My teammates offer to help me get my task done if I am having difficulty.

_____34. My teammates forgive me when I do something that upsets them.

_____35. My teammates seek my inputs.

_____36. As a team, this work group shows signs of falling apart.

_____37. Team members take responsibility for changing their behavior to improve team effectiveness.

_____38. My teammates do not ask if there is anything upsetting me.

_____39. My teammates act in ways that show they care about our team.

_____40. On our team, asking for help is viewed unfavorably.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

_____41. This team seeks information that leads us to make important changes.

_____42. If I were to participate in another team like this one, I would want it to include people who are very similar to the ones in this team.

_____43. Every time we attempt to straighten out a member of our team whose behavior is not acceptable, things seem to get worse rather than better.

_____44. My team is not very task-oriented.

_____45. I frequently wish I could quit this team.

_____46. My teammates ask me questions to make sure they understand what I have said.

_____47. During discussion, my teammates accurately articulate my perspective.

_____48. When the semester is over, I still want to see the people in this team as often as I can.

_____49. Some people in this team do not carry their fair share of the overall workload.

_____50. My teammates accommodate my needs.

_____51. On our team, we do not feel we can trust that sensitive issues will remain confidential.

_____52. In this team, we do not stop to reflect on the team's work process.

_____53. Members of this team care a lot about it, and work together to make it one of the best.

_____54. I am generally satisfied with the work I do on this team.

_____55. In this team, opposing views aid in the full consideration of the issues.

_____56. There is a lot of unpleasantness among people in this team.

_____57. My teammates provide information that helps me look at things in new ways.

_____58. My teammates do not act in a caring manner.

_____59. On our team, we trust that team members will be honest with each other.

_____60. People in this team speak up to test assumptions about issues under discussion.

_____61. There are not many people I like as individuals in this team.

GO ON TO PART 2 ON NEXT PAGE

PART 2

Answer the following questions using the scales provided for each question. Circle your answer.

	C	C+	B-	B	B+	A-	A62.
In your opinion, what is the minimum grade your team feels is acceptable on team projects	1	2	3	4	5	6	7

	Very Unclear			Moderately Clear			Very Clear
63. How clear are your team's goals and objectives?	1	2	3	4	5	6	7

	Very Difficult to Determine						Very Easy to Determine
64. How accurately can you pre-determine the tasks that need to be done to accomplish the team's goals?	1	2	3	4	5	6	7

	Not Stressful			About Average			Very Stressful
65. How stressful is your team?	1	2	3	4	5	6	7

66. Check the box that best describes the relation of one person's success to the success of others on your team (check one):

When one person is successful, all members benefit..... ❑

When one person is successful, it has little effect on the success of others..... ❑

When one person is successful, it is more difficult for others to be successful..... ❑

GO ON TO PART 3 ON THE NEXT PAGE

PART 3

General Information (This information is necessary for data analysis purposes. We will only use it to recognize which set of surveys were answered by the same person and to determine the general characteristics of team members. Remember, your answers will remain strictly confidential.)

67. Today's Date: _____ _____ _____
Month Day Year

68. Your Birth Date:_____ _____ _____
Month Day Year

69. Your Team's Name (if you have one):_____

70. Your Team's Number or Letter (if you have one):_____

71. Number of people in your team, including yourself: _____

72. Course Number:_____

73. Section Number:_____

74. Gender (check one): Male..... ❑
Female..... ❑

75. Are you an American citizen? (check one) Yes..... ❑
No..... ❑

76. Is English your first language? (check one) Yes..... ❑
No..... ❑

77. Indicate your status as a student. (check one) Full-time... ❑ Part-time... ❑

78. When will your team present? (check one)
We haven't been told yet..... ❑
First day of presentations..... ❑
Second day of presentations... ❑
Third day of presentations..... ❑

_____79. Please estimate the total number of hours you have spent together with your team (from your first meeting until today).

80. Please indicate your undergraduate grade point average (indicate GPA/Total possible score): _____

(This information is needed to control for differences in skill levels among teams. The information will remain confidential. Be sure to indicate both GPA and total possible score, e.g., 3.4/4.0 or 93/100 for numeric GPAs)

81. Last 4 digits of your BU ID#: _____
(This information is needed to match your answers on this survey with that of the second survey. Your answers on this survey will remain strictly confidential. No one except the researcher will have access to your answers and the researcher will not have access to information that associates your ID# with your name.)

PLEASE CHECK THAT YOU HAVE ANSWERED ALL 81 QUESTIONS.
THANK YOU. YOUR PARTICIPATION IS GREATLY APPRECIATED.

Appendix D: Post-Test Survey

We are conducting research on teams in management classes and would greatly appreciate your participation in this, the second of two surveys. To analyze the data, we must be able to combine your answers on both surveys. Thus, we ask for partially identifying information at the end of the survey. Please remember your answers will be kept completely confidential. No one in your class will see your answers. Your instructor will not see your answers.

Please answer all questions. If you are having trouble with a question, answer it as best you can but please do not leave it blank. Thank you for your participation.

PART 1

For each of the statements below, use the following scale to indicate how much you agree or disagree with the statement. Write your answer in the blank.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

_____1. When I don't understand something, my teammates do not clear up my confusion.

_____2. If I do or say something my teammates don't like, they remind me of it.

_____3. My teammates provide feedback that helps me improve.

_____4. Working with members of this team is an energizing and uplifting experience.

_____5. My teammates do not meet the commitments they make to the team.

_____6. On our team, team members feel they can be themselves.

_____7. In this team, we discuss our failures so we can learn from them.

_____8. Most of the people in my team are not the kind of people I would enjoy spending time with outside the team.

_____9. My teammates help me when I ask for it.

_____10. If I make a mistake, my teammates remind me of it.

_____11. My teammates tell me they appreciate my efforts.

_____12. Sometimes, one of us refuses to help another team member.

_____13. My teammates accept responsibility for their mistakes.

_____14. Performing well is a top priority for my team.

_____15. My teammates acknowledge the sacrifices I make for the team.

_____16. During the peer review we avoided feedback that might cause tension, even though behavioral changes would have helped our team.

_____17. My teammates act in ways that show they care about me.

_____18. In this team, making a mistake is viewed unfavorably.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

_____19. In this team, we take time to explore ways to improve our work processes.

_____20. In this team, people do not express their views fully.

_____21. When I am having difficulty with my task, my teammates do not help me.

_____22. My teammates act differently toward me after I do or say something they don't like.

_____23. My team saw the peer review process as an important tool to improve our effectiveness.

_____24. My teammates do not take the time needed to fully understand my needs.

_____25. My teammates do not let me know whether they value my contribution.

_____26. In this team, it is safe to raise difficult issues.

_____27. This team handles differences of opinion privately or off-line, rather than addressing them directly as a group.

_____28. The members of my team expect a lot of effort and commitment from me.

_____29. On our team, team members trust that their efforts will not be undermined.

_____30. Everyone's view is listened to, even if it is in the minority.

_____31. When I express a need to my teammates, they explore ways to accommodate it.

_____32. I wish I had more time for "socializing" with my team members.

_____33. On our team, we trust each other to look out for one another's best interests.

_____34. Generally speaking I am very satisfied with my team.

_____35. My teammates offer to help me get my task done if I am having difficulty.

_____36. My teammates forgive me when I do something that upsets them.

_____37. My teammates seek my inputs.

_____38. As a team, this work group shows signs of falling apart.

_____39. Team members take responsibility for changing their behavior to improve team effectiveness.

_____40. My teammates do not ask if there is anything upsetting me.

_____41. My teammates act in ways that show they care about our team.

_____42. On our team, asking for help is viewed unfavorably.

_____43. This team seeks information that leads us to make important changes.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

_____44. If I were to participate in another team like this one, I would want it to include people who are very similar to the ones in this team.

_____45. Every time we attempt to straighten out a member of our team whose behavior is not acceptable, things seem to get worse rather than better.

_____46. All members of my team came to the peer review fully prepared.

_____47. My team is not very task-oriented.

_____48. I frequently wish I could quit this team.

_____49. My teammates ask me questions to make sure they understand what I have said.

_____50. During discussion, my teammates accurately articulate my perspective.

_____51. When the semester is over, I still want to see the people in this team as often as I can.

_____52. Some people in this team do not carry their fair share of the overall workload.

_____53. My teammates accommodate my needs.

_____54. On our team, we do not feel we can trust that sensitive issues will remain confidential.

_____55. The peer review process was taken seriously by my team.

_____56. In this team, we do not stop to reflect on the team's work process.

_____57. Members of this team care a lot about it, and work together to make it one of the best.

_____58. I am generally satisfied with the work I do on this team.

_____59. In this team, opposing views aid in the full consideration of the issues.

_____60. There is a lot of unpleasantness among people in this team.

_____61. My teammates provide information that helps me look at things in new ways.

_____62. My teammates do not act in a caring manner.

_____63. On our team, we trust that team members will be honest with each other.

_____64. People in this team speak up to test assumptions about issues under discussion.

_____65. There are not many people I like as individuals in this team.

_____66. My team put in the effort required to make the peer review process valuable for both individual and team development.

PART 2

Answer the following questions using the scales provided for each question. Circle your answer.

	C	C+	B-	B	B+	A-	A
67. In your opinion, what is the minimum grade your team feels is acceptable on team projects	1	2	3	4	5	6	7

	Very Unclear			Moderately Clear			Very Clear
68. How clear are your team's goals and objectives?	1	2	3	4	5	6	7

	Very Difficult to Determine						Very Easy to Determine
69. How accurately can you pre-determine the tasks that need to be done to accomplish the team's goals?	1	2	3	4	5	6	7

	Not Stressful			About Average			Very Stressful
70. How stressful is your team?	1	2	3	4	5	6	7

	Acceptable		Good		Very Good		Outstanding
71. Please evaluate your team's final product?	1	2	3	4	5	6	7

	Learned Much Less		No Difference		Learned More		Learned Much More
72. How did working on your team affect your learning compared to what it would have been working alone	1	2	3	4	5	6	7

73. Check the box that best describes the relation of one person's success to the success of others on your team (check one):

When one person is successful, all members benefit..... ❑

When one person is successful, it has little effect on the success of others..... ❑

When one person is successful, it is more difficult for others to be successful..... ❑

74. Check the box that best describes your work with team members outside of this class (check one):

I do not work with any of my team members outside of this class..... ❑

I work on a team with some of my team members outside of this class..... ❑

I work on a team with all but 2 of my team members outside of this class..... ❑

I work on a team with all but 1 team member outside of this class..... ❑

I work on a team with all of my team members outside of this class..... ❑

	Not at all Seriously			Moderately Seriously			Extremely Seriously
75. How seriously did you personally treat the overall peer review?	1	2	3	4	5	6	7

	Not At All Useful			Moderately Useful			Extremely Useful
76. How useful was the feedback <u>you</u> received in the peer review?	1	2	3	4	5	6	7

77. Check the box that best describes your team (check one):

We split into subgroups to do the peer review, thus, none of us witnessed <u>all</u> team member reviews ... ❑

We didn't split into subgroups but some of our team members were <u>absent</u> during the peer review..... ❑

All members were present for the in-class peer review and witnessed the reviews of <u>all</u> teammates..... ❑

	Rarely, If Ever, Discussed		Sometimes Discussed If It Came Up		Purposefully Discussed for Each Member		
78. To what extent did your team discuss the feedback recipient's view of how the team contributed to his or her behavior?	1	2	3	4	5	6	7

	Rarely, If Ever, Discussed		Sometimes Discussed If It Came Up		Purposefully Discussed for Each Member		
79. To what extent did your team discuss a plan for workingwith the feedback recipient to change his or her behavior?	1	2	3	4	5	6	7

	No Information Heard Before		About 50% Heard Before		Most Information Heard Before		
80. How much of the feedback that you received in the peer review had you already heard from team members prior to the review?	1	2	3	4	5	6	7

	Extremely Harmful			No Effect			Extremely Helpful
81. Overall, what effect do you feel the peer review had on your group's ability to accomplish its task?	1	2	3	4	5	6	7

	Extremely Harmful			No Effect			Extremely Helpful
82. Overall, what effect do you feel the peer review had on your team members saying what they really think and feel to one another?	1	2	3	4	5	6	7

83. How positive/negative was the feedback you personally received in the peer review?

All Negative			Equal Positive and Negative			All Positive
1.....	2	3.....	4	5.....	6	7..... 8 ..... 9..... 10

GO ON TO PART 3 ON NEXT PAGE

PART 3

General Information (This information is necessary for data analysis purposes. We will only use it to recognize which set of surveys were answered by the same person and to determine the general characteristics of team members. Remember, your answers will remain confidential.)

84. Today's Date: _____ _____ _____
Month Day Year

85. Your Birth Date:_____ _____ _____
Month Day Year

86. Your Team's Number or Letter (if you have one):_____

87. Number of people in your CD710 team, including yourself: _____

88. Section Number:_____

89. Gender (check one): Male..... ❑

Female..... ❑

90. Are you an American citizen? (check one) Yes..... ❑

No..... ❑

91. Is English your first language? (check one) Yes..... ❑

No..... ❑

92. Indicate your status as a student. (check one) Full-time... ❑ Part-time... ❑

93. When did your team present? (check one) First day of presentations..... ❑

Second day of presentations... ❑

Third day of presentations..... ❑

_____94. Please estimate the total number of hours you have spent together with your team (from your first meeting until today. Please multiply any per week estimates to get a total number of hours.).

95. Please indicate your **undergraduate** grade point average (indicate GPA/**Total** possible score): _____

(This information is needed to control for differences in skill levels among teams. The information will remain confidential. Be sure to indicate both GPA and total possible score, e.g., 3.4/4.0 or 93/100 for numeric GPAs)

96. Last 4 digits of your BU ID#: _____
(This information is needed to match your answers on this survey with that of the first survey. Your answers on this survey will remain strictly confidential. No one except the researcher will have access to your answers and the researcher will not have access to information that associates your ID# with your name.)

PLEASE CHECK THAT YOU HAVE ANSWERED ALL 96 QUESTIONS.
THANK YOU. YOUR PARTICIPATION IS GREATLY APPRECIATED.

Appendix E: Final Scales Based on Factor Analysis

Question # Pre(Post)	Intended Dimension	Final Dimension	α		Text
35(37)	Validation	Caring	.84		My teammates seek my inputs.
46(49)	Support	Caring			My teammates ask me questions to make sure they understand what I have said.
47(50)	Validation	Caring			During discussion, my teammates accurately articulate my perspective.
1(1)	Support	Caring		(R)	When I don't understand something, my teammates do not clear up my confusion.
11(11)	Validation	Caring			My teammates tell me they appreciate my efforts.
34(36)	Forgiveness	Caring			My teammates forgive me when I do something that upsets them.
15(15)	Empathy	Caring			My teammates acknowledge the sacrifices I make for the team.
16(17)	Overall	Caring			My teammates act in ways that show they care about me.
50(53)	Empathy	Caring			My teammates accommodate my needs.
23(25)	Empathy	Caring		(R)	My teammates do not let me know whether they value my contribution.
17(18)	Safety	Climate	.65	(R)	In this team, making a mistake is viewed unfavorably.
40(42)	Safety	Climate		(R)	On our team, asking for help is viewed unfavorably.
51(54)	Trust	Climate		(R)	On our team, we do not feel we can trust that sensitive issues will remain confidential.
24(26)	Safety	Climate			In this team, it is safe to raise difficult issues.
6(6)	Safety	Climate			On our team, team members feel they can be themselves.
52(56)	LOB	LOB	.63	(R)	In this team, we do not stop to reflect on the team's work process.
18(19)	LOB	LOB			In this team, we take time to explore ways to improve our work processes.
25(27)	LOB	LOB		(R)	This team handles differences of opinion privately or off-line, rather than addressing them directly as a group.
7(7)	LOB	LOB			In this team, we discuss our failures so we can learn from them.

30(32)	Cohesion	.84	(R)	I wish I had more time for "socializing" with my team members.
61(65)	Cohesion			There are not many people I like as individuals in this team.
8(8)	Cohesion		(R)	Most of the people in my team are not the kind of people I would enjoy spending time with outside the team.
42(44)	Cohesion			If I were to participate in another team like this one, I would want it to include people who are very similar to the ones in this team.
48(51)	Cohesion			When the semester is over, I still want to see the people in this team as often as I can.
45(48)	Satisfaction	.86	(R)	I frequently wish I could quit this team.
32(34)	Satisfaction			Generally speaking I am very satisfied with my team.
14(14)	Drive	.69		Performing well is a top priority for my team.
26(28)	Drive			The members of my team expect a lot of effort and commitment from me.
54(58)	Drive			I am generally satisfied with the work I do on this team.
53(57)	Drive			Members of this team care a lot about it, and work together to make it one of the best.

The following scale was not part of the factor analysis and was added to the post-test survey to test how seriously the groups took the peer appraisal.

(16)	Peer	.80	(R)	During the peer review we avoided feedback that might cause tension, even though behavioral changes would have helped our team.
(23)	Peer			My team saw the peer review process as an important tool to improve our effectiveness.
(46)	Peer			All members of my team came to the peer review fully prepared.
(55)	Peer			The peer review process was taken seriously by my team.
(66)	Peer			My team put in the effort required to make the peer review process valuable for both individual and team development.

Appendix F: Development of Final Scales

This appendix describes the process by which the final scales used in this research were developed. DeVellis (1991) suggests eight steps to develop valid and reliable measures.

Step 1: Determine Clearly What You Want to Measure

This step involves using theory to develop a clear understanding of the constructs to be measured. This was accomplished through a literature review and theory development as part of the proposal for this research. Previously validated scales were used or modified when possible. Kahn's (1993) work on caring behavior was used as the basis for the development of scales to measure these behaviors. A careful examination of his description of the dimensions of caring was used as the basis for scale construction.

A second element of this step is to be clear about what the scale will specifically measure. This study is concerned with individual behavior, thus, the questions were carefully constructed to ask about behaviors exhibited within the group.

Step 2: Generate an Item Pool

For previously validated scales of group task motivation, cohesion and satisfaction, the scales were used with minor modifications to fit the population under study. Scales for learning-oriented behaviors and group safety were based on scales developed by Edmondson (1996) and Tjosvold (1986). A pool of 43 questions were generated to measure the 11 dimensions of caring identified in the literature review. The pool of items contained redundant measures and at least one reverse scored question for each dimension. As suggested by DeVellis (1991) the wording of the questions reflected an attempt to minimize ambiguity, reading difficulty, and word count. As will be discussed in step 6, the

newly constructed questions were refined by getting feedback from a pilot sample. Items belonging to previously validated scales were not changed.

Step 3: Determine the Format for the Measurement

The previously validated scales chosen for this study were all based on 7-point Likert scales. To be consistent with these scales newly constructed measures were assessed on the same scales. Respondents were asked the degree to which they agreed or disagreed with each statement. The scales ranged from 1 = *strongly disagree* to 7 = *strondly agree.*

Step 4: Have the Initial Item Pool Reviewed by Experts

The newly developed items for the caring scale were reviewed by William Kahn who has researched and written about caring behaviors. The items were revised as a result of his suggestions.

Step 5: Consider Inclusion of Validation Items

There are two types of validation items that can be included, items that test for response biases and those known to be correlated with the constructs for which scales are being developed. Due to the length of the questionnaire (96 questions on the post-test) and logistics of administering the survey, no validation items were included.

Step 6: Administer Items to a Test Sample

The phase I study served as a test sample for the survey. The sample used to test the survey consisted of students taking the same course in which the research would be conducted.

Step 7: Evaluate the Items

The results of the pilot survey were evaluated through a factor analysis, which is a common means for developing scales (DeVellis, 1991). The pilot survey sample size consisted of 76 students. Because this is a relatively small sample, it was determined that the factor analysis

would include only the newly developed caring items. It is suggested that the sample size minus the number of variables be greater than 51 (Kim and Mueller, 1992). For the pilot study, including only the caring dimensions meant that the sample size was technically insufficient (76-43=33). Nevertheless, this analysis provided a means, although not perfect, for weeding out questions that did not hold together with the majority of other caring questions. An examination of the questions dropped revealed that many could be misinterpreted or did not clearly measure the intended dimension of caring, thus providing face validity for their elimination.

The factor analysis revealed only five meaningful dimensions of caring. These consisted of 21 items which were labeled: forgiveness, validation, responsibility, empathy, and support. Two additional items were added to the final measure such that each dimension of caring had a minimum of 4 items and one reverse scored item.

The above analysis allowed for development of a caring measure that, at least for the pilot sample, demonstrated the ability to discriminate five meaningful dimensions of caring. The small sample size did not allow for testing the discriminant validity of the caring measures with respect to the remaining constructs.

Assessing Discriminant Validity

Due to the limitations of the pilot test for assessing the discriminant validity of scales used in this research, assessing this characteristic of the final measures becomes a top priority. If the measures cannot be shown to represent distinct constructs, then relationships among the constructs found in the analysis of the data will be subject to the alternate hypothesis that they are due to measurement error.

An exploratory factor analysis with oblique rotation on the Time 1 data showed that the questions did not load on clearly defined factors corresponding to the intended measures. As a result, a series of additional factor analyses were performed to develop measures that could discriminate among the intended constructs. A criteria used in developing the final scales was that all factors should contain only items originally intended to measure the same construct. A second criteria was to produce acceptable reliability measures for the scales. Thus, questions 18 and 40, although marginal, were kept because they improved reliability of the learning-oriented behavior and climate scales, respectively. Table G1 summarizes the process by which the final scales used in the analysis were developed. These scales were then validated using the Time 2 data as an independent sample.

Table F1: Factor Analysis Development of Final Scales

MODIFICATION TO THE SCALES	RATIONALE	RESULT
1. All questions included in a factor analysis. Factors with eigenvalues >1 were kept.	- Statring point	13 Factors (1-cohesion, 1-process outcomes, 1-group task mot., 1-climate, 4-caring, 5-mixed)
2a. Deleted questions 2,10.	- Measure of sampling adequacy < .7	12 Factors (1-Cohesion, 2-LOB, 1-Climate, 4-Caring, 5-mixed)
2b. Deleted questions 3,4,21,31,39,54,58	- No factor loading > .30 (significant loading with n=300 is .4 or greater)	
3a. Deleted question 34	- No factor loading > .30	10 Factors (2-group task mot., 2-climate, 2-caring, 1-cohesion/satisfaction, 1-LOB, 2-mixed.
3b. Deleted questions 33,37,38	- Caring questions clearly loading on wrong factor. Deleting them leaves pure factors. Questions deleted may have been difficult to interpret.	
3c. Deleted viability scale (questions 12,36,56,49,43)	- Questions spread across 3 other factors. Viability appears to be a conglomeration of constructs.	
4a. Deleted question 57	- No factor loading > .30	9 Factors (2-caring, 1-LOB, 2-group task mot., 1-cohesion/satisfaction, 2-climate,1-mixed.)
4b. Deleted questions 5,41	- A caring and LOB question loading on group task motivation factor.	

MODIFICATION TO THE SCALES	RATIONALE	RESULT
5a. Deleted question 22 5b. Deleted question 28	- No factor loading > .30 - This is the question in the mixed factor with the higest average anti-image correlation value with other questions in the mixed factor, indicating the worst fit.	8 Factors (1-LOB, 2-caring, 1-group task mot., 1-cohesion/satisfaction, 1-climate, 2-mixed)
6a. Deleted question 27 6b. Deleted one of the mixed factors with 2 questions (59,62) 6c. Deleted questions 55,60 of mixed factor	- No factor loading > .30 - Only two questions in this factor, which clearly do not belong together. - Question 55 is the question in the mixed factor with the higest average anti-image correlation value with other questions in the mixed factor, indicating the worst fit. Question 60 was then deleted because it left a pure climate factor.	7 Factors with only questions intended to load together (1-group task mot., 1-cohesion/satisfaction, 2-climate, 2-caring, 1-LOB)
7a. Deleted questions 9,13, 29 7b. Deleted question 44 7c. Added questions 34,54 7d. Separated Cohesion/Satisfaction into two scales.	- Factor loadings < .40 in factors with five or more questions. Question 29 also showed instability in a sensitivity analysis. - Unstable in sensitivity analysis - Sensitivity analysis showed loading > .40 on intended factor - These are previously validated scales. Examining the questions provides face validity for two factors.	Scales: Cohesion - 5 items - α = .84 Satisfactn - 2 items - α = .86 Task Mot. - 4 items - α = .69 Caring 1 - 6 items - α = .81 Caring 2 - 4 items - α = .70 (Combined caring - 10 items α = .84) Climate 1 - 3 items - α = .59 Climate 2 - 2 items - α = .53 (Combined climate - 5 items α = .65) LOB - 4 items - α = .63

In step one I start with all questions entered into a factor analysis. In this and all subsequent steps, questions with a measure of sampling adequacy less than .7 or no loading greater than .30 are deleted from the mix. In step three there were two caring questions that loaded on factors which otherwise would have contained only items intended to load together. These questions were deleted as were all questions in the viability scale. The viability scale appears to be a conglomeration of a number of constructs.

In step five there was a factor that contained questions from two dimensions. The question with the worst fit based on the anti-image matrix was deleted. The same procedure was used in step six to eliminate questions from a mixed factor. Additionally, one factor contained two unrelated items, both were deleted. The results of this iteration yielded a desirable solution where all questions loaded with other questions intended to measure the same construct.

A final step was taken to refine the final scales. A sensitivity analysis was performed whereby each question not included was added back and the results noted. Additionally, each included question was deleted and the results noted. This analysis revealed some questions that were sensitive to the addition or subtraction of questions, i.e., they loaded most highly on a different factor. These questions were deleted when the remaining questions produced a scale with acceptable reliability, otherwise they were kept. Questions that were added were kept if the loading on the intended factor was greater than .40. Finally, questions that had loadings of less than .40 were dropped unless they were required to improve scale reliability.

The result of the final factor analysis for the Time 1 data is shown in Table G2. When analyzed in relation to all other constructs, the caring behavior scales did not separate into five dimensions as expected. Instead, there were only two dimensions of caring that could be distinguished from the other constructs. Similarly, safety and trust, did not load onto separate factors. Cohesion and satisfaction loaded onto the same factor. These scales are previously validated and separate scales, thus, they were not combined in the analysis. Group viability spread across multiple dimensions and was dropped as an outcome measure. The above factor analysis shows that the final measures of caring, climate, group task motivation, and process outcomes load onto separate factors. Thus, the measures as finally constituted exhibit acceptable discriminant validity.

Table F2: Factor Analysis of Time 1 Data

Question	Factor 1 (Coh./Sat)	Factor 2 (Drive)	Factor 3 (Validation)	Factor 4 (Empathy)	Factor 5 (LOB)	Factor 6 (Climate1)	Factor 7 (Climate2)
S1Q30	.80883						
S1Q48	.78823						
S1Q8	.56127						
S1Q42	.46351	.30834					
S1Q45	.43492	.31096					.30531
S1Q32	.42490	.41258					
S1Q61	.38990					.34096	
S1Q14		.78529					
S1Q26		.63496					
S1Q53		.63249					
S1Q54		.45029					
S1Q46			.74067				
S1Q47			.63539				
S1Q1			.61602				
S1Q35			.50154			.30362	
S1Q15				-.78521			
S1Q16				-.70708			
S1Q11				-.65475			
S1Q23				-.49371			
S1Q34				-.46455			
S1Q50				-.45509			
S1Q52					.69235		
S1Q25					.67475		
S1Q7				-.41878	.52345		
S1Q6						.84350	
S1Q24						.66061	
S1Q17							.61739
S1Q40			.35895				.51804
S1Q51					.33830	.31601	.47126
S1Q18*(LOB)			.32684		.36794		-.37846

As a means of validating the first factor analysis, a second factor analysis with oblique rotation was performed on the data at Time 2 and is shown in Table G3. The number in parentheses after the question number represents the corresponding question number in the first survey. The two questionnaires have slightly different question numbers because six questions measuring the seriousness with which the peer appraisal was conducted were

inserted among the questions of the first survey. The asterisks represent differences from the factor analysis on the data at Time 1. Following the asterisk is the dimension the question was intended to measure.

Table F3: Factor Analysis of Time 2 Data

Question # Post(Pre)	Factor 1 (Empathy)	Factor 2 (Coh./Sat.)	Factor 3 (Drive)	Factor 4 (Climate)	Factor 5 (LOB)	Factor 6 (Validation)
S2Q11(11)	.85596					
S2Q15(15)	.79040					
S2Q25(23)	.64800					
S2Q17(16)	.62293					
S2Q36(34)	.56989			.34222		
S2Q53(50)	.48272					
S2Q37(35)*(V)	.44195					.37856
S2Q51(48)		-.85241				
S2Q32(30)		-.77734				
S2Q8 (8)		-.69445				
S2Q48(45)		-.65099				
S2Q44(42)		-.62653				
S2Q34(32)		-.58104	.31974			
S2Q65(61)		-.51185				
S2Q57(53)*(Drive)		-.46894	.45572			
S2Q14(14)			.70560			
S2Q28(26)			.62303			
S2Q19(18)*(LOB)			.47936		.32505	
S2Q58(54)	.32702		.40575			
S2Q6 (6)				.64637		
S2Q18(17)				.42279		
S2Q54(51)				.41823	.33743	
S2Q26(24)				.38854		.31459
S2Q7 (7)*(LOB)						
S2Q27(25)					.68485	
S2Q56(52)			.43735		.56833	
S2Q50(47)						.67506
S2Q49(46)						.66780
S2Q1 (1)		-.39998				.51920
S2Q42(40)*(Climate)						.46452

The factor analysis on the Time 2 data was, for the most part, able to discriminate among the major constructs of this research. Question 35 originally loaded on the validation

dimension of caring but moved to the empathy dimension of caring. Although these two dimensions of caring appear to be rather stable, I decided to combine them in the final analysis. The two dimensions of climate collapsed on to one dimension, however, question 40 loaded most heavily on the validation dimension of caring. Question 53 of the group task motivation (drive) dimension loaded almost equally on the cohesion/satisfaction dimension and the drive dimension for which it was intended. The learning-oriented behavior dimension had two questions that remained together (#25 and #52), one question (#18) that loaded most heavily on the group task motivation factor and second highest on the LOB factor, and one question (#7) that had no factor loadings greater than .30. Although not a perfect validation of the scales, the results of the second factor analysis provide reasonable confirmation of the validity of the scales, thus, the scales derived from the Time 1 data will be used without change. This increases the generalizability of the results as it reduces the likelihood of the alternate hypothesis that the analysis was fit to the data.

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