To the Graduate Council:

I am submitting herewith a disseration written by DonnaMaria Christina Vigil-King entitled "Team Conflict, Conflict Management Strategies, and Team Effectiveness: A Field Study." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Industrial/Organizational Psychology.

Eric Sundstrom, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

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U.T. ARCHIVES

TEAM CONFLICT, INTEGRATIVE CONFLICT-MANAGEMENT STRATEGIES, AND TEAM EFFECTIVENESS: A FIELD STUDY

A Dissertation
Presented for the
Doctor of Philosophy Degree
The University of Tennessee, Knoxville

DonnaMaria C. Vigil-King
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TO

Rosemary, Bill, and Neah, my beacons on a foggy night.

My father who took me to work before it was "cool."

My God, my family, and the friends who anchor me.

In Memory of Dolores Vigil,
My strongest supporter;
I only wish you were here to see this in more than spirit.

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ABSTRACT

A longitudinal field study examined team effectiveness, including both performance and viability, in relation to team conflict management strategies and three types of team conflict. Hypotheses predicted that integrative conflict-management strategies would correlate with team performance and viability, and that these relationships would vary with the level and type of team conflict. Teams using integrative conflict management styles were expected to have higher performance and viability than teams using less integrative styles. When higher levels of relationship conflict were perceived by the team, the performance and viability of teams using a more integrative strategy would be higher than teams using less a integrative strategy. Finally, the performance of teams using more integrative strategy would be higher than teams using less integrative strategy, when higher levels of task conflict are perceived by the team.

Participants for this study were 323 student members of 77 intact instructional teams. Individual members completed questionnaires mid-semester and late semester. The questionnaire was used to assess all variables expect performance: three conflict-management strategies - collaborative, compromising, and avoiding; three types of conflict - relationship, task, and process; and team viability. Team performance was assessed through instructors' grades, and were standardized within their respective courses. Participating teams were from graduate programs in business administration and accounting, and undergraduate engineering and business administration courses. From 50% to 100% of the students' grades were dependent on team performance.

Results showed that perceived relationship conflict and task conflict were both significantly and inversely related to team viability. Relationship conflict was more predictive of viability than task conflict. The relationship between integrative conflict-management strategies, relationship conflict and viability was also significant. Similarly, when controlling for the level of relationship conflict or task conflict, integrative conflict-management strategies and performance were found to be significant. The interaction between relationship conflict and compromising conflict-management strategy was significant for performance. Implications are discussed.

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CHAPTER 1

INTRODUCTION

For the past several decades, the human element of organizations has slowly shifted from individuals performing single, complete, and intact assignments to groupings of individuals performing larger, more complex tasks. Teams have become central to the structure of organizations (Hackman, 1990; Lawler, Mohrman, & Ledford, 1995). Nearly two decades ago, Jewell and Reitz (1981) observed: "A strong group of talented people can achieve what seems to be impossible..." A decade later, Gordon (1992) found that 82% of the U. S. organizations polled had at least some teams. Sundstrom (1999) postulated that by the year 2000, most organizations will use self-managed teams.

Conflict is common in groups of all kinds, including work groups. For example, Forsyth (1990) states, "group conflict is as common as group harmony" (p.79). Stevens and Campion (1994) suggest that moderate levels of conflict may be necessary for optimal team performance, and others have found that, when managed effectively, it can even be beneficial (Pruitt, 1981; Rahim, 1983; Thomas, 1990). Examples of positive outcomes of conflict in teams include increases in decision quality, strategic planning, financial performance, and organizational growth (Bourgeois, 1985; Schweiger, Sandberg & Rechner, 1989; Eisenhardt & Schoonhoven, 1990).

Conflict is a ubiquitous team dynamic, and it frequently functions as a catalyst for initiating problem-solving or discovering new and innovative solutions to complex situations (Pruitt, 1981). Even so, it is viewed as undesirable by some managers and

employees (Losey, 1994; Stone, 1995). Previous research has indicated detrimental effects of conflict on performance and satisfaction (Pondy, 1967; Blake & Mouton, 1984; Gladstein, 1984; Wall & Nolan, 1986). However, more recent studies in the team or work group context have found conflict to be beneficial (Jehn, 1995, 1997; Amason and Schweiger, 1994; Amason, 1996). For example, Jehn (1995) found that task-oriented conflict can improve the quality of a group's performance. For these reasons, it is important to continue investigating the role conflict plays in team outcomes.

Several researchers have suggested that conflict is an important element in group processes (Gladstein, 1984; Jewell & Reitz, 1981; Argote & McGrath, 1993). These processes are said to influence the team's output (performance and effectiveness). Recent studies have begun to explore the role of conflict within teams and its effect on performance (Jehn, 1995; Amason & Schweiger, 1994; Amason, 1996; Sessa, 1996, Vigil-King & Rush, 1998). Prior to 1993, little research had been done in this arena, and the influence of conflict on a team's level of output had been virtually ignored (Argote & McGrath, 1993).

The present study examines conflict within teams by investigating the integrative conflict-management styles used by teams, and it expands on previous work examining the relationship between the use of various conflict-management strategies and the team outcomes of performance and viability (Vigil-King & Rush, 1998). It incorporates the findings of Jehn (1995, 1997) and her typology of task, relationship, and process conflict. The type of conflict-management strategy used by a group is studied to determine it's

specific relationship to the team's overall performance and viability. The framework presented in Figure 1.1 serves as a guide.

This study expands on the existing research in four ways. First, it attempts to examine conflict at the group level instead of at the traditional individual or dyadic levels. Second, this study is concerned with cognitive conflict tasks (conflicts of viewpoints); most research examining conflict has focused on mixed-motive tasks (conflicts of interest). Third, it examines the relationship between integrative conflict-management strategies and the group outcomes of viability and performance. Finally, this study explores three types of perceived conflict occurring within groups and attempts to link them to conflict-management strategies and group outcomes. To date, no published study has examined the relationships between group conflict, conflict-management strategies, and group outcomes.

The remainder of this chapter will review the types of conflict and some of the models of group effectiveness identified in the literature. A discussion of conflict-management strategies as a tool for investigating conflict within groups will follow, and the chapter will conclude by specifying the hypotheses for this study.

Types of Conflict

To understand the expected relationships between conflict types, conflict strategies, and group performance and viability, three theoretical perspectives were considered. Thomas' (1976) definition of conflict and conflict-management strategies were integrated with Jehn's (1997) conflict typology and several input-process-output models of group effectiveness (Hackman & Morris, 1975; Gladstein, 1984;

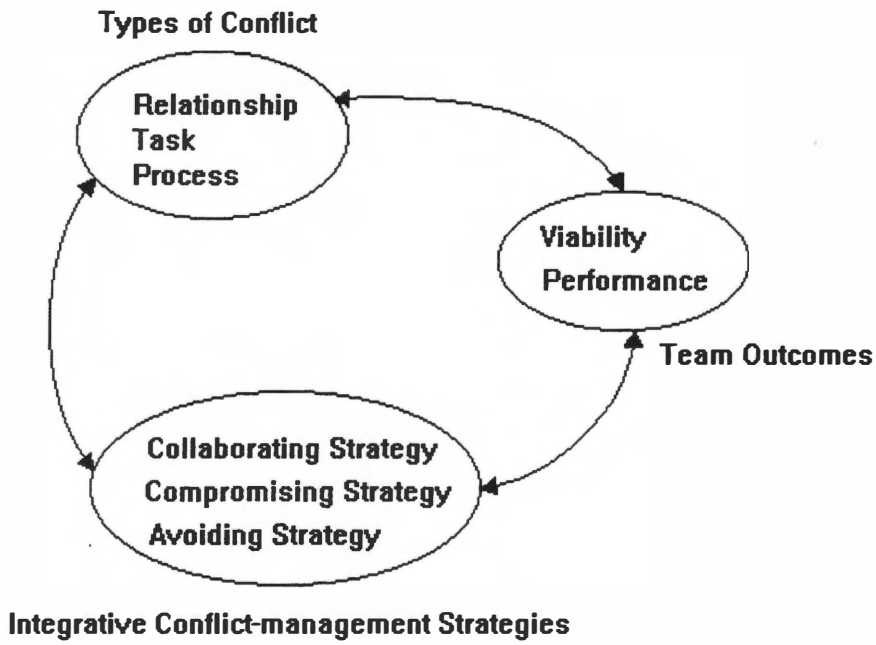


Figure 1.1 Framework for examining conflict and team outcomes using conflict-management strategies.

Sundstrom & Altman, 1989). The following sections will first present Jehn's conflict typology, then briefly review group effectiveness models, and conclude with a discussion of Thomas' conflict-management strategies and their applicability to this study.

Conflict Typology

Jehn's (1997) conflict typology provides a conceptual framework to explore three types of conflict and their relationship to group performance and viability, and builds upon the work of Guetzkow and Gyr (1954), Wall and Nolan (1986), Priem and Price (1991), and Pinkley (1990). Guetzkow and Gyr proposed two types of conflict: affective conflict (conflict in interpersonal relationships) and substantive conflict (conflict specifically involving the group's task). Wall and Nolan expanded on the ideas presented by Guetzkow and Gyr and defined the types of conflict in terms of relationship-focused "people conflicts" and substantive, content-oriented "task conflicts." More recently, Priem and Price suggested that conflict emerging from disagreements indirectly related to the task took on the forms of cognitive, task-related conflicts and social-emotional conflicts, while Pinkley uncovered a task-versus-relationship dimension while conducting a multidimensional scaling analysis of disputants' interpretations of conflict. Jehn (1992) validated Pinkley's finding regarding the task-versus-relationship dimension and discovered that these two types of conflict related differently to work group outcomes.

More recent work by Jehn (1997) has found evidence of a third type of conflict, "process conflict," in addition to task conflict and relationship conflict. Task conflict exists when group members disagree about the content of the tasks being performed; differences may be formulated in terms of differing viewpoints, ideas, and/or opinions.

Displays of tension, animosity, and annoyance among group members may signal the existence of relationship conflict, which involves interpersonal incompatibilities among group members. Over a 20-month period, Jehn observed six organizational work teams (two management teams and four production teams) in the international headquarters of a household-goods-moving company and uncovered another type of conflict: process conflict. This newly identified conflict type focuses on how the work gets done, and disagreements about assignments of duties or resources indicate its presence. To better understand process conflict, it is helpful to examine McGrath's task circumplex, specifically the negotiation quadrant.

McGrath (1984) provided a conceptual framework for examining group-task-performance processes and classified group tasks into four group-performance functions: generating alternatives, choosing between alternatives, negotiating conflict, and executing the behaviors necessary to accomplish the agreed-upon goals. The function of interest in this study is the negotiation function, which can be further divided into two task types, cognitive conflict tasks (concerned with resolving conflicts of viewpoints) and mixed-motive tasks (concerned with resolving conflicts of interest). Mixed-motive tasks have been the most frequently-studied tasks (Levine & Moreland, 1990; Carnevale & Pruitt, 1992).

Cognitive conflict occurs when members are in agreement as to the goal, task, or mission, but have determined multiple and competing means to the end. Mixed-motive conflict results when two or more parties or groups of parties have competing goals. Jehn's (1995) task conflict is similar to cognitive conflict, while her process conflict is

similar to mixed-motive conflict and other constructs such as distributive conflict (Kabanoff, 1991) or procedural complexity (Kramer, 1991). Process conflict is concerned with team regulations or guidelines which govern individual team members' roles and responsibilities and the allocation, distribution, and exchange of resources.

Relationship conflict, task conflict, and process conflict form the foundation of Jehn's (1997) model of group conflict and performance. In addition to establishing a new typology of conflict, she proposes the existence of four conflict dimensions which are each applicable to all three types of conflict: resolution potential, acceptability norms, emotionality, and importance. These four conflict dimensions moderate the three types of conflict and their relationship to group performance, and Jehn suggests that the optimal profile for a high-performance team includes "moderate task conflict, no relationship conflict, little or no procedural conflict, with norms that conflict is acceptable, perceptions that conflict is resolvable, and with little emotionality" (p. 552).

Jehn's identification of the conflict dimension moderators is extremely significant, but the focus of the current study is on conflict-management styles and their relationship to team performance and viability, while exploring the types of conflict perceived by the team. This paper will expand on recent conflict research examining cognitive conflict at the group level by combining Jehn's (1997) typology of conflict and Vigil-King and Rush's (1998) work examining conflict-management styles and team performance and viability. For this study, groups or teams are defined as two or more people who share responsibility for accomplishing specific group goals.

Models of Group Effectiveness

Using Jehn's (1995) conflict typology as a basic framework, conflict in a group setting can best be examined using one of several models of group effectiveness which have been presented in the literature. Representative of the current models are those of Gladstein (1984), Hackman and Morris (1975), and Sundstrom and Altman (1989). All of these models are variations of an input-process-output model.

Gladstein's (1984) model is useful because of its comprehensive nature and because it builds on previous work by Hackman and Morris (1975), expanding on their model of group effectiveness by defining the group interaction process in more detail. Her model has been empirically tested on a large sample of work groups. Briefly, the inputs of the model are at the group level (group composition and group structure) and at the organizational level (resources available and organizational structure). Open communications, supportiveness, conflict, discussion of strategy, and weighing of individual inputs are included in the group process portion, which is defined as those behaviors which "build, strengthen, and regulate group life" and assist the group in resolving the problems to which they are committed (Bales, 1958). Group effectiveness is the output portion of the model, which includes group performance and satisfaction of the group members' needs.

Sundstrom and Altman's (1989) model is also a modified version of the basic input-process-output model, and takes an ecological perspective in analyzing work-team effectiveness. Organizational context and group boundaries are the inputs of this model. Team development equates to group processes, and is inclusive of what has been

considered group structure and interpersonal processes. The output is team effectiveness. In contrast to Gladstein (1984), Sundstrom, De Meuse, and Futrell (1990) identify group outputs as group performance and viability. Viability includes both the satisfaction of the group members' needs and the group's ability to exist over time.

All of these models of work-team effectiveness are input-process-output model variations. This study incorporates these variations by focusing on conflict (identified by Gladstein (1984) as a component of group process) and performance and viability (identified by Sundstrom and Altman (1989) as output components). In their review of group processes in organizations, Argote and McGrath (1993) stressed that little research has examined the influence of conflict on group levels of output. More recent work by Jehn (1995) examined the relationship between conflict and satisfaction, liking, and intent to remain in the group at the individual level, and the relationship between conflict and production at the group level. Within top management teams, Amason (1996) explored the impact of cognitive conflict (task-based) and affective conflict (relationship-based) on strategic decision quality. Vigil-King and Rush (1998) investigated the relationship between conflict-management strategies and performance and viability, both at the group level. Thus, conflict-management strategies (which will be reviewed next) will be used to examine the influence of task conflict, relationship conflict, and process conflict on group levels of output.

Conflict-Management Strategies

This study examines informal conflict within a group and the influence of the three types of conflict on the group's overall performance and viability, based on the

assumption that the conflict-management strategy used by the group reflects their internal group processes. Subjects' conflict-management behaviors were examined using Thomas' (1979) taxonomy of strategic intentions, shown in Figure 1.2. This taxonomy defines an individual's decision to act in a specific way as an indicant of their intention and shows that an intention is the culmination of the individual's thoughts and emotions about the given circumstances. According to Thomas' taxonomy, "the party's strategic intentions are classified and plotted along two basic orthogonal dimensions of intent" (1979, p. 667). These dimensions represent the extent to which a party attempts to satisfy their own concerns (the assertiveness dimension) and the extent to which a party attempts to satisfy the concerns of the other party (the cooperativeness dimension). Within these axes are five strategic intentions:

1) Avoiding: An attempt by a party not to satisfy their own concerns or the concerns of others. In the literature, this intention is also referred to as withdrawing, lose-lose, inaction, fatalistic, or isolation.

2) Accommodating: A party attempts to satisfy the other party's concerns while neglecting their own. This intention has also been referred to as smoothing over, yielding-losing, obliging, yielding, and lose-win.

3) Compromising: An attempt by a party to satisfy some of their own concerns and some of the other party's concerns. Splitting the difference or sharing are other common ways to refer to this intention.

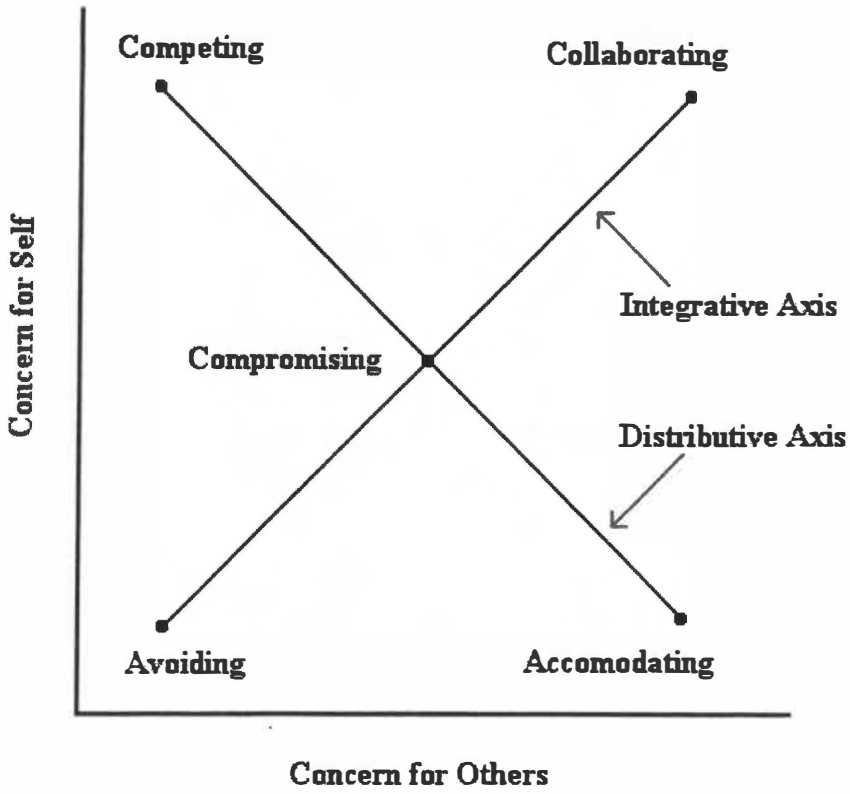


Figure 1.2 Thomas' taxonomy of strategic intentions

4) Competing: An attempt by a party to satisfy their own concerns without regard for the other party's concerns. Other terms for this intention include win-lose, dominating, and contending.

5) Collaborating: One party is attempting to satisfy their concerns and the concerns of the other party. The goal is an integrative solution. Problem solving, synergy, win-win, and integrating are other terms for this intention.

Thomas (1979) theorized that the five conflict-management styles lie on two diagonals: the integrative (major) diagonal, where the interests of both parties are taken into consideration when an agreement is made; and the distributive (minor) diagonal, where each party only looks at their own interests. Avoiding and collaborating conflict-management styles represent polar ends of the integrative dimension, while competing and accommodating represent polar ends of the distributive dimension. Compromising is centered at the intersection of the diagonals and at the centers of the axes.

The diagonals of Thomas' taxonomy have some similarities with cognitive conflict and mixed-motive conflict. Integrative conflict-management strategies are more suited to the resolution of cognitive conflict, in which team members agree as to what their goal, task, or mission is but have different ideas about how to accomplish them. On the other hand, distributive conflict-management strategies are more related to mixed-motive conflict, which involves competing goals. Most definitions of teams incorporate the idea that the members are working towards a common goal (McGrath, 1984; Campion, Medsker, and Higgs, 1993), so this study focused on cognitive conflict and the integrative conflict-management strategies that are suited to its resolution.

Previous work by Vigil-King and Rush (1998) explored how a group's commonly-used integrative conflict-management strategy is related to the group's performance and viability. Using an input-process-output model, they examined the relationship between integrative conflict-management strategies, group conflict, and group performance and viability. They found that a more integrative conflict-management strategy was associated with higher levels of group viability and performance. This study will expand on Vigil-King and Rush's previous work by incorporating, in place of the single measure of conflict, the conflict typology identified by Jehn (1997).

Hypotheses

Jewell and Reitz (1981) discuss two obstacles faced by newly-formed groups and teams which can lead to conflict. The first obstacle is uncertainty and disagreement over power and authority, and the second is uncertainty and disagreement over interpersonal relations. Conflict between team members over goals and the means used to achieve them is common (task conflict), as is conflict concerning issues of group structure (process conflict) or interpersonal relationships (relationship conflict). Regardless of the source, it is important to investigate the three identified types of conflict and their differing relationships to the group organizational outcomes of viability and performance.

Conflict and Viability

Building on the findings of Surra and Longstreth (1990), Walton and Dutton (1969), Peterson (1983), and Ross (1989), Jehn (1995) showed that an individual's level of satisfaction, liking of team members, and intent to remain in the team would be

negatively related to the individual's perceived level of relationship conflict. Viability, which considers the team's capacity to continue operating together in the future, includes member satisfaction, member participation, and capacity for future interaction, and is similar to the variables examined by Jehn at the individual level. Thus, interpersonal tension and frustration resulting from members' feelings of dissatisfaction, dislike, and other negative affective responses should be negatively related to a team's viability (measured at the group level).

In addition, intense task and process conflict may also cause tension, animosity, and annoyance among group members. An individual's normal reaction to any disagreement or questioning is frustration, dissatisfaction, and anxiety (Ross, 1989), and within top management teams, task conflict was found to lead to frustration and dissatisfaction (Amason & Schweiger, 1994). Jehn (1995) found that higher levels of perceived task conflict were related to decreases in team member satisfaction and intent to remain in the group. Conversely, members in groups with high task consensus have expressed more satisfaction and desire to remain in the group than members in groups with high task dissension (Schweiger, Sandberg, and Ragan, 1986).

Ambiguity and disagreements over roles and resources are frequent sources of process conflict among group members (Jehn, 1997). Gladstein's (1984) input-process-output model would suggest that this form of conflict occurs at the group level (group structure) and at the organizational level (resources available), and that these variables refer to the degree to which employee behavior is specified by routines, procedures, and prescribed roles (Pugh, Hickson, Hinings, and Turner, 1968; Kiesler, 1978). Specifically,

norms and role clarity have been identified by Gladstein (1984) as components of group structure.

Norms are rules for behavior developed and used by the group regarding the proper division of labor or activities (e.g., "who should do what"). Behavior norms among team members are often discussed in terms of roles, role expectations, and role systems, and role expectations are norms that specify "what should be done, and who should do what, when and how" (McGrath, 1984, p. 201). Role problems may be the consequence of unclear role messages (role ambiguity) that may require different and mutually conflicting actions (role conflict) and be beyond the capabilities of the target individual (role overload).

At the individual level, Jackson and Schuler (1985) found that role ambiguity and role conflict were associated with lower levels of job satisfaction and higher levels of propensity to leave an organization, as did Netemeyer, Johnston, and Burton (1990). At the group level, Campion, Medsker, and Higgs (1993) found that components of "Job Design" and "Context" (which map onto Gladstein's "Group Structure" and "Resources Available," respectively) were correlated with employee satisfaction. In addition, process conflict can occur when resources are fixed and limited. The involved parties may desire to maximize their own individual gains (Walton & McKersie, 1965), resulting in outcomes which are not favorable to all involved parties. This win-lose outcome of a distributive situation or mixed-motive task can also ignite process conflict, and is not recommended if one desires to maintain a relationship in the future with the other party (Greenhalgh, 1986; Lax & Sebnius, 1986).

Based on the above discussion, the following four empirically-based hypotheses were developed to investigate the relationships between the three types of conflict identified by Jehn (1997) and their relationships with viability:

Hypothesis 1a: Perceived relationship conflict will be related to team viability.

Hypothesis 1b: Perceived task conflict will be related to team viability.

Hypothesis 1c: Perceived process conflict will be related to team viability.

Hypothesis 1d: Relationship conflict will be more predictive of the group's viability than task conflict or process conflict.

Conflict and Performance

The benefits of task conflict are numerous. Janis (1982) discovered that task conflict decreased the groupthink phenomenon by increasing the flow of ideas, criticism, and alternative solutions, and Baron (1991) found that task conflict within a group encouraged its members to develop new ideas. Putnam (1994) determined that issues were better understood and identified when task conflict was present. Longitudinal research by Fiol (1994) demonstrated that learning and accurate assessment of situations improved when group members viewed the issues surrounding the task's content differently. Within the decision-making research, Schwenk and Valacich (1994) found that work groups provided higher quality decisions when they challenged the status quo, and Amason (1996) found that top management teams experiencing task conflict also produced higher-quality decisions and had a clearer understanding of these decisions. In short, conformity, complacency, and lack of understanding and innovation can be the by-products of too little task conflict.

Several researchers have suggested that there are optimal levels of task conflict, with too little conflict resulting in low-quality outputs and too much conflict producing low-quality outcomes or no outcomes (Pondy, 1967; Brown, 1983). Van de Vliert and De Dreu (1994) found that conflict stimulation enhances performance by stimulating activity, while too little conflict can lead to a lack of urgency and inactivity. However, Gersick (1989) found that groups that continued to hammer at issues well past the point of effectiveness and failed to reach consensus were unable to advance to the next stage of fruitful work. Jehn (1995) unearthed support for a curvilinear relationship between task conflict and group performance, which was assessed using supervisor and production reports obtained at the group level. Her analyses showed an optimal level of task conflict in non-routine-task groups.

Unlike task conflict, relationship conflict has been found have a less than positive relationship to productivity and satisfaction in groups (Evan, 1965; Gladstein, 1984; Wall and Nolan, 1986). Evan found that interpersonal attacks were negatively related to group performance and productivity. Specifically, under conditions of relationship conflict, group resources were focused on ignoring or resolving the interpersonal conflicts rather than on performing the task. Baron (1991) found that when the components of interpersonal conflicts included anger or frustration, communication and cooperation among group members were limited. In a study of the ways that relationship conflict is associated with a group's performance, Pelled (1995) found three: 1) group members are less able to consider new information from other members due to more limited cognitive processing; 2) group members are less open to ideas from other group members; and

3) the group uses their resources working on resolving or ignoring the conflicts instead of working on the task at hand.

As mentioned before, process conflict has its roots in the variables of group structure and resources available, as identified in Gladstein's (1984) input-process-output model. Role issues such as role ambiguity, role conflict, and role overload, and resources issues such as managerial support and training can spur process conflict. Role expectations (perceived as role pressures) have also been found to have an adverse relationship with team performance (Ross & Starke, 1981; Katz & Kahn, 1978).

Campion, Medsker, and Higgs (1993) found that managers rated teams with greater job assignment flexibility as more effective. Process conflict resulting from fixed or limited resources will also decrease performance by creating a distributive situation that pits one party's desires against another's. Research examining integrative and distributive bargaining has also found that more integrative solutions generally improve the performance of all parties involved (Thompson, 1990). Thus, it is expected that process conflict will decrease performance.

Grounded in the discussion above, the following hypotheses were developed to explore the relationships between Jehn's (1997) three types of conflict and their relationships with group performance:

Hypothesis 2a: Teams perceiving moderate task conflict will have higher levels of performance than teams perceiving high or low task conflict.

Hypothesis 2b: Perceived relationship conflict will be related to team performance.

Hypothesis 2c: Perceived process conflict will be related to team performance.

Hypothesis 2d: Task conflict will be more predictive of the group's performance than relationship conflict or process conflict.

Conflict-Management Strategies

The third set of hypotheses extends the first two sets to include Thomas' conflict-management styles. According to Gladstein (1984) and Argote and McGrath (1993), conflict is a necessary component of team development, and when teams learn to deal with conflict they can better focus their energy on the group's tasks. Specifically, the management of a team's conflict takes the form of one of Thomas' five conflict-management styles, and integrative conflict-management strategies allow for an increase in satisfaction and performance (Thompson, 1990). For example, when the negotiation outcome was measured by the number of points accumulated during a negotiation exercise, it was found that the negotiator using a more integrative conflict strategy amassed the greater number of points (higher level of performance) (Pruitt & Rubin, 1986). Greater satisfaction has also been associated with integrative tactics (Wall & Nolan, 1986). Since satisfaction is an element of viability, it follows that the level of viability for the group will be higher when integrative tactics are used.

The performance and viability of teams using more integrative conflict-management strategies should also be higher than that of teams using less integrative conflict-management strategies, when higher levels of conflict are perceived by the team. A previous test of these hypotheses lacked sufficient power (small number of teams), but marginally significant results suggested further investigation was warranted (Vigil-King & Rush, 1998). The current study examined the relationships between performance, task

conflict, and the use of integrative strategies; between performance, relationship conflict, and the use of integrative strategies; and between viability, relationship conflict, and the use of integrative strategies. (In situations where the team perceives low levels of conflict, the team's choice of a conflict-management style is not expected to be related to their performance or viability as much, because there is little conflict to be managed.) Hypotheses 3a and 3b address the relationship between conflict-management strategies and performance and viability. Hypotheses 3c, 3d, and 3e are extensions of the first two hypotheses and reflect the interaction of conflict with conflict-management strategies:

Hypothesis 3a: Teams using a more integrative strategy will have higher performance than teams using a less integrative strategy.

Hypothesis 3b: Teams using a more integrative strategy will have higher group viability than teams using a less integrative strategy.

Hypothesis 3c: The performance of teams will be an interactive function of conflict-management strategies and task conflict, such that the performance of teams using a more integrative strategy will be higher than teams using a less integrative strategy, when higher levels of task conflict are perceived by the team.

Hypothesis 3d: The performance of teams will be an interactive function of conflict-management strategies and relationship conflict, such that the performance of teams using a more integrative strategy will be higher than teams using a less integrative strategy, when higher levels of relationship conflict are perceived by the team.

Hypothesis 3e: The viability of teams will be an interactive function of conflict-management strategies and relationship conflict, such that the viability of teams using a more integrative strategy will be higher than teams using a less integrative strategy, when higher levels of relationship conflict are perceived by the team.

Aggregation of Variables

Conceptually, the aggregation of individuals' perceptions of the team's level of conflict, viability, and group conflict-management strategies to the group level has to be based on a sound rationale and a construct which is equally meaningful when analyzed at a higher level (Roberts, Hulin & Rousseau, 1978; James, 1982). The items used in this study to assess the level of conflict perceived by the team and the viability of the team directly addressed the relationship that group members had with one another, and the scales measuring conflict-management strategies addressed the way team members interacted with one another. Thus, the scales meet the first criterion to justify aggregation. Further conceptual justification exists because the constructs of interest represent situations commonly perceived by all group members; it is assumed that group members experiencing the same situation will describe it in similar ways (Jones & James, 1979). The participating teams were all performing similar group tasks under given performance criteria, so this lends further credence to the decision to aggregate the data.

In addition to these conceptual justifications, there must also be statistical justification to aggregate. Schneider and Bowen (1985) suggested that a statistical test of

the homogeneity within groups is preferred over intraclass correlation coefficient indexes (which require between-group differences) when within-group agreement is desired. Past research conducted by George (1990) and George and Bettenhausen (1990) supports this, and James, Demaree, and Wolf's (1984) measure of within-group agreement ($r_{wg(j)}$) for a multiple-item estimator (i.e., scale) was used to test for the homogeneity within groups.

The r_{wg} statistic is an index of interrater agreement, and tests the proportion of systematic variation in judgments in relationship to the total variance in judgments within each group. Provided that the scale to be examined has adequate internal consistency (coefficient alpha of .70 and above), the j items are assumed to be parallel indicators of the same construct. Kozlowski and Hattrup (1992) interpreted the r_{wg} statistic as an indicator of perceptual/statistical convergence, and values of .70 or higher were generally viewed as indicative of agreement among team members (George, 1990).

CHAPTER 2

METHOD

Research Design

A field study examined 77 intact instructional teams in 1-semester university courses. The student team members were involved in team projects as part of course requirements. Members of participating teams completed questionnaires at 2 times during the semester - at week 8 to 10 and again at week 14 to 16 - to provide assessments of team conflict, conflict management strategies, team viability, and team performance. (The first survey distribution will be referred to as Time 1 and the second survey distribution will be referred to as Time 2.) Course instructors provided independent assessments of team performance. Participating teams came from the Masters of Business Administration (MBA) program, the Masters of Accountancy (MAcc) program, and undergraduate engineering and business administration programs. The students participated in the study voluntarily, and were provided gift certificates or extra credit in return for their participation.

Participants

A total of 323 student members of 77 intact instructional teams lasting for one semester participated in the study. Teams consisted of 3 to 12 students (mean = 4.26, standard deviation = 1.24). Table 2.1 provides information regarding the number of

Table 2.1. Time 1 participant population demographic and return rate information

	Fall			Spring			Time in semester when measured	Gender	Age	
	Ind	Teams	RR	Ind	Teams	RR		% Male	Mean	SD
MBA	77	17	84%	72	15	84%	8-10 weeks	72	25.4	3.54
MAcc	52	11	65%				8-10 weeks	43	23.9	6.28
Engineers				72	18	92%	8-10 weeks	91	23.7	3.66
Undergrad 1				26	5	100%	4 weeks	58	22.8	2.49
Undergrad 2				19	5	83%	8-10 weeks	61	22.1	.94
Undergrad 3				22	5	85%	4 weeks	50	23.2	2.51
Totals	129	28	75%	211	48	88%		68	24.3	3.71

individuals and the number of teams they comprised, the return rate for each survey, and the age and gender of those participating.[1]

There was a variety of approaches to teamwork used among the various disciplines from which the participant population was drawn. The student participants were involved in teams that were much like organizational work teams. They were expected to develop and implement their own strategies, and to create and present multiple presentations to both faculty and external companies. In some cases, they even had to contact external vendors to obtain equipment. Between 50 - 100% of the participants' grades were dependent on team performance. Team projects spanned the course of the semester, ranging from a single project to as many as 7 projects.

MBA Teams. MBA students comprised two separate sets of participating teams, one during the fall semester and one during the spring semester. Prior to the onset of classes, students were divided into teams of four to six members by the program coordinator, yielding 18 teams. To maximize the breadth of task-relevant expertise, the program coordinator took into consideration each individual's work background, expertise, and major concentration. Personality measures and biographical data were also used to assist the program coordinator in shaping diverse teams.

The above method of dividing the MBA students into different teams was followed for spring semester as well. MBA students are assigned to different teams at the beginning of each new semester, so the MBA teams surveyed during the fall semester were not the same teams as those surveyed in the spring semester. Students were divided

[1] See Appendix B, Table B.1, for Time 2 participant population and return rate information.

into new teams of four or five students by the program coordinator, yielding 17 teams. (Attrition resulted from students leaving the MBA program in both fall and spring semesters).

MBA course work was team-based, and the teams worked together on the same assigned projects throughout the 16-week semester. Approximately 60% of the work required of the MBA students was team-based. 92 students were solicited in the fall and 86 students were solicited in the spring.

MAcc Teams. Prior to the onset of classes, students were divided into teams of three or four members by the program coordinator, yielding 20 teams. Biographical data was used to assist the program coordinator in maximizing the breadth of task-relevant expertise. The program coordinator took into consideration each individual's work background, expertise, and type of accounting specialty when shaping diverse teams.

MAcc course work was team-based, and the teams worked together on the same assigned projects throughout the 16-week semester. Approximately 50% of the work required of the MAcc students was team-based. 80 students were solicited.

Engineering Teams. Course instructors assembled upper-level undergraduate students from four engineering courses into teams ranging in size from 3 to 12 members: 7 Chemical Engineering teams with 3 students per team; 12 Mechanical Engineering teams with 3 or 4 students per team; 1 Fluid Engineering Team with 5 students; and 1 Automotive Engineering team with 12 students. The Chemical Engineering and Mechanical Engineering course instructors randomly divided the students into teams. Students on the Fluid Engineering and Automotive Engineering teams volunteered for

these projects, and the projects lasted for the entire semester. The Mechanical Engineering teams each had their own designated project to complete by the semester's end. The Chemical Engineering students worked on five different projects during the semester, but different groups worked on the same projects at differing times. A total of twenty-one engineering teams, comprised of 78 students, were solicited.

One hundred percent of the work required of the Engineering students was team-based, and the teams worked together on assigned projects throughout the 16-week semester. Depending on the instructor, between 50% and 100% of the students' grades were dependent on the outcome of their team project. Peer appraisals and instructor ratings of each individual determined the remainder of students' grades for teams having less than 100% of their course grade dependent on the team project.

The Automotive Engineering team stands out from the rest because it was the largest of all the teams surveyed, with 12 team members. Although it was much larger than the others, this team was included because all team members felt that they were (and acted as) a single team. The team was tasked with the responsibility of creating a high-performance car to run in a race. Faculty members and engineering students viewed and treated this team as similar to a high-performing sports team (i.e., a football team, a baseball team, the pit crew for a race car, etc.).

Business Teams. Upper-level undergraduate students were solicited from 2 business courses, and divided into teams of 5 or 6 members by the course instructors. One instructor had students working in the same team for 16 weeks, yielding five teams. The other instructor had students working in one team for the first 8 weeks of the

semester. Students were then assigned to different teams for the last 8 weeks of the semester. Regardless of the instructor, teams within each course completed the same projects. A total of fifteen teams resulted from these courses. Approximately 50% of the work required of the upper-level undergraduate business students was team-based, and 49 students were solicited.

Time 1 Participants

The final set of 323 surveys comprised 77 teams (32 MBA teams, with a total of 143 student responses; 12 MAcc teams, with a total of 42 student responses; 18 engineering teams, with a total of 71 student responses; and 15 undergraduate business teams, with a total 67 student responses). When analyzing data at the team level, 17 surveys were eliminated because information used to identify team membership was missing or because fewer than three members of a given team completed the survey.

Time 2 Participants

The final set of 270 surveys comprised 65 teams (28 MBA teams, with a total of 126 student responses; 13 MAcc teams, with a total of 47 student responses; 16 engineering teams, with a total of 64 student responses; and 8 undergraduate business teams, with a total of 33 student responses). Again, when analyzing data at the team level, thirty-seven surveys were eliminated because information used to identify team membership was missing or because fewer than three members of a given team completed the survey.

Procedure

Participants in this study were solicited in a variety of ways. Student participation was petitioned from the MBA and MAcc programs through the respective department deans. The undergraduate business students were solicited through their instructors, who were graduate-student instructors from the Management department. The engineering student participants were obtained through the Engineering department's team facilitator.

The solicitation of the students was performed by arrangement with the above-mentioned contacts. The students were given a brief explanation of the surveys they would be completing and the incentives that would be available to them for participation. At the beginning of coursework and then periodically during the semester, the surveys were distributed during class visits, along with a reminder of the incentives for participation. Further reminders were sent via mass e-mails, delivered through the deans of the MBA and MAcc programs, the graduate-student instructors, and the engineering department teams facilitator. The surveys were returned to secretaries in the Management department or via campus mail in sealed envelopes provided to the participants. Incentives were distributed at the end of each semester by Management department secretaries.

Incentives. Students were provided various incentives for participating. Any MBA or MAcc student returning all surveys by the designated deadlines received a $10 gift certificate to Border's Bookstores. These students had the opportunity to earn an additional $5 gift certificate if they and their teammates returned all surveys by the designated deadlines. In addition, teams that fully participated in all surveys were entered

into a drawing for an additional gift certificate to Border's Bookstores. Members of the winning team each received an additional gift certificate valued at $25. This procedure was followed again during the spring semester for the MBA students.

Engineering students were more motivated by food than books. Any Engineering student returning all surveys by the designated deadlines was given a $10 gift certificate to Calhoun's restaurant. Students had the opportunity to earn an additional $5 gift certificate if they and their teammates return all the surveys by the designated deadlines.

The undergraduate business instructors provided extra credit to participating students upon completion of the surveys. As an extra incentive, teams that fully participated had an opportunity to enter a drawing for a gift certificate to Border's Bookstore. Members of the winning team each received a gift certificate valued at $15. Students who were in two different teams during the semester had two opportunities for extra credit and an opportunity for a chance in both drawings.

Students completed two survey measures during the semester: approximately mid-semester (Time 1; during weeks 8 through 10) and near the conclusion of the semester (Time 2; during weeks 14 through 16). Measures collected from MBA students, MAcc students, undergraduate business students, and half of the engineering students corresponded with the completion of a major team project. The remaining engineering students worked continuously throughout the semester on a single project, and only the second survey corresponded to the completion of a group project.

Several sets of participants were measured twice. During spring semester, MBA students were again measured after completing each of two milestones (major team

projects). These projects occurred during mid-semester and at the end of the semester. (As a reminder, MBA students are assigned to different teams at the beginning of each new semester, so the MBA teams surveyed during the fall semester were not the same teams as those surveyed in the spring semester.) Students from the second undergraduate business course were measured during the fourth week (mid-point of team work) and eighth week of classes (later part of team work). They were then assigned to different teams and measured during the twelfth week (mid-point of team work) and sixteenth week of classes (later part of team work).

Performance measures were collected from the respective program contacts. MBA and MAcc instructors provided their ratings to the deans of their respective departments. The graduate-student instructors provided their ratings directly. The engineering department teams facilitator collected the project grades from the engineering instructors.

Students were gathered for debriefing at the end of the semester. MBA students were not debriefed until spring semester, since they were measured during both fall and spring semesters. The purpose of this study and an explanation of the hypotheses were provided to the participants, as well as some suggested "further reading" on teams and conflict management.

The variables used in this study were designed to assess the group's level of relationship, task, and process conflict, their viability, and the conflict style most often used by their group. Performance measures were gathered from the instructors.

Measures

Nearly identical four-page surveys were distributed twice during the semester. (The differences in the surveys were minor; for example, demographic information was only collected at Time 1.) The seven scales used in this study were part of a larger survey effort. (Of the 126 items on each survey, all items addressed some form of group interaction process such as group communication, group goal clarity, group reflexivity, etc.) The general instructions included at the top of each survey were as follows: "Completing this survey will require approximately 15-20 minutes. No individual responses will be revealed. All data will be summarized at the group-level. Participation in this project is voluntary. If you choose not to participate, you will not be penalized. You may terminate participation at any time. The return of this survey will constitute informed consent to participate."

Team conflict strategies were assessed using a modified version of the ROCI-II (Rahim, 1983a). Task, relationship, and process conflict were measured using scales developed by Jehn (1995). Several additional items were also developed in order to improve on Jehn's existing scales. Group viability was assessed using a scale developed by Sundstrom (George, Perkins, Sundstrom, & Myers, 1990). Team grades were collected from the instructors and used as the group performance measure.

Conflict Strategies

The students reported on their team's conflict style using a modified version of the ROCI-II scale (Rahim, 1983a). The original scale measured an individual's situation-specific conflict style. It consisted of 28 5-point Likert scale questions which measured

the five styles of handling interpersonal conflict, consistent with Thomas' taxonomy. The Likert scale responses ranged from strongly agree (5) to strongly disagree (1). Evidence of the scale's validity is indicated by the ROCI-II's ability to discriminate between groups having known, differing conflict styles and by the scale's relationship with other conflict constructs (Rahim, 1983a, 1983b, 1986; Weider-Hatfield, 1988). Other variations of the original ROCI-II have been developed to assess the conflict style used by an individual when interacting with their peers, supervisors, or subordinates (Rahim & Magner, 1995).

This study used a group variation of the original ROCI-II to assess the group's level and style of conflict-management, substituting the words "team" or "team members" where the original referred to either "supervisor," "peer," or "subordinate." For example, where the original ROCI-II item read: "I often went along with the suggestions of my supervisor," the modified group variation reads: "Members of my team often went along with the suggestions of other team members." This group variation of the questionnaire asked individuals to consider the actions of their teammates during team exercises. The response options were strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1). While students' responses were elicited for all five conflict-management styles, this study only focused on the three conflict-management strategies associated with the integrative axis (collaborative, compromising, and avoiding). The collaborative, compromising and avoiding scales consisted of seven, four, and six items respectively, but one item each was dropped from the collaborative and avoiding scales. The responses to corresponding scale items were averaged to create each conflict-management strategy and average scores could range between 1 and 5. The coefficient alphas for the scales

included in the modified ROCI-II (collaborative, compromising, and avoiding) were .88, .80, and .83, respectively. See Figures 2.1 through 2.4 for the items collected and the instructions given for completing these scales.

Conflict Measures

Group members were also asked to assess the level of conflict present in their respective groups. An eight-item measure developed by Jehn (1995) was used to measure task and relationship conflict. Process conflict was measured using three items from Jehn's (1992) Intragroup Conflict Scale. Nine additional items were added to augment Jehn's three conflict scales, since past research showed that several of the items loaded negatively on their factor (Jehn, 1993, 1995). The 5-point Likert scale response options were: constant (5); a lot (4); some (3); a little (2); and none (1). See Figures 2.5 through 2.8 for the full set of items collected and the set of instructions given for completing these scales.

Task Conflict. Conflict associated with the group's task was assessed using Jehn's (1995) four-item measure of task conflict (e.g., "How frequently are there conflicts about ideas in your work unit?") and four newly developed items. References to "work unit" in the original scale were changed to "team." All eight items were retained and summed to create this scale (which could range between 8 and 40), and the coefficient alpha was .90.

Relationship Conflict. Conflict involving one's affective responses to individuals was assessed using Jehn's (1995) four-item measure of relationship conflict (e.g., "How

1. Members of my team tried to integrate their ideas to come up with a decision jointly.
2. Most members of my team tried to work together for a proper understanding of a problem.
3. Most members of my team tried to investigate an issue to find a solution acceptable to us.
4. Most team members tried to work together to find solutions to problems which satisfied our expectations.
5. Members of my team exchanged accurate information with each other to solve a problem together.
6. Members of my team collaborated with each other to come up with decisions acceptable to us.
7. My teammates tried to bring all our concerns out in the open so that the issues could be resolved in the best possible way.

Note: Items are measured on a five-point scale (1 = strongly disagree to 5 = strongly agree).

Figure 2.1 Items measuring the "collaborative" conflict-management style.

1. My teammates tried to find a middle course to resolve an impasse.
2. My teammates negotiated with each other so that a compromise could be reached.
3. Most members of my team used "give and take" so that a compromise could be made.
4. Members of my team usually proposed a middle ground for breaking deadlocks.

Note: Items are measured on a five-point scale (1 = strongly disagree to 5 = strongly agree).

Figure 2.2 Items measuring the "compromising" conflict-management style.

1. My team members attempted to avoid being "put on the spot" and tried to keep their conflict with other team members to themselves.
2. Most members of my team tried to keep their disagreements with each other to themselves in order to avoid hard feelings.
3. Members of my team tried to avoid unpleasant exchanges with each other.
4. Most members of my team usually avoided open discussions of their differences with each other.
5. Most members of my team tried to stay away from disagreements with each other.
6. My teammates avoided encounters with each other.

Note: Items are measured on a five-point scale (1 = strongly disagree to 5 = strongly agree).

Figure 2.3 Items measuring the "avoiding" conflict-management style.

SECTION I - Incompatibilities, disagreements, or differences (i.e., conflict) within teams occur regularly. Please carefully read each of the following statements, then indicate **YOUR EXPERIENCES** and how **YOUR TEAM** handled any conflict situations that may have occurred from the **beginning of the semester through the completion** of XXX project name XXX. Using the following scale, indicate your responses by writing 1, 2, 3, 4, or 5 in the blank to the left of the item.

1 = strongly disagree **2** = disagree **3** = neutral **4** = agree **5** = strongly agree

Figure 2.4 Instructions for completing the ROCI-II.

1. To what extent were there differences of opinion in your team?
2. How often did your teammates disagree about opinions regarding the work being done?
3. How much conflict about the work you do was there in your team?
4. How frequently were there conflicts about ideas in your team?
5. How often did your teammates disagree about ideas regarding the task? *
6. To what extent were differences of opinion regarding tasks evident among your teammates? *
7. To what extent where there disagreements about the tasks you were working on with team members? *
8. How often did your teammates disagree about the work being done? *

Note: Items are measured on a five-point scale (1 = none to 5 = constant).

* Newly developed items

Figure 2.5 Items measuring task conflict.

1.	How much friction was there among members of your team?
2.	How much tension was there among team members?
3.	How much were personality conflicts evident in your team?
4.	How much emotional conflict was there among team members?
5.	How much anger was present in your team?
6.	To what extent were personality clashes evident in your team?

Note: Items are measured on a five-point scale (1 = none to 5 = constant).

Figure 2.6 Items measuring relationship conflict.

1.	How often did your teammates disagree about how the work should be divided? *
2.	How frequently were there disagreements about who should do what in your team?
3.	How much disagreement was there about procedures in your team?
4.	To what extent did you disagree about the way to do things in your team?
5.	How often did your teammates disagree about whose responsibility it was to complete a task? *
6.	To what extent did your teammates disagree about the processes used to complete tasks? *

Note: Items are measured on a five-point scale (1 = none to 5 = constant).

* Newly developed items

Figure 2.7 Items measuring process conflict.

SECTION II - This section asks you to describe the ongoing activities in your team. Please read each item and indicate the response that best represents your evaluation of **YOUR TEAM** from the **beginning of the semester through the completion of** XXX project name XXX.

1 = none **2** = a little **3** = some **4** = a lot **5** = constant

Figure 2.8 Instructions for completing the items representing relationship, task, and process conflict.

much friction is there among members in your work unit?") and two other items (Jehn, 1992). References to "work unit" were changed to "team." Five of Jehn's items were retained and summed to create a relationship conflict scale (which could range between 5 and 25), and the coefficient alpha was .95.

Process Conflict. Three items from Jehn's (1992) Intragroup Conflict Scale (e.g., "How much disagreement was there about procedures in your work group?") and three additional items were developed to assess process conflict. References to "work group" were changed to "team." The items reflected disagreements about roles and the distribution of resources within the teams. Two newly developed items and one of Jehn's were summed to created this final conflict scale (which could range between 3 and 15), and the coefficient alpha was .88.

Viability

Five items were used to measure the group's viability. This scale was developed by Sundstrom (George, Perkins, Sundstrom, & Myers, 1990), and covers aspects of satisfaction, participation, and capacity for future work (e.g., "Everyone on my team wants to continue working together in the future"). All items were scored using a 5-point Likert scale, with the following response options: strongly agree (5), agree (4) neutral (3), disagree (2), strongly disagree (1). The scale score was calculated by averaging across all of the items, and could range between 1 and 5. The coefficient alpha for this scale was .86. See Figures 2.9 and 2.10 for the full set of items collected and the instructions given for completing the scale.

1.	Everyone on my team wants to continue working together in the future.
2.	Everyone on my team does their share of the work.
3.	I find it personally satisfying to be a member of my work-team.
4.	Certain members of our team aren't pulling their weight. (R)
5.	I am proud to be a member of this work team.

Note: Items are measured on a five-point scale (1 = strongly disagree to 5 = strongly agree).
R = Reverse-coded item.

Figure 2.9 Items measuring team viability.

SECTION III - This part of the questionnaire asks how you feel about your team and about your team's ability to function. In the blanks provided, please indicate how you currently feel about your team *TODAY*.

1 = strongly disagree **2** = disagree **3** = neutral **4** = agree **5** = strongly agree

Figure 2.10 Instructions for completing group viability items.

Individual-Level Variables

Collaborating Strategy. Individual scores were obtained by averaging responses to 6 items, all ranging from 1 to 5 where 5 indicated the greatest collaboration. Individual scores ranged from 1 to 5 with a mean of 4.04 and standard deviation of .60.

Compromising Strategy. Individual scores were obtained by averaging responses to 4 items, all ranging from 1 to 5 where 5 indicated the greatest compromising. Individual scores ranged from 1 to 5 with a mean of 3.63 and standard deviation of .66.

Avoiding Strategy. Individual scores were obtained by averaging responses to 5 items, all ranging from 1 to 5 where 5 indicated the greatest avoidance. Individual scores ranged from 1 to 5 with a mean of 2.98 and standard deviation of .78.

Relationship conflict. Individual scores were obtained by summing responses to 5 items, all ranging from 1 to 5 where 5 indicated the greatest conflict. Individual scores ranged from 5 to 25 with a mean of 10.19 and standard deviation of 4.77.

Task conflict. Individual scores were obtained by summing responses to 8 items, all ranging from 1 to 5 where 5 indicated the greatest conflict. Individual scores ranged from 8 to 40 with a mean of 17.68 and standard deviation of 5.70.

Process conflict. Individual scores were obtained by summing responses to 3 items, all ranging from 1 to 5 where 5 indicated the greatest conflict. Individual scores ranged from 3 to 15 with a mean of 5.13 and standard deviation of 2.34.

Group Viability. Individual scores were obtained by averaging responses to 5 items, all ranging from 1 to 5 where 5 indicated the greatest viability. Individual scores ranged from 1 to 5 with a mean of 3.49 and standard deviation of .93.

Group-Level Predictors and Viability

To create the group-level variables, individual scale scores for the predictor variables (collaborating, compromising and avoiding strategies and relationship, task, and process conflict) and the criterion variable of group viability were aggregated using the mean aggregation function in SPSS. (Individual scale scores were standardized before aggregation to control for group differences. The group-level scores for the 77 teams ranged from -1.97 to 2.19. See the Preliminary Analysis Section of Chapter 3 for individual-level unstandardized and group-level descriptives.) Individual team member scale scores were aggregated to create a team scale score for the item when there were at least three individual scale scores per team. There was no need to aggregate performance since team scores were obtained from the course instructor.

Performance

Performance was measured throughout the semester by the course instructors and department faculty. Many of the performance measures corresponded to the completion of a team project and to the distribution of a survey. For Time 1, team performance scores were the sum of all team project grades up to the completion of the first survey. For Time 2, team performance scores were the sum of all team project grades from the completion of the first survey until the end of the semester.

MBA student performance was measured using three levels: Below Expectations (BE), Meets Expectations (ME), and Exceeds Expectations (EE). For Time 1, instructors provided four performance measures for the fall MBA teams. The instructors assigned numeric values of -1, 0, or 1 for the performance scores, representing BE, ME, and EE,

respectively. Thus, the performance scores at Time 1 could range between -4 and 4.[2] Two performance measures were obtained for the spring MBA teams at Time 1. Numeric values of -1, 0, and 1 were used again, and the scores could range from -2 to 2.[3] The combined performance scores are presented in Table 2.2.

MAcc student performance was also assessed by course instructors and department faculty. Depending on the project, their performance was measured using either a three-level (BE, ME, and EE) or a seven-level ("A+" through "C") scale. Corresponding numeric representations used by the accounting faculty were: BE (76); ME (88); EE (100); or A+ (98); A(95); A- (92); B+ (88); B (85); B- (82); C (78 or 75).

MAcc performance was calculated for Time 1 by combining two team project scores.[4] While the first project was completed earlier than the mid-point of the semester, faculty members felt that it was a better representation of team performance than the second project. (They said that students were more attentive during the first project because during the period of the second project, the students were consumed with interviewing for positions they would take following graduation.) Therefore, the first project score was doubled, then summed with the second project score. These scores can be found in Table 2.2, with their range being between 228 and 295. (The first project occurred during the fourth week of classes, and was worth 10% of the students' grades. The second project occurred during the eighth week of classes, and was worth only 5% of the students' grades.)

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[2] Performance at Time 2 could range between -3 and 3 because 3 performance measures were collected.
[3] Performance at Time 2 could range between -2 and 2 because 2 performance measures were collected.
[4] Performance at Time 2 was assessed using a single measure of performance.

Performance for the undergraduate chemical engineering students was measured using a typical percentage scale of 0 - 100%. Letter grades were not assigned until the end of the semester, but students understood that 90 -100% was an "A;" 80 - 89% was a "B;" 70 - 79% was a "C;" 60 - 69% was a "D;" and below 60% was an "F." For Time 1, the performance scores for the chemical engineering students consisted of the summation of three project scores, and the range of these scores was between 0 and 300.[5] Performance for the remaining engineering teams (mechanical, fluid, and automotive) was a one-time performance grade at the end of the semester on an "A" through "F" scale. The engineering faculty assigned the following numeric values to the letter grades: 6 (A+); 5 (A); 4 (B+); 3 (B); 2 (B-); 1 (C+); 0 (C).

Undergraduate business student performance was measured using a typical percentage scale. Students understood that 90 -100% was an "A;" 80 - 89% was a "B;" 70 - 79% was a "C;" 60 - 69% was a "D;" and below 60% was an "F." For Time 1, two of the three business courses had only one performance measure. The two performance measures for the remaining course were summed to create a performance score. The number of performance measures collected for a given period and all the methods used to access performance are summarized in Table 2.2.[6]

Differences in performance rating systems used by the MBA, MAcc, and undergraduate engineering and business faculty were controlled for by standardizing

[5] Performance at Time 2 was the sum of 2 performance measures.
[6] See Appendix B, Table B.2, for Time 2 summary of performance measures.

Table 2.2. Summary of performance measures at time 1.

Population	MBA				MAcc		Engineers				Undergraduate Business					
Subpopulation							Chemical		Other		1		2		3	
# of Teams	18		17		20		7		14		5		5		5	
Semester	Fall		Spring		Fall		Spring		Spring		Spring		Spring		Spring	
Performance Period	Week 5 to Week 8		Week 5 to Week 8		Week 3 to Week 8		Week 3 to Week 8		N/A		Week 1 to Week 4		Week 8		Week 8 to Week 12	
Perf. Scale	EE, ME, BE		EE, ME, BE		Percentage		Percentage		A to F		Percentage		Percentage		Percentage	
# of Projects	4		2		2		3				1		1		2	
Score Range	-4 to 4		-2 to 2		227 to 295		0 to 300				0 to 100		0 to 100		0 to 200	
	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.
	3	1	2	2	292	1	291	1	N/A		90	2	94	1	192.5	1
	2	2	1	3	288	1	282	1	(only measured		80	1	86	1	190	1
	1	5	0	11	285	2	280	1	at Time 2)		70	2	83	1	183	1
	0	7	-1	1	275	1	278	1					81	1	175	2
	-1	2			271	2	264	1					79	1		
	-2	1			268	2	241	1								
					261	5	222	1								
					247	1										
					244	1										
					240	1										
					237	3										
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	.44	1.20	.35	.79	262.5	17.69	265.4	25.11			80.0	10.0	84.6	5.86	183.1	8.17

performance scores within each of the respective populations and courses. Ninety-one teams were solicited for this study, and while only 77 teams participated at Time 1 and 65 teams participated at Time 2, all performance scores were utilized when standardizing performance within their respective populations or courses. MBA and MAcc performance scores were standardized within their respective groups. Undergraduate chemical engineering and business student performance scores were standardized within their respective course populations (performance was measured at Time 1 and Time 2). The performance scores of the remaining 14 undergraduate engineering teams were standardized within their respective population (performance was measured at Time 2).

Aggregated Variables

All of the predictor variables and the criterion variable of group viability were aggregated to the group level. A performance score for each team was obtained from the course instructor, so aggregation of this variable was not necessary. Justification for the use of aggregated variables is dependent on meeting certain conceptual and statistical conditions, as discussed in Chapter 1.

Using the James, Demaree and Wolf (1984) procedure, 77 estimates (i.e., number of groups) were calculated for each of the following scales: relationship conflict, task conflict, process conflict, collaborative strategy, compromise strategy, and avoiding strategy, and group viability.

James (1982) also suggested that before aggregating the variables, the differences between groups should be shown, so between-group differences were examined using the George and Bettenhausen (1990) technique. One-way ANOVA's were calculated for

each of the scales. If the obtained F ratio was greater than 1.0, group differences were deemed significant based on Hays (1981). The results obtained using the r_{wg} statistic and the ANOVA procedure supported the decision to aggregate variables to the group level.

Power Analysis

A power analysis with respect to multiple regression revealed that there was a 50-60% probability of detecting a medium effect size ($f^2 = .15$).[7] However, it was not possible to achieve a power of .80 or greater (which would have required at least 104 teams), given the limits in the availability of teams and funding. The power analysis calculation suggests that the limited sample size may make it difficult to determine some of the hypothesized relationships, especially those involving interactions (i.e., hypotheses 3c, 3d, and 3e).

[7] See Appendix A, Table A.3, for anticipated sample sizes for powers .80, .85, and .90.

CHAPTER 3

RESULTS

Data Analyses

Before aggregation, several preliminary analyses were performed using individual-level data. Principal components exploratory factor analyses were used to evaluate both the ROCI-II and the scales that measured the three types of conflict and scale reliabilities were calculated.

Tests for group differences were conducted, and z-scores were computed for each of the variables since differences were found. Individual standardized correlations were also examined.

All of the variables except performance were aggregated. Performance, a group-level variable, was collected from course instructors. Since there were differences in the performance scales used by the instructors, the scores were standardized within the respective populations. Hypotheses 1a through 1c and 2a through 2c were tested using correlational analyses. Hypotheses 1d and 2d were tested using simple regression. Before testing hypothesis 3, tests were conducted to examine whether the assumptions were met for hierarchical regression, including tests for multicollinearity and outliers, and examination of residual scatterplots. Finally, tests of the study's hypotheses were conducted using the aggregated data.

Preliminary Analyses

Three principal components exploratory factor analyses were used to evaluate the psychometric adequacy of the scales measuring the three conflict-management styles and the three conflict types. The modified ROCI-II scales (collaborative, compromising, and avoiding strategies) were examined using the first principal components analysis (varimax rotation). The seven items measuring the collaborative strategy loaded on the first factor. The six items measuring the avoiding strategy loaded on the second factor and the four items measuring the compromising strategy loaded on the third factor. Based on the items' loadings on their respective factors (factor loading of less than .60), previous research (which used confirmatory factor analysis to examine the five conflict-management strategies, modified to reflect the group (Vigil-King, 1999)), and known problems with the compromising scale (see discussion in limitations), one item measuring the avoiding strategy and one item measuring the collaborating strategy were eliminated. The items measuring each of the conflict management strategies were then averaged to create their respective strategies: avoiding, collaborating, compromising. The results of the principal components factor analysis are shown in Appendix A, Table A.1.

The second principal components analysis (also a varimax rotation) examined the scales that measured the three conflict types. These scales included Jehn's original 13 items and the 7 newly developed items. This analysis failed to indicate separate factors for each of the three conflict scales, so a third principal component analysis (4-factor, quartmax rotation) was performed. The results of this analysis (see Table A.2 in

Appendix A) showed a general conflict factor and two separate independent factors. All 8 task conflict items clearly loaded on the general conflict factor. Five items identified as relationship conflict loaded on the second factor. Three items identified as process conflict loaded on the third factor. Based on this analysis, one relationship conflict item and three process conflict items were dropped. The conflict items were then summed together to create their respective conflict scales.

Scale reliabilities were also examined. Using Cronbach's alpha, it was determined that all scale reliabilities were above .80.

Since four different student populations were used in this study, tests for group differences were conducted in addition to testing the psychometric adequacy of the scale items. (Different subpopulations have been found to perceive and rate conflict and other variables differently.) Significant mean differences and differences in variances were found for many of the variables; Table 3.1 shows these differences.[8] Z-scores were computed for each of the variables to control for these group differences.

Individual-level standardized correlations between integrative conflict-management strategies showed that the collaborative and compromising strategies were significantly related (.52, $p < .01$) and that the compromising and avoiding strategies were significantly related (.11, $p < .05$). All three types of conflict had significant negative relationships with the collaborative and compromising strategies, and the largest

[8] See Appendix B, Table B.3, for Time 2 descriptive statistics by sub-populations (MBA, MAcc, Engineer, Undergraduate Business).

Table 3.1. Individual-level descriptive statistics, tests for mean differences, and test for equality of variances for participating students at time 1.

Variables	MBA Participants			MAcc Participants			Engineering Participants			Business Participants			F-value[b] (ANOVA)	Levene Test[c] F-value
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD		
Criterion[a]														
1. Viability	149	3.35	.95	52	3.68	.91	72	3.42	.99	67	3.71	.80	3.15*	1.57
Strategy Predictors														
2. Collaborative Strategy	149	4.05	.53	52	4.16	.53	72	3.89	.79	67	4.12	.54	2.56	2.51
3. Compromise Strategy	149	3.53	.66	52	3.80	.59	72	3.57	.80	67	3.79	.49	3.76*	2.53
4. Avoiding Strategy	149	2.95	.77	52	2.97	.70	72	2.88	.84	67	3.17	.77	1.75	.77
Conflict Predictors														
5. Relationship Conflict	149	12.06	4.63	52	8.12	3.26	72	10.11	5.38	67	7.75	3.46	19.54***	8.02***
6. Task Conflict	149	19.85	5.32	52	14.72	4.20	72	17.71	6.17	67	15.10	4.94	18.99***	1.74
7. Process Conflict	148	5.43	2.34	51	4.37	1.89	72	5.50	2.86	67	4.63	1.79	4.37**	4.42**

Note: Viability and Strategy Predictors were measured using a 5-point Likert scale where 1 = "Strongly Disagree" and 5 = "Strongly Agree." Conflict Predictors were measured using a 5-point Likert scale where 1 = "None" and 5 = "Constant."
*p ≤ .05, **p ≤ .01, *** p ≤ .001.

[a] Performance was measured at the group level and standardized within the MBA, MAcc, engineering and undergraduate business student populations.
[b] Tests for mean difference (ANOVA) between the MBA, MAcc, Engineer, and Business student populations respectively.
[c] Tests for the homogeneity of variance between the MBA, MAcc, Engineer, and Business student populations.

correlation was between the collaborative strategy and relationship conflict (-.53, $p < .01$). Means, standard deviations, correlations, and reliabilities for the individual-level variables (before aggregation) are shown in Table 3.2.[9]

Aggregation

Aggregation of standardized individual responses to the group level was only performed when there were at least three individual responses per team. As explained in the "Participants" section, a total of 17 surveys were eliminated because the information used to identify team membership was missing, or because fewer than three members of a given team completed the survey.[10] With the exception of process conflict, 86% of the estimates were in the acceptable range (i.e., greater than .70). Table 3.3 contains the results of aggregation.[11] These results suggest that process conflict does not meet traditional criteria for a group-level measure and was therefore eliminated from further analyses. Overall group-level means, standard deviations, and ranges for aggregated variables are in Tables 3.4 and 3.5.[12] (Group-level correlations can be found later in the text.)

Team Viability - Hypothesis 1

Correlations were computed to test for Hypotheses 1a, 1b, and 1c. Hypothesis 1a predicted relationship conflict would be related to team viability. Congruent with the prediction, a negative, statistically significant correlation was found between relationship conflict and viability (-.82, $p < .001$). Hypothesis 1b predicted that perceived task

[9] See Appendix B, Table B.4, for Time 2 standardized descriptive statistics and zero-order correlations.
[10] At Time 2, 37 surveys were eliminated.
[11] See Appendix B, Table B.5, for the results of aggregation at Time 2.
[12] See Appendix B, Tables B.6 and B.7, for group-level descriptive statistics at Time 2.

Table 3.2. Individual-level standardized descriptive statistics and zero-order correlations for all participants and reliabilities at time 1.

Variables	M	SD	1	2	3	4	5	6	7
Criterion[a]									
1. Viability	.00	1.00	(.86)						
Strategy Predictors									
2. Collaborative Strategy	.00	1.00	.60**	(.88)					
3. Compromise Strategy	.00	1.00	.39**	.52**	(.80)				
4. Avoiding Strategy	.00	1.00	-.06	-.01	.11*	(.83)			
Conflict Predictors									
5. Relationship Conflict	.00	1.00	-.62**	-.53**	-.39**	.02	(.95)		
6. Task Conflict	.00	1.00	-.44**	-.45**	-.27**	-.07	.69**	(.90)	
7. Process Conflict	.00	1.00	-.49**	-.50**	-.30**	.04	.61**	.63**	(.88)

Note: All statistics were computed at the individual level; N = 340.

*p ≤ .05, **p ≤ .01, *** p ≤ .001.

[a] Performance was measured at the group level and standardized within the MBA, MAcc, engineering and undergraduate business student populations.

Table 3.3. Distribution of r_{wg} for variables at time 1.

Variables	≤ .59	.60 to .69	.70 to .79	.80 to .89	≥ .90	Percent ≥ .70	Mean R_{WG}	F-value (ANOVA)
Criterion[a]								
1. Viability	.13	.09	.16	.22	.39	.78	.77	1.28
Strategy Predictors								
2. Collaborative Strategy	.07	.00	.04	.10	.80	.93	.90	1.22
3. Compromise Strategy	.04	.01	.05	.28	.62	.95	.88	2.56
4. Avoiding Strategy	.16	.07	.15	.32	.32	.78	.77	1.79
Conflict Predictors								
5. Relationship Conflict	.08	.11	.08	.20	.54	.82	.82	1.83
6. Task Conflict	.05	.04	.04	.22	.65	.91	.87	1.56
7. Process Conflict	.63	.09	.09	.08	.11	.28	.31	1.23

Note: ANOVA = analysis of variance.

Total number of groups is 77.

Estimates > .70 are considered acceptable. With the exception of process conflict, overall 86% of these estimates are within acceptable range.

*$p \leq .05$.

[a] Performance was measured at the group level.

Table 3.4. Group-level descriptives for participating teams at time 1.

Variables	Team Descriptives			
	N	Mean	SD	Range of scores
Criterion[a]				
1. Viability	77	.01	.75	-1.97 to 1.60
Strategy Predictors				
2. Collaborative Strategy	77	.03	.69	-1.83 to 1.38
3. Compromise Strategy	77	.03	.58	-1.56 to 1.32
4. Avoiding Strategy	77	.01	.59	-1.35 to 1.47
Conflict Predictors				
5. Relationship Conflict	77	-.01	.68	-1.32 to 1.65
6. Task Conflict	77	.00	.64	-1.39 to 2.19

[a] Performance was measured at the group level.

Table 3.5. Group-level descriptive statistics for sub-group populations at time 1.

Variables	MBA Teams				MAcc Teams				Engineering Teams				Business Teams			
	N	M	SD	Range	N	M	SD	Range	N	M	SD	Range	N	M	SD	Range
Criterion[a]																
1. Viability	32	-.02	.64	-1.2 to 1.2	12	.08	.80	-1.9 to 1.5	18	.05	.91	-2.0 to 1.6	15	-.03	.77	-1.1 to 1.2
Strategy Predictors																
2. Collaborative Strategy	32	-.02	.60	-1.3 to 1.0	12	.14	.86	-1.3 to 1.4	18	.10	.75	-1.8 to 1.1	15	-.02	.72	-1.4 to 1.3
3. Compromise Strategy	32	-.03	.55	-1.3 to 1.1	12	.15	.78	-1.0 to 1.3	18	.10	.64	-1.6 to 1.1	15	.01	.43	-1.0 to .8
4. Avoiding Strategy	32	-.02	.60	-1.4 to 1.5	12	.06	.66	-.8 to 1.2	18	.06	.65	-1.1 to 1.2	15	-.02	.51	-1.0 to .7
Conflict Predictors																
5. Relationship Conflict	32	.01	.66	-1.3 to 1.2	12	-.02	.69	-1.0 to 1.5	18	-.07	.79	-1.0 to 1.7	15	.03	.63	-.9 to 1.4
6. Task Conflict	32	.04	.64	-.9 to 1.3	12	-.06	.56	-1.1 to .9	18	-.04	.75	-.9 to 2.2	15	.02	.63	-1.4 to 1.0

[a] Performance was measured at the group level.

conflict would be related to team viability, and a negative, statistically significant correlation was also found between task conflict and viability (-.67, $p < .001$). Table 3.6 contains the zero-order correlations for all variables.[13] Hypothesis 1c (dealing with process conflict) was eliminated from the analysis due to problems cited earlier.

Hypothesis 1d stated that relationship conflict would be more predictive of group viability than either task conflict or process conflict. A test for the significance of the difference between dependent r's was conducted (Cohen & Cohen, 1983; p. 56) and was found to be significant ($t = -3.35$, $p < .01$).[14] (Process conflict was eliminated from the analysis due to problems cited earlier in the text.)

Performance - Hypothesis 2

Correlations were computed to test for Hypotheses 2a, 2b, and 2c. Hypothesis 2a predicted that teams perceiving moderate task conflict would have higher levels of performance than teams perceiving high or low task conflict. To test for the expected curvilinear relationship, the task conflict was divided into 3 groups (using SPSS ranking method-ntiles, which created 3 groups with approximately the same number of cases). Contrary to prediction, no significant relationship was found between moderate levels of task conflict and performance (.10, p = ns).[15] Hypothesis 2b predicted that perceived relationship conflict would be related to team performance. Again, contrary to prediction, no significant relationship was found between relationship conflict and performance (.12,

[13] See Appendix B, Table B.8, for group-level descriptive statistics and zero-order correlations at Time 2.
[14] For Time 2, test for the significance of the difference between dependent r's was found to be significant ($t = -3.76$, $p < .01$).
[15] For Time 2, no significant relationship was found between moderate levels of task conflict and performance (.20, p = ns).[15]

Table 3.6. Group-level descriptive statistics and zero-order correlations for all groups at time 1. [a]

Variables	M	SD	1	2	3	4	5	6	7
Criteria									
1. Performance	.00	.96							
2. Viability	.01	.75	.02						
Strategy Predictors									
3. Collaborative Strategy	.03	.69	.11	.75**					
4. Compromise Strategy	.03	.58	-.24	.50**	.64**				
5. Avoiding Strategy	.01	.59	-.10	-.12	-.10	.13			
Conflict Predictors									
6. Relationship Conflict	-.01	.68	.12	-.82**	-.75**	-.58**	.10		
7. Task Conflict	.00	.64	.16	-.67**	-.63**	-.48**	.03	.78**	

Note: All statistics were computed at the group level; N = 77. *$p \leq .05$, **$p \leq .01$

[a] Because of significant group differences, all variables were standardized within the MBA, MAcc, engineering, and undergraduate business student populations.

p = ns). (See correlations, Table 3.6). Hypothesis 2c (dealing with process conflict) was eliminated from the analysis due to problems cited earlier.

As with viability, simple linear regression was used to test the relationship between the conflict typology and performance. Hypothesis 2d stated that task conflict would be more predictive of group performance than relationship conflict or process conflict. . A test for the significance of the difference between dependent r's was conducted (Cohen & Cohen, 1983; p. 56) and was not significant (t = -.53, p < ns).[16] (Process conflict was eliminated from the analysis due to problems cited earlier in the text.)

Tests of Accuracy of Assumptions

Multicollinearity. Several of the correlation coefficients between the independent variables were relatively high (p > .50), so multicollinearity diagnostics were conducted with respect to the relevant regressions. Pedhazur (1982) suggests that multicollinearity can be defined by very high intercorrelations among the independent variables, but he makes it clear that there is no consensus as to what the term means or agreement on what constitutes "very high" intercorrelation. Tabachnick and Fidell (1989) suggest that correlations above .90 are dangerously high and that variables with correlations greater than .70 should be carefully examined before including them in regression analysis.

Collinear variables provide very similar information, and their effects are difficult to separate because of this. Regarding regression, high correlations between independent variables have been found to affect the stability of the regression weights while R itself

remains unaffected (Pedhazur, 1982). Thus, minor changes in the data can produce substantial changes in a beta weight because the significance of the beta weight is based on the ratio of its absolute value to its standard error.

Two diagnostic measures of collinearity were used: tolerance and variance inflation factor (VIF). The tolerance of a variable has been defined as 1.0 minus the squared multiple correlation coefficient. A low tolerance indicates that the variable is almost a linear combination of the other independent variables. Closely related to tolerance is the VIF, which can be best defined as the reciprocal of the tolerance. A high VIF also indicates that the variable is almost a linear combination of the other independent variables. Tolerances for all independent variables were greater than .37 and the highest VIF was 2.70 (for the collaborative conflict-management strategy), so multicollinearity was not found to be a problem.[17]

Outliers. Univariate and multivariate tests for outliers were conducted. Scatterplots between each of the predictor variables and each of the criterion variables (univariate) and Mahalanobis distance (multivariate) were used to determine outliers. The univariate scatterplots indicated the possibility of outliers, but no values were in excess of 3 standard deviations from the mean. (Figure 3.1 shows a sample scatterplot for the relationship between the compromising conflict-management strategy and performance.) Using Mahalanobis distance ($\chi^2 = 24.322$; $p < .001$) with seven degrees of freedom, three teams were identified as outliers. However, these three teams were not

[16] For Time 2, test for the significance of the difference between dependent r's was found to be significant ($t = -.13$, $p <$ ns).

[17] For Time 2 tolerances for all independent variables were greater than .24 and the highest VIF was 4.14.

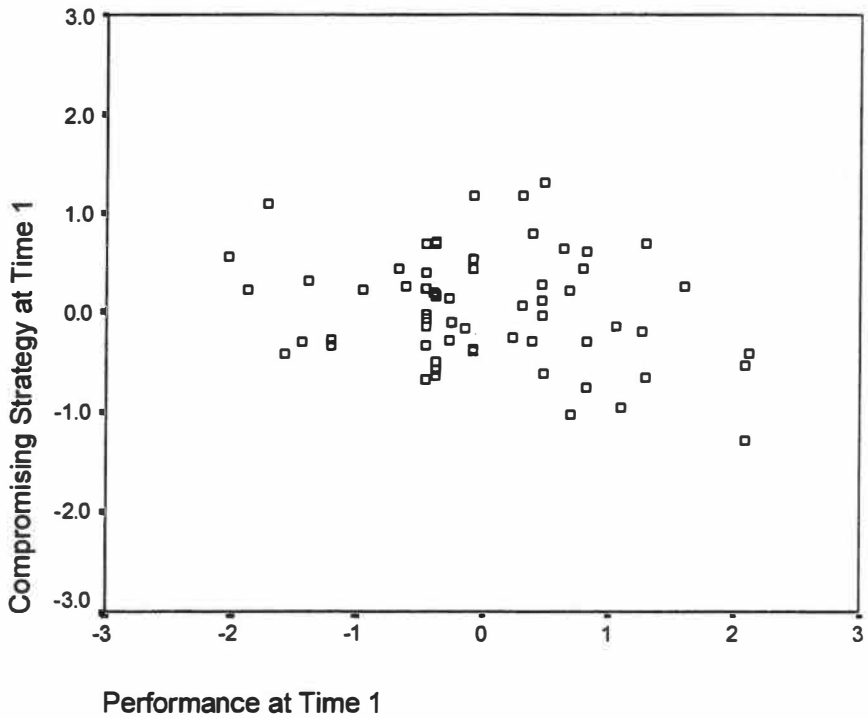


Figure 3.1 Sample scatterplot

eliminated from the regression analyses because they had previously been identified by faculty as problematic, and 87% of the r_{wg}s (level of agreement) for each of the aggregated variables for these three teams were above .70.

Examination of Residuals Scatterplots. Residual scatterplots with respect to multiple regression were used to test the assumptions of normality, linearity, and homoscedasticity between predicted criterion scores and errors of prediction. When these assumptions are met, the residuals are normally distributed about the predicted criterion and have a straight line relationship with the predicted criterion scores, and the variance of the residuals about the predicted criterion scores are the same for all predicted scores. Plots of the predicted values of group viability and performance with residuals indicated that the assumptions for regression were met. The scatterplots of the predicted criterion scores and errors of prediction were rectangular in shape, with no values exceeding three standard deviations from the mean. The best fit line was a straight horizontal line positioned at zero, which was the standardized mean.

Hierarchical Regression - Hypothesis 3

Hierarchical regression analysis was used to test the relationships associated with Hypotheses 3a and 3b. It was hypothesized that teams using more integrative conflict-management strategies would have higher performance and viability than teams adopting less integrative strategies. For Hypotheses 3c, 3d, and 3e, moderated regression was used to test the moderating influence of conflict types on the relationships associated with the first two hypotheses. Interaction terms were created and added to the model by multiplying each of the three conflict-management strategy variables by the type of

conflict previously stated in the corresponding hypothesis. Specifically, for Hypotheses 3a and 3b the role of conflict-management styles was examined in Step 1 for each criterion variable. Step 2 examined the simultaneous effect of task conflict and conflict-management strategies on the criterion variables. The interaction of task conflict with each of the conflict-management strategies was tested in Step 3 (a test of Hypotheses 3c, 3d, and 3e).

Performance and Task Conflict. A significant relationship between conflict-management styles and performance was found in Step 1 (Hypothesis 3a). The overall model ($F = 3.34$, $p < .05$) and the coefficients associated with the relationships between the collaborative strategy and performance (.35, $p < .01$) and between the compromising strategy and performance (-.43, $p < .01$) were significant. The beta weight for the avoiding strategy was not significant (-.02, $p = -.15$). Specifically, the beta weight for the collaborative strategy was positive in sign and the beta weight for the compromising strategy was negative in sign.

For Step 2, the analysis of the relationship between conflict-management styles and performance, controlling for levels of task conflict, was significant ($F = 4.12$, $p < .01$). The beta weight for the collaborative strategy increased (.55, $p < .01$) when task conflict was added to the model. The beta weights for the compromising and avoiding strategies remained unchanged. For Step 3, Hypothesis 3c was not supported by the data. While the overall regression was significant ($F = 2.42$, $p < .05$), none of the coefficients

for the interactions were significant.[18] The results of the hierarchical regression analysis for the predictors of performance are found in Table 3.7.

Performance and Relationship Conflict. Similar testing was performed for Hypothesis 3d, except that relationship conflict replaced task conflict in Step 2 and beyond. The simultaneous entry of the three conflict strategies was analyzed above, so an explanation of Step 1 will not be repeated. The analysis of the relationship between conflict-management styles and performance, controlling for levels of relationship conflict, was significant in Step 2 ($F = 3.90$, $p < .01$), and the beta weight for the collaborative strategy increased when relationship conflict was added to the model. As before, the beta weights for the compromising and avoiding strategies remained relatively unchanged.

For Step 3, Hypothesis 3d was supported by the data. This step tested the interactions between the conflict-management strategies and relationship conflict with performance. The overall regression was significant ($F = 2.96$, $p < .01$). The coefficient for the interaction of collaboration (more integrative strategy) with relationship conflict was significant (.38, $p < .06$). This result suggests that higher performance levels were associated with teams using more integrative strategies, when higher levels of relationship conflict were perceived. The coefficient for the interaction of compromise with relationship conflict was significant (-.38, $p < .05$), and this result suggests that lower levels of performance were associated with this (less integrative) strategy, when

[18] Non-significant results were found in all three steps for the Time 2 data. See Appendix B, Table B.9.

Table 3.7. Hierarchical regression analysis for predictors of performance with conflict-management strategies and task conflict at time 1.

Step	Predictor Variable	β	*t*	R	F	*dfs*	ΔR^2	ΔF
1	Collaborative Strategy	.35	2.36*	.38	3.34**	3,60	.14	
	Compromise Strategy	-.43	-2.96**					
	Avoiding Strategy	-.02	-.15					
2	Collaborative Strategy	.55	3.31**	.47	4.12**	4,59	.08	5.67*
	Compromise Strategy	-.42	-2.99**					
	Avoiding Strategy	-.03	-.26					
	Task Conflict	.34	2.38**					
3	Collaborative Strategy	.50	2.87**	.48	2.42*	7,56	.01	.35
	Compromise Strategy	-.38	-2.55*					
	Avoiding Strategy	-.04	-.30					
	Task Conflict	.34	2.28*					
	Collaborative X Conflict	.15	.87					
	Compromise X Conflict	-.15	-.92					
	Avoiding X Conflict	.01	.08					

Note: Step 1 is a test of the linear relationship between Conflict Strategies and Performance. Step 2 adds Task Conflict to the equation. Step 3 tests the interaction between Conflict Strategies and Task Conflict.

$^{+}$ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

higher levels of relationship conflict were perceived. See Table 3.8 for results of hierarchical regression analysis of the viability predictors.[19]

Additional analyses were performed to more clearly examine the interactions identified between conflict management strategies, relationship conflict, and performance. Relationship conflict was partitioned into three equal groups representing three levels of relationship conflict: low, moderate, and high (using SPSS ranking method-ntiles, which created 3 groups with approximately the same number of cases). Correlations were calculated between each of the conflict-management strategies and performance for each level of relationship conflict.

The correlation between the collaborative strategy and performance was positive and significant when relationship conflict was high (.49, $p < .05$), and the correlations between the compromising strategy and performance and between the avoiding strategy and performance were negative (although not significant). This lends support to the previously noted association between higher levels of performance and the more integrative conflict-management strategy at high levels of relationship conflict.
On the other hand, correlations between the compromising strategy and performance and the avoiding strategy and performance were negative and significant (-.45, $p < .05$; -.52, $p < .05$; respectively) at moderate levels of relationship conflict, while the correlation between the collaborating strategy and performance were positive (although not significant). This lends support to the previously noted association between

[19] For the Time 2 data, no significant results were found. See Appendix B, Table B.10.

Table 3.8. Hierarchical regression analysis for predictors of performance with conflict-management strategies and relationship conflict at time 1.

Step	Predictor Variable	β	*t*	R	F	*dfs*	ΔR^2	ΔF
1	Collaborative Strategy	.35	2.36*	.38	3.34**	3,60	.14	
	Compromise Strategy	-.43	-2.96**					
	Avoiding Strategy	-.02	-.15					
2	Collaborative Strategy	.60	3.28**	.46	3.90**	4,59	.07	4.92*
	Compromise Strategy	-.39	-2.70**					
	Avoiding Strategy	-.06	-.48					
	Relationship Conflict	.38	2.22*					
3	Collaborative Strategy	.54	2.95**	.52	2.96*	7,56	.06	1.55
	Compromise Strategy	-.33	-2.26*					
	Avoiding Strategy	-.08	-.64*					
	Relationship Conflict	.44	2.53*					
	Collaborative X Conflict	.38	1.96^{+}					
	Compromise X Conflict	-.38	-2.04*					
	Avoiding X Conflict	.05	.39					

Note: Step 1 is a test of the linear relationship between Conflict Strategies and Performance. Step 2 adds Task Conflict to the equation. Step 3 tests the interaction between Conflict Strategies and Task Conflict.

$^{+}$ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

degraded performance and the less integrative conflict-management strategies. (This association seems to be more pronounced at moderate levels of relationship conflict.)

A summary of all the correlations between conflict-management strategies and performance for each level of relationship conflict is shown in Table 3.9.

Viability and Relationship Conflict. Similar testing was performed for Hypotheses 3b and 3e, with relationship conflict replacing task conflict in Step 2 and beyond. Hierarchical regression analysis was used to test the moderating relationship between conflict strategies, relationship conflict, and viability. The interaction of relationship conflict with each of the conflict-management strategies was tested in Step 3.

Hypothesis 3b predicted that teams using a more integrative strategy would have higher levels of group viability. This was tested in Step 1 of the analyses. The overall model ($F = 32.19$, $p < .001$) and the coefficient associated with the relationship between collaborative strategy and group viability (.71, $p < .001$) were found to be significant. All conflict-management coefficients were in the hypothesized direction, but beta weights for the compromising (.05, $p = .61$) and avoiding (-.05, $p = .49$) strategies and group viability were not significant.

The positive relationship between the collaborative strategy and viability was also evident in Step 2, controlled for the level of conflict. When conflict was added to the regression equation, the relationship between conflict-management styles, relationship conflict, and viability was also significant ($F = 45.93$, $p < .001$). Relationship conflict had a counter additive (negative) association with the collaborative

Table 3.9. Correlations between conflict-management strategies and performance at tri-levels of perceived relationship conflict at time 1.

Relationship Conflict Level	Conflict-Management Strategy	Performance
High	Collaborative	.49*
N=26	Compromising	-.21
	Avoiding	-.04
Moderate	Collaborative	.26
N=25	Compromising	-.45*
	Avoiding	-.52*
Low	Collaborative	-.09
N=26	Compromising	.14
	Avoiding	.11

*$p \leq .05$

strategy in its relationship to viability (i.e., higher viability when conflict associated with collaboration). Beta weights for the compromising strategy and the avoiding strategy remained unchanged. Hypothesis 3e (Step 3) was not supported by the data. While the F-test associated with the overall model was significant ($F = 26.72$, $p < .001$), the coefficients of the interaction terms were not.[20] The results of the hierarchical regression analysis for the predictors of viability are found in Table 3.10.

Repeated Measures

The General Linear Model Repeated Measures procedure was conducted to check for response differences over time, because participants were measured twice during the semester. With the exception of the avoiding strategy ($F = 5.87$, $p < .05$), no time differences were noted for conflict-management strategies, conflict types, viability, or performance.

[20] Similar results were found for Time 2 data. See Appendix B, Table B.11.

Table 3.10. Hierarchical regression analysis for predictors of viability with conflict-management strategies and relationship conflict at time 1.

Step	Predictor Variable	β	*t*	R	F	*dfs*	ΔR^2	ΔF
1	Collaborative Strategy	.71	6.97***	.75	32.19***	3,73	.57	
	Compromise Strategy	.05	.61					
	Avoiding Strategy	-.05	.49					
2	Collaborative Strategy	.34	3.34**	.85	45.93***	4,74	.15	38.09**
	Compromise Strategy	-.06	-.76					
	Avoiding Strategy	-.02	-.24					
	Relationship Conflict	-.60	-6.17***					
3	Collaborative Strategy	.36	3.51***	.85	26.73***	7,69	.01	1.03
	Compromise Strategy	-.08	-.99					
	Avoiding Strategy	.00	.04					
	Relationship Conflict	-.63	-6.39***					
	Collaborative X Conflict	-.20	-1.59					
	Compromise X Conflict	.12	.99					
	Avoiding X Conflict	.00	-.04					

Note: Step 1 is a test of the linear relationship between Conflict Strategies and Viability. Step 2 adds Relationship Conflict to the equation. Step 3 tests the interaction between Conflict Strategies and Relationship Conflict.

$^{+}$ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table 3.11. Summary of support for hypotheses.

Hypothesis 1	Supported?
1a) Relationship Conflict and Viability (correlation)	Yes
1b) Task Conflict and Viability (correlation)	Yes
1c) Process Conflict and Viability (correlation)	Dropped from analysis
1d) Relationship Conflict + Task Conflict and Viability (test of differences between correlations)	Yes
Hypothesis 2	
2a) Relationship Conflict and Performance (correlation)	No
2b) Task Conflict and Performance (correlation)	No
2c) Process Conflict and Performance (correlation)	Dropped from analysis
2d) Task Conflict + Relationship Conflict and Performance (test of differences between correlations)	No
Hypothesis 3	
3a) Collaborating + Compromising + Avoiding Strategies with Performance (simple regression)	Yes
3b) Collaborating + Compromising + Avoiding Strategies with Viability (simple regression)	Yes
3c) Conflict-Management Strategies + Task Conflict + Interactions with Performance (hierarchical regression)	No
3d) Conflict-Management Strategies + Relationship Conflict + Interactions with Performance (hierarchical regression); Collaborating, Compromising, Avoiding Strategies, and Performance (correlations) controlling for level of relationship conflict	Yes
3e) Conflict-Management Strategies + Relationship Conflict + Interactions with Viability (hierarchical regression)	No

CHAPTER 4

DISCUSSION

This exploratory study weaves conflict, conflict-management strategies, and team outcomes together. To date, no published study has examined the relationship between the types of conflict perceived by the team, the conflict-management strategies reportedly used by the team, and team performance and viability. This study of 77 instructional groups yielded four main findings: 1) as predicted, members' aggregated reports of group viability correlated with two types of reported conflict, task and relationship; 2) reported use of integrative strategies for managing conflict (collaboration and compromise) both correlated positively with viability; 3) contrary to predictions, group performance did not correlate with the two types of reported conflict; and 4) the collaborative strategy was positively correlated with team performance when perceived relationship conflict was high.

The negative correlation of relationship conflict with group viability (the team's capacity to continue operating together in the future), which includes member satisfaction and member participation (Sundstrom, DeMeuse, & Futrell, 1990), is consistent with a study by Jehn (1995) (Hypothesis 1a). She found that satisfaction, liking of team members, and intent to remain in the team were negatively related to relationship conflict in freight transportation groups.

The finding of a negative relationship between task conflict and viability is consistent with a study by Amason and Schweiger (1994) which found that task conflict

was associated with frustration, dissatisfaction, and anxiety within top management teams (Hypothesis 1b). Similarly, Jehn (1995) found dissatisfaction and intent leave the group related to task conflict.

Tests confirmed the prediction that relationship conflict would have a stronger association with group viability than task conflict (Hypothesis 1d). While Jehn (1995) found relationships between satisfaction and intent to remain in the group for both relationship and task conflicts, no study has examined which of these types of conflict is more predictive of viability.

This study found no support for hypotheses predicting relationships between performance and reported types of group conflict (Hypotheses 2a, 2b, and 2d). Earlier studies found evidence for optimal levels of task conflict for performance (Pondy, 1967; Brown, 1983; Jehn, 1995). Other research found an inverse relationship between conflict and performance (Evan, 1965; Amason, 1996). The lack of a relationship with performance in this study could reflect any of at least three factors: 1) unreliability of performance criteria; 2) restricted variability in performance; 3) invalid measure of conflict. These factors are discussed at length in the limitations section.

Support was found for more integrative conflict-management strategies being related to higher viability and performance (Hypotheses 3a and 3b). Past empirical research found that negotiators using more integrative conflict-management strategies have increases in satisfaction (Wall & Nolan, 1986) and performance (Thompson, 1990), and teams reporting more integrative conflict-management strategies were found to have

higher viability and performance than teams reporting less integrative strategies (Vigil-King & Rush, 1998).

Support was not found for the prediction that performance in teams using a more integrative conflict-management strategy would be higher than in those using a less integrative strategy when higher levels of task conflict were perceived by the team (Hypothesis 3c). Increases in performance have been linked to the use of integrative conflict strategies (Thompson, 1990) and task conflict has been linked with performance (Brehmer, 1976; Jehn, 1995), but this study examined these relationships in combination and the predictions made were not supported.

On the other hand, support was found for the prediction that performance of teams using a more integrative conflict-management strategy would be higher when higher levels of relationship conflict were perceived (Hypothesis 3d). While this study examined the relationships between integrative conflict-management strategies and relationship conflict with performance, increases in performance have been linked to the use of integrative conflict strategies (Thompson, 1990) and relationship conflict has been linked with performance (Jehn, 1995; Amason, 1996).

These findings were further examined by dividing relationship conflict into three almost equal groups (low, moderate, and high levels). Under conditions of high relationship conflict, the collaborative strategy had a significant positive correlation with performance (suggesting a positive trend in performance associated with the most integrative strategy), while the compromising and avoiding strategies had non-significant negative relationships with performance. Under moderate levels of relationship conflict,

both the compromising and the avoiding strategies had significant negative relationships with performance (suggesting a negative trend in performance associated with the less integrative strategies), while the collaborating strategy had a non-significant positive relationship with performance. These additional analyses added some support to the hierarchical regression results.

No support was found for the prediction that the viability of teams using more integrative strategies would be higher than of those using less integrative strategies when higher levels of relationship conflict were perceived by the team (Hypothesis 3e). Relationship conflict appeared to have a counter additive (negative) association with collaboration in its relationship to viability. Increases in satisfaction and intent to remain in the group have been linked to the use of integrative conflict strategies (Thompson, 1990) and relationship conflict has been linked with viability (Jehn, 1995).

Limitations

Generalizability

The external validity of studies using student samples is periodically debated in the literature (Dobbins, Lane, & Steiner, 1988; Gordon, Slade, & Schmitt, 1986) and calls into question the generalizability of results to other populations. However, unlike many other studies examining teams, these 77 intact instructional teams were working towards a common goal (the grade on a group project) and worked together for a minimum of 8 weeks with minimal interference from their instructors. Their team-based projects had high fidelity to an organizational setting. Students were expected to create and deliver

multiple business presentations to faculty and members of external companies, to contact external vendors, and to implement strategies for completing projects.

Multiple populations of student participants were also included in this study. The 77 intact teams were from three separate programs, representing three different disciplines. Specifically, the majority of the teams were from the MBA, MAcc, and engineering programs, and all were from senior-level undergraduate or graduate-level courses. It is felt that the structure of the team projects and the composition of the teams contribute to the generalizability of this study.

Method Variance

All of the variables assessing conflict-management styles, conflict types, and viability were collected twice during the semester, using a self-report survey instrument. These self-report surveys were the primary source of data for this study, and their use may result in the inflation of some of the relationships. However, subjective performance measures (and in many cases multiple subjective measures of performance) were gathered from the instructors during the semester to minimize these effects.

Sample Size

Ideally, it would have been desirable to increase the number of participants. While data regarding 77 teams was collected, more teams are necessary. A power analysis was conducted on the data for this study which yielded a 50-60% probability of detecting a medium effect size ($f^2 = .15$).[21] Since four variables and their interactions were of interest, a sample size of 104 or greater would be ideal (.80 probability of

[21] See Appendix A, Table A.3, for anticipated sample sizes for powers .80, .85, and .90.

detection). Approximately 90 teams were solicited, and monetary opportunities were offered as incentives. Still, some team members chose not to participate, and the members of their teams who did so usually indicated that their team was performing poorly and was experiencing a great deal of conflict. There was usually a member of the non-participating teams who was interested in participating, but this member was unable to encourage the remaining members to do so.

Measurement of Conflict Management

The ROCI-II (Rahim, 1983) was the conflict-management scale chosen for this study. It was selected over the similar MODE scale, developed by Thomas and Kilman (1974), for several reasons: 1) it has received considerable attention from the research community; 2) it is used and evaluated regularly; 3) it has been successfully modified to address multiple targets (e.g., supervisor, peer, subordinate). However, Van De Vliert and Kabonoff (1990) recently examined both of these scales empirically and concluded that each of the scales has some problems: 1) the MODE differentiates poorly (both theoretically and practically) between the collaborative and competing styles; 2) the ROCI-II discriminates poorly between the compromising and collaborative styles; 3) both scales fail to distinguish between the avoiding and accommodating styles. They conclude that both the MODE and the ROCI-II are "moderately valid measurements of the conflict management theory underlying their construction" with "considerable room for improvement" (Van De Vliert and Kabonoff, 1990; p.206). Thus, it is possible that improved measures might increase the magnitude of support for several of the hypotheses of this study.

Measurement of Conflict Types

While task conflict and relationship conflict have been predominately studied in the literature (see Guetzkow and Gyr (1954), Pinkley (1990), Priem and Price (1991), and Jehn (1992) for some of these studies), recently a third type of conflict has been hypothesized (Jehn, 1992; Jehn, 1997). Jehn's relationship, task, and process conflict scales were used to assess the frequency of these conflict types within teams. Based on a published factor analysis (Jehn, 1992), it was thought that additional items might help to improve the existing scales.

However, when using the conflict scales with the additional items in this study, problems still existed. For example, while the coefficient alphas for these scales were above .85, a principal components factor analysis with varimax rotation failed to separate the items into their respective scales. In addition, task conflict and relationship conflict were successfully aggregated to the group level, but only 28% of the teams agreed on the level of perceived process conflict they were experiencing. While Jehn's task and relationship conflict scales have been used in multiple studies (Jehn, 1992; Jehn, 1995; Amason, 1996), her process conflict scale has not been used as much. Future research might include refinement of the process conflict scale to elicit better agreement between team members for group-level analyses.

Measurement of Performance

Team performance measures were subjective ratings of performance gathered from instructors. While the performance of several teams was measured only once at the end of the semester, most team measures included multiple ratings of performance

collected at varying times throughout the semester. Still, there was little variance in performance, which may have contributed to the difficulty in finding relationships between performance and other variables such as relationship and task conflict. Also, participants were upper-level students who were expected to perform well. The resulting lack of poorly-performing students may have contributed to the inability to find significant relationships between performance and other variables. Statistical support for restriction in range is shown by the non-significant correlation between performance at Time 1 and performance at Time 2 (-.03, $p = .80$).

Overall, it is felt that three limitations made it difficult to discover and confirm relationships between variables. Sample size was a problem; the power (.80) needed to detect a medium effect size required a minimum of 104 teams, and only 77 teams participated in this study. Several of the of scales were also in need of refinement; while the coefficient alphas for the scales measuring the three types of conflict were solid, some indications of possible problems include: the factor analysis; the number of low r_{wg}s for process conflict; and the sometimes awkward structure of the items. Finally, grades were used as measures of performance. While the use of grades by instructors to rate performance parallels the ratings given by supervisors in the workplace, it is likely there wasn't enough variance in performance to detect significant relationships between variables. Specifically, the use of upper-level students restricts the range in performance because few (if any) students/teams are expected to perform poorly. It could be suggested that the performance measure be augmented by some other measure of performance in future studies.

Questions for Future Research

What are the types of conflict? Jehn (1997) suggests that conflict can be separated into three types of conflict, and her conflict typology provides a conceptual framework to guide in the study of conflict. However, her measures of relationship, task, and process conflict have not been as rigorously tested as the ROCI-II, and problems occurred with the process conflict scale when aggregating this measure to the group level. Specifically, only 28% of the teams surveyed were in agreement concerning the amount of process conflict they were experiencing. In contrast, the teams were much more in agreement on task conflict (91% agreement) and relationship conflict (82% agreement), and past empirical research supports the idea of only two types of conflict (Wall & Nolan, 1986; Priem & Price, 1991). Future research needs to clarify the types of conflict that exist.

What conflict-management strategy will actually increase performance in situations of high conflict within a team? Taking the research by Jehn, Amason, and others a step further, Thomas' taxonomy of strategic intentions was used to examine internal group processes. This study found relationships between types of conflict, conflict-management strategies, and group performance and viability, but no causal links. While many of the findings in this study were consistent with those found at the individual and dyadic levels (e.g., more integrative strategies were associated with higher viability), others were not (e.g., more integrative strategies were not necessarily related to higher performance). Future research should therefore continue examining informal conflict at the group level and attempt to find causal links between the type of conflict, group conflict-management strategies, and group outcomes.

What conflict-management styles are most preferred by team members? The conflict literature has linked individual conflict-management strategies to personality dispositions. For example, previous research has found that individuals with a high need for affiliation tend to use the accommodating strategy and not the competing strategy (Jones, & Melcher, 1982) and individuals with a high need for achievement tended to use the collaborative strategy (Bell & Blakeney, 1977). However, the team conflict-management composition was not examined in this study. Future research should examine which conflict-management styles are most preferred by team members and how they are related to the group-level strategy reported by the team.

Could r_{wg} be used as an independent surrogate measure of group conflict within teams? A significant and negative correlation was found between the r_{wg} for the three types of conflict and the actual scale measures of these types of conflict (-.52, $p < .001$; -.32, $p < .01$; -.31, $p < .001$ for relationship, task, and process conflict, respectively). These correlations suggest that the aggregate measure of conflict might be a good group-level surrogate measure of conflict. In the current study, groups with low agreement about the level of conflict had the highest levels of reported conflict, while the groups with the lowest reported levels of conflict showed the highest agreement. Conflict is naturally about disagreement, so the lack of agreement among group members regarding the three conflict types is itself a type of conflict. Future research should examine the possibility of using r_{wg} as a group-level measure of conflict. Also, the elimination of variables in conflict studies based on r_{wg} should be reconsidered.

How does the perceived intensity of conflict within a team relate to the group's outcomes? The conflict measures used in this study examined the perceived frequency of relationship and task conflict within the groups. Another dimension of conflict that may bear examination would be the perceived intensity of the conflict and how this perception is associated with the performance and viability of the groups. Future research could include the development of conflict scales that incorporate intensity as well as frequency into the measure.

Are teams concurrently using more than one type of conflict-management strategy? Typically, the study of conflict-management strategies to date has focused on identifying the one strategy used most by the individual (Van de Vliert & Kabanoff, 1990). Both the ROCI-II and the MODE scales are scored such that one conflict-management strategy emerges as the preferred one (Rahim, 1983a; Thomas & Kilman, 1974). It is possible that several strategies may be employed at the same time. For example, team members might employ a combination of both the collaborative strategy (because at the individual level it has been found to improve performance and satisfaction) and the avoiding strategy (because it is a good strategy to use when trying to prevent the escalation of conflict) in situations of high conflict. Future research should examine the possibility of two or three strategies being employed in combination.

How do the distributive conflict-management strategies relate to team outcomes? The three integrative conflict-management strategies of collaborating, compromising, and avoiding were the focus of this study. These three strategies are based on the idea that each party involved has a near-equal level of concern for self as they have concern for

others. Integrative conflict-management strategies are characterized by trust and openness, and are more congruent with teamwork. On the other hand, distributive conflict-management strategies, which are characterized by coercion, entrenchment, and manipulation, are grounded in the idea that one party's gain will be at the expense of the other party (Lewicki & Litterer, 1985). They are not congruent with teamwork, and their use increases the likelihood of misunderstanding and hostility (Pruitt, 1971; Thompson & Hastie, 1990). This mistrust and hostility can lead to bitterness and the desire to avoid working with others in the future. While distributive conflict-management strategies are not conducive to teamwork, team members may utilize them when dealing with others. Future research should examine the role of distributive conflict-management strategies within teams and their impact on group viability and performance.

What other things should be considered when conducting group conflict research? While this study found relationships between conflict-management styles and viability and between conflict-management styles and performance, tests of the hypothesized interactions yielded mixed results. A replication of this study using additional teams would help to clarify these relationships. An organizational field study examining these relationships could address the issues surrounding the use of student populations and allow for the use of more objective measures of performance (such as production rates, scrap rates, and other quality assurance measures) instead of subjective measures of performance (i.e., supervisor ratings).

More longitudinal research would also help improve this study; not because there wasn't a longitudinal element, but because participants were measured twice during the

semester. Many of the findings for viability at Time 1 remained at Time 2. However, the performance finding at Time 2 was inconsistent with Time 1, and was also inconsistent with the predicted/hypothesized relationships. More research is needed to understand the minute changes in performance over the course of a project. Future longitudinal research should focus on measuring conflict, conflict-management strategies, and performance at multiple times during the course of a project prior to its conclusion.

Method variance was another cited limitation. Since team facilitators are becoming more commonplace in organizations, it might be useful for future research to have these facilitators rate their team(s) on the amount and type of conflict they feel the team is experiencing, as well as the types of conflict-management strategies they are using. This would allow for additional (and possibly less biased) measures of conflict and conflict-management strategies.

Problems with the scales used to measure conflict-management strategies and conflict types were also discussed as limitations. Van De Vliert and Kabonoff (1990) mentioned in their review of the ROCI-II that the conflict-management scales suffered from some problems and could be improved. One of the reasons that Rahim's conflict-management scale was selected is because it has been continually used, studied, and revised to reflect different targets over the 25 years of its existence. Thus, while the scale is not a perfect measure of conflict-management strategies, it is a relatively good one.

Practical Implications

If replicated, the results of this study have implications for managing conflict within teams, and suggest that a delicate balance exists within a group or team. For

example, under high levels of conflict, the collaborative strategy was positively correlated with performance, when controlling for the level of relationship conflict. Also, under moderate levels of conflict, the compromising and avoiding strategies were negatively correlated with performance, when controlling for the level of relationship conflict. Thus, the conflict-management strategy reported by a team related differently to performance, depending on the level of conflict perceived by the team members. Further study is needed to determine if there is a causal link (this study only shows an association), and if team members may be able to improve team performance by monitoring (and possibly altering) their conflict-management strategy based on the perceived level of conflict.

This study also has organizational implications for teamwork. While the collaborating and compromising strategies were positively correlated with viability (the team members' satisfaction and the team's capacity to continue working together in the future), the collaborative conflict-management strategy was more predictive of the team's viability than either the compromising or avoiding strategies. Even when controlling for relationship conflict, the collaborative strategy was still positively related to viability. These findings are consistent with previous research, which found that greater satisfaction was associated with the use of more integrative conflict-management strategies (Wall & Nolan, 1986). A causal link (if one can be established) between the collaborative strategy and viability might provide a method for improving the "health" of a team. Given that teams are becoming more central to the structure of organizations (Hackman, 1990; Lawler, Mohrman, & Ledford, 1995), information of this nature could prove invaluable to managers who are interested in finding out what they can do that would allow successful

teams to continue working together in the future, thus potentially improving their organizational outcomes.

Conflict-management strategies are also a proactive method for dealing with conflict within organizational groups, because they are a resource that is readily available to all disputants; the challenge comes in using them effectively to reconcile differences (Kilmann & Thomas, 1978; Brett, Goldberg, & Ury, 1990). Another possible business use of the findings of this study might be to teach members of organizational teams to recognize the type and level of conflict their team is experiencing and which of the five conflict-management styles (or combinations of them) could assist them in maximizing their team outcomes, which in turn may be positively related to organizational outcomes.

In a recent survey of U.S. firms, it was found that the use of interpersonal skills training (which often includes conflict-management training) has increased by 30%-40% over the past several years (Filipczak, 1994). With an estimated $50.6 billion being spent on formal training programs, managers want to know that their training dollars are being spent wisely. The results of this study tie the integrative conflict-management strategies presented in the training to team outcomes like viability and performance. However, the effectiveness of these training interventions (as with any interpersonal skills training) will be dependent on the maintenance mechanisms inherent in the training process. For example, post-training interventions that focus on self-management and goal-setting have emerged as successful methods of training maintenance (Wexley and Nemeroff, 1975).

While relationships between conflict-management styles and viability and between conflict-management styles and performance were found in groups interacting

face-to-face, these relationships may not hold true for virtual teams, whose members communicate via electronic mail (e-mail) from separate locations, cities, countries, etc. For example, McGuire, Keisler, and Siegel (1987) examined risk-taking among corporate managers and found that electronic communication increased risk-taking behavior among corporate managers, which in turn could alter levels of performance.

Electronic communication (and especially e-mail) opens the door to miscommunication and misinterpretation because it creates an impoverished social environment (Thompson, 1998). The social cues and shared experiences that bind individuals to each other are absent, and a social context that creates and fuels feelings of anonymity is fostered. In addition, the ephemeral nature of electronic communication must not be ignored. E-mail messages are frequently fired back and forth rapidly among the recipients, so the ease and speed of e-mail makes it easy for individuals to forget their audience and ignore typical face-to-face courtesies such as social boundaries, politeness rituals, and the acknowledgment of other's viewpoints and contributions (Sproull and Keisler, 1991). This impoverished social environment provides a foundation for conflict to grow and makes it more difficult for collaboration (which is based on shared viewpoints and acknowledgement of all team members' contributions) to minimize conflict within teams.

Conclusion

In conclusion, this study of 77 instructional groups considered conflict, conflict-management strategies, and team outcomes together, something no published study has previously examined. As predicted, team members' aggregated reports of group viability

correlated with reported task and relationship conflict. The reported use of the collaborative and compromising conflict-management strategies correlated positively with team viability. Group performance did not correlate with task or relationship conflict, contrary to predictions. Finally, when perceived relationship conflict was high, the collaborative strategy correlated positively with team performance.

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APPENDICES

APPENDIX A

Table A.1. Factor analysis results and revised scales measuring conflict-management styles.

Item	Component 1	2	3
Avoiding			
1. My team members attempted to avoid being "put on the spot" and tried to keep their conflict with other team members to themselves.		.746	.103
2. Most members of my team tried to keep their disagreements with each other to themselves in order to avoid hard feelings.		.782	
3. Members of my team tried to avoid unpleasant exchanges with each other. *	.280	.580	.204
4. Most members of my team usually avoided open discussions of their differences with each other.	-.102	.785	
5. Most members of my team tried to stay away from disagreements with each other.		.806	.106
6. My teammates avoided encounters with each other.	-.168	.670	
Collaborative			
1. Members of my team tried to integrate their ideas to come up with a decision jointly.	.768		.279
2. Most members of my team tried to work together for a proper understanding of a problem.	.758		.123
3. Most members of my team tried to investigate an issue to find a solution acceptable to us.	.642		.247
4. Most team members tried to work together to find solutions to problems which satisfied our expectations.	.807		.162
5. Members of my team exchanged accurate information with each other to solve a problem together.	.779		.107
6. Members of my team collaborated with each other to come up with decisions acceptable to us.	.781		.187
7. My teammates tried to bring all our concerns out in the open so that the issues could be resolved in the best possible way. *	.571	-.176	.299
Compromise			
1. My teammates tried to find a middle course to resolve an impasse.	.189	.105	.752
2. My teammates negotiated with each other so that a compromise could be reached.	.393		.673
3. Most members of my team used "give and take" so that a compromise could be made.	.241		.761
4. Members of my team usually proposed a middle ground for breaking deadlocks.	.197	.175	.769

Note: Analysis was principal components factor analysis with varimax rotation. Only factor loadings greater than or equal to .10 are presented in the table. Factors with eigenvalues greater than 1.0 were retained. N = 340.

* = items eliminated from respective scales.

Table A.2. Factor analysis results and revised scales measuring the three types of conflict.

Item	Component 1	2	3	4
Task Conflict				
1. To what extent were there differences of opinion in your team?	.729	-.320	-.153	.219
2. How often did your teammates disagree about opinions regarding the work being done?	.826			
3. How much conflict about the work you do was there in your team?	.742			-.422
4. How frequently were there conflicts about ideas in your team?	.725	-.258	-.227	.287
5. How often did your teammates disagree about ideas regarding the task?	.740	-.262	-.256	.229
6. To what extent were differences of opinion regarding tasks evident among your teammates?	.779			.361
7. To what extent where there disagreements about the tasks you were working on with team members?	.755	.218	-.232	
8. How often did your teammates disagree about the work being done?	.777		-.174	
Relationship Conflict				
1. How much friction was there among members of your team?	.813	-.128	.402	
2. How much tension was there among team members?	.843		.343	
3. How much were personality conflicts evident in your team?	.828		.424	
4. How much emotional conflict was there among team members?	.806		.375	
5. How much anger was present in your team? *	.796		.286	-.106
6. To what extent were personality clashes evident in your team?	.789		.450	.102
Process Conflict				
1. How often did your teammates disagree about how the work should be divided?	.685	.550		
2. How frequently were there disagreements about who should do what in your team?	.674	.530		
3. How much disagreement was there about procedures in your team? *	.810	.113	-.114	-.113
4. To what extent did you disagree about the way to do things in your team? *	.762			-.261
5. How often did your teammates disagree about whose responsibility it was to complete a task?	.676	.591		.122
6. To what extent did your teammates disagree about the processes used to complete tasks? *	.817		-.234	

Note: Analysis was principal components factor analysis with varimax rotation. Only factor loadings greater than or equal to .10 are presented in the table. Factors with eigenvalues greater than 1.0 were retained. N = 340.

* = items eliminated from respective scales.

Table A.3. Power analysis

Significance criterion	a = .05
Desired power	.80 .85 .90
k_b	7 [a]
L [b]	14.35 for power of .80 16.04 for power of .85 18.28 for power of .90
f^2; effect size	$f^2 = .15$ [c]
n^*; number of subjects [d]	104 for power of .80 115 for power of .85 130 for power of .90

[a] based on the structural equation for h_1

[b] from Table E.2 in Cohen and Cohen (1983)

[c] based on a medium effect size as defined by Cohen (1977) where $R^2 = .13$

[d] based on the following equation:

$$n^* = \frac{L}{f^2} + k + 1$$

APPENDIX B

Table B.1. Time 2 participant population and return rate information

	Fall			Spring			Time in semester when measured
	Ind	Teams	RR	Ind	Teams	RR	
MBA	74	16	80%	63	12	73%	16 weeks
MAcc	58	13	69%				16 weeks
Engineers				68	17	85%	16 weeks
Undergrad 1				2	5	84%	8 weeks
Undergrad 2				12	1	50%	16 weeks
Undergrad 3				10	2	38%	16 weeks
Totals	132	29	75%	175	37	72%	

Table B.2. Summary of performance measures at time 2.

Population	MBA				MAcc		Engineers				Undergraduate Business					
Subpopulation							Chemical		Other		1		2		3	
# of Teams	17		17		20		7		14		5		5		5	
Semester	Fall		Spring		Fall		Spring		Spring		Spring		Spring		Spring	
Performance Period	Week 9 to Week 16		Week 9 to Week 16		Week 16		Week 9 to Week 16		Week 16		Week 5 to Week 8		Week 15		Week 13 to Week 16	
Perf. Scale	EE, ME, BE		EE, ME, BE		Percentage		Percentage		A to F		Percentage		Percentage		Percentage	
# of Projects	3		2		1		2		1		2		1		2	
Score Range	-3 to 3		-2 to 2		0 to 100		0 to 200		-5 to 6		0 to 200		0 to 100		0 to 200	
	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.
	2	1	2	4	95	4	190	1	6	1	195	1	93	1	195	1
	1	5	1	3	92	6	189.5	1	5	7	194	1	91	1	190	1
	0	6	0	7	88	8	184	2	4	1	190	1	89	1	189	1
	-1	5	-1	3	78	2	177	1	3	3	185	1	86	1	180	1
							170	1	2	2	178	1	84	1	178	1
							168	1								
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	.12	.93	.47	1.07	89.6	4.82	180.4	8.89	4.14	1.29	188.4	7.02	88.6	3.65	186.4	7.16

Table B.3. Individual-level descriptive statistics, tests for mean differences, and test for equality of variances for participating students at time 2.

Variables	MBA Participants			MAcc Participants			Engineering Participants			Business Participants			F-value[b] (ANOVA)	Levene Test[c] F-value
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD		
Criterion[a]														
1. Viability	136	3.34	.94	58	3.80	1.03	68	3.44	.96	44	3.66	1.03	3.54*	.28
Strategy Predictors														
2. Collaborative Strategy	137	3.98	.62	58	4.09	.68	68	3.93	.64	45	4.11	.66	1.23	.37
3. Compromise Strategy	137	3.55	.66	58	3.80	.55	68	3.62	.72	45	3.87	.66	3.78*	.82
4. Avoiding Strategy	137	3.11	.81	58	3.07	.74	68	2.91	.81	45	3.15	.81	1.18	.44
Conflict Predictors														
5. Relationship Conflict	137	11.32	4.32	58	7.76	3.53	68	9.35	4.33	44	8.16	3.93	13.49***	1.19
6. Task Conflict	137	19.65	5.26	58	14.64	4.95	68	17.43	5.79	44	14.95	6.17	15.56***	.28
7. Process Conflict	137	5.71	2.33	58	4.62	2.10	68	5.37	2.49	44	4.80	2.19	3.82*	.65

Note: Viability and Strategy Predictors were measured using a 5-point Likert scale where 1 = "Strongly Disagree" and 5 = "Strongly Agree." Conflict Predictors were measured using a 5-point Likert scale where 1 = "None" and 5 = "Constant."
*p ≤ .05, **p ≤ .01, *** p ≤ .001.

[a] Performance was measured at the group level and standardized within the MBA, MAcc, Engineer, and Business student populations respectively.
[b] Tests for mean difference (ANOVA) between the MBA, MAcc, Engineer, and Business student populations respectively.
[c] Tests for the homogeneity of variance between the MBA student and Business student populations.

Table B.4. Individual-level standardized descriptive statistics and zero-order correlations for all participants and reliabilities at time 2.

Variables	M	SD	1	2	3	4	5	6	7
Criterion[a]									
1. Viability	.00	1.00	(.86)						
Strategy Predictors									
2. Collaborative Strategy	.00	1.00	.68**	(.88)					
3. Compromise Strategy	.00	1.00	.49**	.67**	(.83)				
4. Avoiding Strategy	.00	1.00	-.10	-.05	.12*	(.83)			
Conflict Predictors									
5. Relationship Conflict	.00	1.00	-.67**	-.58**	-.42**	.05	(.93)		
6. Task Conflict	.00	1.00	-.49**	-.46**	-.33**	-.07	.72**	(.92)	
7. Process Conflict	.00	1.00	-.47**	-.49**	-.33**	.03	.68**	.68**	(.89)

Note: All statistics were computed at the individual level; N = 308.

*$p \leq .05$, **$p \leq .01$, *** $p \leq .001$.

[a] Performance was measured at the group level and standardized within the MBA student and Business student populations.

Table B.5. Distribution of r_{wg} for variables at time 2.

Variables	≤ .59	.60 to .69	.70 to .79	.80 to .89	≥ .90	Percent ≥ .70	Mean R_{WG}	F-value (ANOVA)
Criterion								
1. Viability	.17	.02	.15	.37	.29	.82	.75	1.74
Strategy Predictors								
2. Collaborative Strategy	.03	.02	.02	.11	.82	.94	.91	0.91
3. Compromise Strategy	.03	.02	.06	.23	.66	.95	.89	1.14
4. Avoiding Strategy	.23	.08	.15	.28	.26	.69	.71	1.47
Conflict Predictors								
5. Relationship Conflict	.09	.02	.08	.20	.62	.89	.85	1.56
6. Task Conflict	.03	.03	.08	.18	.68	.94	.89	1.28
7. Process Conflict	.60	.05	.11	.06	.18	.35	.42	1.66

Note: ANOVA = analysis of variance.

Total number of groups is 65.

Estimates > .70 are considered acceptable. With the exception of process conflict, overall 87% of these estimates are within acceptable range.

*$p \leq .05$.

Table B.6. Group-level descriptives for participating teams at time 2.

Variables	Team Descriptives			
	N	Mean	SD	Range of scores
Criterion				
1. Viability	65	.07	.71	-1.84 to 1.62
Strategy Predictors				
2. Collaborative Strategy	65	.04	.64	-1.24 to 1.47
3. Compromise Strategy	65	.03	.46	-.92 to 1.20
4. Avoiding Strategy	65	.02	.47	-.87 to .97
Conflict Predictors				
5. Relationship Conflict	65	-.05	.69	-1.36 to 2.04
6. Task Conflict	65	-.04	.62	-1.39 to 1.45

Table B.7. Group-level descriptive statistics for sub-group populations at time 2.

Variables	MBA Teams				MAcc Teams				Engineering Teams				Business Teams			
	N	M	SD	Range	N	M	SD	Range	N	M	SD	Range	N	M	SD	Range
Criterion[a]																
1. Viability	28	.00	.66	-1.0 to 1.2	13	.02	.71	-1.8 to .9	16	.21	.83	-1.1 to 1.6	8	.09	.73	-1.1 to .9
Strategy Predictors																
2. Collaborative Strategy	28	.00	.62	-1.1 to 1.0	13	.04	.68	-1.2 to 1.0	16	.13	.73	-1.1 to 1.5	8	.00	.55	-.7 to .8
3. Compromise Strategy	28	.01	.42	-.9 to .7	13	.01	.46	-.7 to .7	16	.09	.56	-.8 to 1.2	8	.02	.48	-.8 to .5
4. Avoiding Strategy	28	.00	.45	-.7 to 1.0	13	.01	.52	-.7 to .8	16	.06	.44	-.8 to .6	8	.05	.61	-.9 to .7
Conflict Predictors																
5. Relationship Conflict	28	-.02	.70	-1.4 to 1.4	13	-.03	.79	-.8 to 2.0	16	-.12	.69	-1.0 to 1.1	8	-.03	.60	-.6 to 1.2
6. Task Conflict	28	-.02	.61	-1.3 to 1.5	13	-.03	.62	-.9 to 1.1	16	-.09	.70	-1.4 to 1.3	8	-.03	.57	-.5 to 1.1

Table B.8. Group-level descriptive statistics and zero-order correlations for all groups at time 2. [a]

Variables	M	SD	1	2	3	4	5	6
Criteria								
1. Performance	.02	.94						
2. Viability	.07	.71	.16					
Strategy Predictors								
3. Collaborative Strategy	.04	.64	.17	.83***				
4. Compromise Strategy	.03	.46	.14	.70***	.81***			
5. Avoiding Strategy	.02	.47	-.09	-.16	-.20	-.01		
Conflict Predictors								
6. Relationship Conflict	-.05	.69	-.15	-.83***	-.72***	-.62***	.14	
7. Task Conflict	-.04	.62	-.14	-.67***	-.65***	-.56***	.03	.82***

Note: All statistics were computed at the group level; N = 65. *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

[a] Because of significant group differences, all variables were standardized within the MBA student and business student populations.

Table B.9. Hierarchical regression analysis for predictors of performance with conflict-management strategies and task conflict at time 2.

Step	Predictor Variable	β	*t*	R	F	*dfs*	ΔR^2	ΔF
1	Collaborative Strategy	.24	1.08	.22	1.02	3,61	.05	
	Compromise Strategy	-.05	-.25					
	Avoiding Strategy	.14	1.07					
2	Collaborative Strategy	.22	.89	.22	.76	4,60	.00	.05
	Compromise Strategy	-.06	-.25					
	Avoiding Strategy	-.13	1.03					
	Task Conflict	-.04	-.22					
3	Collaborative Strategy	.19	.75	.25	.56	7,57	.02	.32
	Compromise Strategy	-.05	-.22					
	Avoiding Strategy	.13	.96					
	Task Conflict	-.04	-.22					
	Collaborative X Conflict	.14	.53					
	Compromise X Conflict	-.04	-.18					
	Avoiding X Conflict	.12	.80					

Note: Step 1 is a test of the linear relationship between Conflict Strategies and Performance. Step 2 adds Task Conflict to the equation. Step 3 tests the interaction between Conflict Strategies and Task Conflict.

$^{+}$ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table B.10. Hierarchical regression analysis for predictors of performance with conflict-management strategies and relationship conflict at time 2.

Step	Predictor Variable	β	*t*	R	F	*dfs*	ΔR^2	ΔF
1	Collaborative Strategy	.24	1.08	.22	1.02	3,61	.05	
	Compromise Strategy	-.05	-.25					
	Avoiding Strategy	.14	1.07					
2	Collaborative Strategy	.20	.80	.22	.78	4,60	.00	.11
	Compromise Strategy	-.06	-.27					
	Avoiding Strategy	.14	1.07					
	Relationship Conflict	-.06	-.33					
3	Collaborative Strategy	.19	.72	.27	.66	7,57	.03	.52
	Compromise Strategy	-.01	-.05					
	Avoiding Strategy	.11	.82					
	Relationship Conflict	.00	.05					
	Collaborative X Conflict	.19	.74					
	Compromise X Conflict	.01	-.02					
	Avoiding X Conflict	.11	.71					

Note: Step 1 is a test of the linear relationship between Conflict Strategies and Performance. Step 2 adds Relationship Conflict to the equation. Step 3 tests the interaction between Conflict Strategies and Relationship Conflict.

$^{+}$ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table B.11. Hierarchical regression analysis for predictors of viability with conflict-management strategies and relationship conflict at time 2.

Step	Predictor Variable	β	*t*	R	F	*dfs*	ΔR^2	ΔF
1	Collaborative Strategy	.76	5.84***	.83	44.52***	3,61	.69	
	Compromise Strategy	.08	.65					
	Avoiding Strategy	-.01	-.15					
2	Collaborative Strategy	.45	3.78**	.89	58.51***	4,60	.11	32.20**
	Compromise Strategy	-.04	.37					
	Avoiding Strategy	-.01	-.11					
	Relationship Conflict	-.48	-5.67***					
3	Collaborative Strategy	.47	3.94***	.85	33.92***	7,57	.01	1.03
	Compromise Strategy	.01	.06					
	Avoiding Strategy	.01	.14					
	Relationship Conflict	-.52	-5.72***					
	Collaborative X Conflict	-.15	-1.36					
	Compromise X Conflict	.08	.85					
	Avoiding X Conflict	-.11	-1.63					

Note: Step 1 is a test of the linear relationship between Conflict Strategies and Viability. Step 2 adds Relationship Conflict to the equation. Step 3 tests the interaction between Conflict Strategies and Relationship Conflict.

$^{+}$ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

VITA

DonnaMaria C. Vigil-King was born in Sacramento, California on March 22, 1964, a windy Palm Sunday. Along with two younger brothers and a sister, she grew up in Albuquerque, New Mexico, also a very windy place. Her favorite pastimes, besides arm-wrestling the boys at school for their lunch money, were playing tennis and sewing.

She attended Queen of Heaven Catholic School, Montgomery Elementary, Cleveland Junior High School, and Del Norte High School, all in Albuquerque. Because of a paper snafu she was accepted to the University of New Mexico in 1981 as an early admission candidate but never "officially" graduated from high school. Not one for leaving things unfinished, she received her G.E.D. in June of 1982.

After an internship at Peanut Butter and Jelly Preschool, her focus changed from child psychology to "?". She quit school for a period and put her husband Bill through school (since he knew what he wanted to do). When he graduated from college in 1986, they left New Mexico for Florida. For the next two years, they traveled the United States courtesy of the US Navy.

In January 1988, she began commuting 4 hours a day to the University of Washington in Seattle. She did an internship with Battelle Northwest and in December 1989 received her Bachelors degree in Psychology. After two-year stint as a computer programmer, she and her husband moved to Clinton, Tennessee, and she enrolled in the Ph.D. program in Industrial and Organizational Psychology at the University of Tennessee, Knoxville.

As a graduate student, she was primarily involved in team research and worked with Dr. Eric Sundstrom. In her free time, she also worked at the Tennessee Valley Authority and started SierraTECH, a computer consulting business. Her dissertation was supported by the Bonham Dissertation Fellowship, her husband Bill, and Neah-Bay (their collie/border collie).

Donna currently lives in Clinton, Tennessee, with her husband and dog and works for Covenant HealthCare in Knoxville, Tennessee.