Agreeing to Disagree… or Not: A Multi-Level Examination of Conflict Spillover in Diverse Groups

by

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To better understand the impact of task conflict in work teams, an incremental, multi-level model is developed, which distinguishes individual-level perceptions of conflict from more overt group-level manifestations of conflict. Task conflict is conceptualized as being detrimental for teams only to the extent that it positively predicts relationship conflict. The positive relationship between task conflict and relationship conflict is referred to as conflict spillover. The composition of team members’ underlying beliefs concerning the functional value of task conflict (referred to as conflict values) is examined as a moderator of conflict spillover. It is proposed that perceptual conflict spillover is smaller among team members who hold positive conflict values, and that manifest conflict spillover is smaller among teams composed primarily of members who hold positive conflict values. Hypotheses were tested in a longitudinal study of 59 student teams (294 individuals). At the team level, the diversity of team members’ conflict values was found to moderate manifest conflict spillover, such that the association between task and relationship conflict was significantly positive for teams composed of members who held more diverse conflict values. For teams composed of members who had less diverse conflict values, there was no significant association between manifest task conflict and manifest relationship conflict. As a result of these significant differences in conflict spillover, manifest task conflict indirectly and negatively predicted the task performance and viability of teams containing more diverse conflict values, but did not significantly impact the effectiveness of teams with less diverse conflict values. At the
individual level, the significant positive association between perceived task conflict and perceived relationship conflict was not moderated by individual conflict values. However, because of this perceptual conflict spillover, task conflict perceptions also indirectly and negatively predicted team members’ personal willingness to continue working in the team. Results of this dissertation highlight important differences in the ways that conflict operates at the individual and group levels. Having identified the diversity of conflict values as a moderator of manifest conflict spillover, this dissertation outlines areas for further academic and practical knowledge development concerning the prevention of dysfunctional team dynamics.
Acknowledgements

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Chapter 1: Introduction

The integration of diverse viewpoints forms an essential part of complex problem-solving in organizations (e.g., technical innovation and design, Dougherty, 1992; strategic management, Grant, 1996; and scientific advancement, Levine & Moreland, 2004). Complex tasks like these are assigned to teams because, in theory, collections of individual problem solvers contain the diversity of expertise and knowledge that is needed to produce effective solutions (cf. Ashby, 1956; Huber, 1984). Indeed, the increased use of self-managing and cross-functional teams in organizations may have been prompted by evidence, largely derived from experimental research, which suggests groups more diverse in terms of their perspectives on the task (i.e., problem) are also more effective at achieving integrative or creative solutions (e.g., Nemeth, 1986; Triandis, Hall, & Ewen, 1965; for reviews, see Hoffman, 1965; Nemeth & Staw, 1989).

Theoretical arguments in favour of team diversity aside, most general reviews of the literature find no evidence of robust patterns of diversity effects (e.g., Bowers, Pharmer, & Salas, 2000; Milliken & Martins, 1996; Stewart, 2006; Webber & Donohue, 2001). Even when quantitative reviews have accounted for inherent task requirements (e.g., complexity), it would appear that diversity exhibits only a small, positive influence (Bowers et al., 2000; Stewart, 2006). For instance, Stewart (2006) found that diversity (in terms of personality, cognitive ability, and expertise) was positively predictive of the performance of knowledge workers engaged in non-repetitive tasks; but the effect (summarized across eight studies) was negligible, $\rho = .04$.

Diversity is theoretically proposed to influence team outcomes through the manner in which these differences influence team members’ interactions. Yet, the impact of diversity
on team processes is not straightforward. Research that has focused on the problem-solving advantage of team members’ diverse task-related views stands in sharp contrast with that focused on the difficulties that arise when team members find their differences uncomfortable or divisive (van Knippenberg, De Dreu, & Homan, 2004; Williams & O’Reilly, 1998).

Perhaps part of the reason a robust positive relationship between team diversity and performance is difficult to find is related to the complexity that is introduced into team processes when members express their different views concerning the task. The literature on intragroup conflict has long maintained an important distinction between two forms of conflict, task conflict and relationship conflict (Jehn, 1994, 1995; cf. Guetzkow & Gyr, 1954). Task conflict, which entails disagreements about the task and derives from team members’ different underlying viewpoints, ideas, and opinions, is theoretically proposed to serve a positive function in groups by causing individuals to more carefully process and integrate the diversity of information at hand (cf. Schwenk, 1990; Tjosvold, 1991). Relationship conflict is a more plainly dysfunctional type of intragroup conflict, which entails person-centered tension, animosity, and friction between team members (Jehn, 1994; 1995; cf. Guetzkow & Gyr, 1954).

Consistent with conflict theory, empirical research finds that relationship conflict consistently negatively predicts both team performance and member satisfaction (De Dreu & Weingart, 2003). In addition, certain influential field studies have provided results that are consistent with the notion that task conflict can have a positive impact on team performance (Jehn, 1995; Jehn, Northcraft, & Neale, 1999; Pelled, Eisenhardt, & Xin, 1999). Nevertheless, a recent quantitative review by De Dreu and Weingart (2003) found the effects
of task conflict in these studies are not representative of the majority of effects. On the contrary, their meta analysis found that there is little to be gained, and much to be lost, through task conflict in work groups (De Dreu & Weingart, 2003). More specifically, De Dreu and Weingart reported that task conflict generally negatively predicts performance (-.23), as well as average team member satisfaction (.32), across studies. They also noted the general existence of a moderate positive relationship between task and relationship conflict (.52), which suggests that it is difficult to have one form of conflict without the other.

Evidence that task conflict has generally negative effects on the effectiveness of teams challenges the prescriptions of “positive conflict” theory (cf. De Dreu, 2008; Tjosvold, 1991) and demands that conflict researchers build upon existing typologies of conflict to develop models that outline the process by which conflict unfolds in work settings (De Dreu & Gelfand, 2008).

The general degree of positive correspondence between task-based and relational forms of conflict, a phenomenon referred to here as “conflict spillover” (cf. De Dreu & Weingart, 2003; Simons & Peterson, 2000; Williams & O’Reilly, 1998), has been interpreted as evidence of team members’ tendency to misinterpret task-based disagreements as signals of more deep-seated, interpersonal conflicts (Amason & Schweiger, 1994; Peterson & Behfar, 2003; Simons & Peterson, 2000). This potential for task conflict to trigger dysfunctional person-centered reactions is a matter in need of greater clarification since it challenges the underlying logic of using teams to solve problems. In any case, if the expression of task conflicts in work settings is likely to be accompanied by relational tension, then any empirical examination of task conflict that does not account for its possible impact on relationship conflict would be inconclusive, and potentially misleading.
1.1 Research question

The position taken in this dissertation is that the generally inconclusive results concerning the effects of diversity in teams can be addressed by developing models that more clearly specify the bases upon which team members differ, and by linking these differences to conflict-related processes, particularly the processes by which task conflict might “spill over” into relationship conflict.

It is argued that the compelling evidence concerning task conflict’s generally negative effects on team performance and team member satisfaction (De Dreu & Weingart, 2003) is suggestive of a general negative reaction to task-based differences in team settings. Spillover is identified here as the essential mechanism by which the otherwise positive function of task conflict on performance is cancelled out by the countervailing negative function of relationship conflict. De Dreu and Weingart’s review (2003) provided evidence that is somewhat consistent with this argument, given they found the strength of task conflict’s negative effects across studies was moderated by variations in the extent of spillover. The lower the correlation between task and relationship conflict across studies, the less negative the relationship between task conflict and performance (and member satisfaction) was shown to be (De Dreu & Weingart, 2003).

This dissertation is aimed at better understanding conflict spillover, particularly at predicting when task conflicts are more or less likely to correspond with relational friction. Toward this end, hypotheses are developed concerning the role played by underlying bases of team diversity that are directly relevant to conflict emergence and spillover. Specifically, it is argued that team members’ underlying beliefs regarding the function served by task-based
disagreements (hereafter referred to as conflict values) are most crucial to explaining when spillover will be more likely to occur and undermine team effectiveness.

1.1.2 Overall view of groups and group effectiveness

This dissertation examines phenomena occurring within the context of team-based organizational problem-solving, a type of task that requires interdependent team members to share their ideas, opinions, and knowledge relevant to organizational issues and to collectively propose a course of action toward addressing these issues. In this type of work, a certain degree of underlying problem-relevant diversity is expected, if not demanded. Nevertheless, team members must effectively integrate their different points of view in order to propose actionable plans.

The mechanisms that are essential to this model involve the way in which team members’ initial underlying differences influence subsequently emergent team properties and outcomes. Accordingly, the model describes a sequential (i.e., longitudinal) process, and teams are treated as complex, interdependent systems (Arrow, McGrath, & Berdahl, 2000), consisting of individual-level and group-level properties, as well as links between constructs at these two levels.

The effectiveness of teams is conceptualized here not only in terms of how well teams perform their assigned tasks, but also by the capability of team members to continue working together in the future (Hackman, 1987; cf. Sundstrom, de Meuse, & Futrell, 1990). It is important to consider each of these dimensions of effectiveness in order to distinguish the potential long-term effects of team conflict from its more immediate impact on team performance at a given point in time. Indeed, Hackman indicated that “work groups and
committees usually continue to relate to one another long after the group task is completed; what happens in the work group can substantially affect their willingness (and their ability) to do so” (1987, p.323). This capability of the team will be referred to as team viability, and is operationally defined as members’ collective willingness to work together in the future, consistent with the approach taken in other team viability research (e.g., Tekleab, Narda, & Tesluk, 2009).\(^1\)

Lastly, although the word ‘group’ can be used in reference to more diffuse and disconnected social entities (i.e., as contrasted with the word ‘team’), the term ‘group’ will be used herein to refer to the collected members of interdependent work groups (cf. Hackman, 1990), and the words ‘group’ and ‘team’ will be used interchangeably.

1.2 Major objectives of the current approach to modelling group diversity and conflict

This dissertation offers a unique approach to understanding the conflict-based implications of team diversity. It begins by identifying which bases of diversity are relevant to study, and then outlines how these bases of diversity potentially lead to both task and relationship conflict. It advocates a multi-level view of the positive association between task and relationship conflict, and identifies moderators of this relationship at both the individual

\(^1\) Some research has employed a more multi-dimensional definition of team viability, which includes team member assessments of need satisfaction and participation in addition to their willingness to continue working together (Kozlowski & Bell, 2003, Sundstrom, et al., 1990). Here, it is felt that focusing on willingness to continue working together can provide more conceptual precision.
and group levels. Lastly, it outlines the significant implications of the moderation of task-to-relationship conflict spillover for both the task performance and viability of teams.

It should be noted that intragroup conflict research has sometimes examined alternative conflict types, such as conflicts regarding the allocation of responsibilities across team members and other logistical issues (e.g., process conflict; Jehn, 1997; or administrative conflict; Shah & Jehn, 1993). Although alternative types of conflict are worth bearing in mind, the current focus maintains that the primary distinction between conflict types concerns whether the conflict is related to differing views regarding the substantive work-related issues facing the group, or whether it is related to inherent interpersonal differences between group members. In other words, task conflict pertains to work-related ideas, opinions, or preferences; relationship conflict pertains to people. Because process conflict also involves differences in work-related ideas, opinions, or preferences, these conflicts about team processes (and perceptions of these conflicts) are often subsumed within the broader category of task conflict. Indeed, measures of process conflict have not always been found to be empirically distinct from those of task conflict (see Behfar, Mannix, Peterson, & Trochim, 2010). In line with the broader history of research on conflict in general (e.g., Guetzkow & Gyr, 1954; Pinkley, 1990), as well as the bulk of research that has been conducted on intragroup conflict more recently (De Dreu & Weingart, 2003), this dissertation focuses on task and relationship conflict.

The model’s major objectives are briefly outlined below, and will be developed in depth in Chapter 2. Although the complete set of hypotheses derived from this conceptual framework will be provided in Chapter 2, Appendices 1A and 1B contain schematic representations of all of the relationships that are contained in the model.
1.2.1 Examining the relationships between demographic diversity and underlying differences in problem-relevant assumptions and conflict values

The first objective of this research is to highlight the importance of directly investigating, rather than assuming, possible relationships between different indicators of team diversity. It will be argued that existing research has largely failed to clearly specify the underlying bases upon which team members might be expected to differ, or has merely assumed general underlying differences on the basis of team members’ demographic make-up. Moreover, it will be argued that this inattention to the nature of member differences has led to the notion that diverse ideas ("deep-level" differences) facilitate team performance, but that diverse appearances ("surface-level" differences) impede it. It will be shown how, for the most part, existing evidence cannot support this claim because diversity researchers (particularly, those operating within the demography paradigm) have frequently assessed “deep-level” and “surface-level” differences using the same variable - demographic diversity. As has been noted by others, the strength (let alone the existence or direction) of relationships between surface- and deep-level diversity is inconsistent across studies (Harrison, Price, & Bell, 1999).

As will be described in detail in Chapter 2, a closer look at the accumulated evidence suggests the phenomenon of group diversity does not vary consistently according to “types” of differences, nor does it operate by way of strictly functional or dysfunctional mechanisms. Rather, existing research suggests that deep-level diversity (e.g., underlying differences in ideas, knowledge, and values) is a potentially positive predictor of complex task performance; yet, deep-level diversity (sometimes inferred by group members on the basis of
surface-level characteristics) is also generally uncomfortable, which threatens to undermine its positive performance-related potential.

This dissertation addresses the particularly inconsistent operational specifications found in prior research on group diversity by acknowledging that, although a wide array of personal characteristics exists upon which team members might differ, certain underlying differences are particularly relevant to understanding how task conflict emergences and, potentially, leads to relationship conflict. Two specific bases of deep-level diversity are identified by way of the direct relevance these attributes have for task performance, as well as for members’ reactions to their task-related differences. In addition, demographic differences are examined as distinct bases of diversity in the model. An overview of the content of these three bases of member differences is provided below to facilitate an understanding of the roles they play in the model.

*Problem-related assumptions.* First, teams likely contain a diversity of assumptions that have some bearing on the nature of the problem to be solved. Given its causal priority in the problem-solving sequence, the effective formulation of a given organizational problem can greatly influence its chain of consequences (e.g., alternative generation, selection and implementation). In fact, researchers of organizational problem-solving have noted that one of the most crucial performance requirements for teams concerns the way the problem is initially formulated (Mintzberg et al., 1976; Sims, 1979), because it is possible that decision makers can fail by providing a solution to the “wrong problem” (Ackoff, 1978; see “errors of the third kind” in Mitroff & Betz, 1972; Mitroff & Featheringham, 1974). Organizational scholars have also outlined how the cognitive representation of given problems might vary
between group members, resulting in “representational gaps” that lead to coordination difficulties and conflict (Cronin & Weingart, 2007).

In their review of work on problem identification in groups, (see for example, Dutton, Fahey, & Narayanan, 1983; Smith, 1988, 1989), Moreland and Levine (1992) outlined the importance of the collaborative, social processes that lead teams to formulate the problems that they face. This stems from the fact that groups do not think. Rather, group members must “think aloud” as part of the process of working together. This interpersonal nature of the process of identifying a given problem, combined with the inherent difficulty of thoroughly assessing all relevant aspects of complex situations, directly reinforces the importance of utilizing groups to solve complex problems. Although differences in team members’ problem-relevant assumptions may lead to coordination difficulties if they go unnoticed (Cronin & Weingart, 2007), their existence at initial stages of problem solving may also lead to expressions of task conflict, which permit team members to recognize some of limitations of their personal viewpoints and, as a result lead the team to more effective solutions.

As a result of interactive discussions concerning their differences in perspectives, members’ tacit assumptions regarding the nature of the problem are more likely recognized, compared, and contrasted (cf. Churchman, 1971). For individual problem-solvers, by contrast, assumptions can go unnoticed and, thereby, act to constrain decision making to fit within preconceived ideas, which increases the risk of “solving the wrong problem” through cursory analyses. Therefore, it is proposed here that differences in initial problem-relevant assumptions are not merely a source of inconsistency that must be overcome in order for the
group to coordinate its efforts. These differences form an integral part of effective group problem solving, provided they are expressed through open task-based disagreements.

Conflict values. In addition to potentially diverse assumptions regarding the problem, team members are also likely to bring a diversity of other assumptions to the setting, including different underlying views concerning what makes for effective teamwork itself. These beliefs likely derive from team members’ unique personal histories and experiences in related settings (Bettenhausen & Murnighan, 1985; McGrath, Arrow, & Berdahl, 2000).

Team members’ underlying views regarding the extent to which task-based conflicts serve to either inhibit or facilitate team performance (i.e., members’ conflict values) are identified in this dissertation as a fundamentally important attribute to examine in order to understand how task conflicts emerge and spillover in teams. Underlying beliefs that task conflict is dysfunctional will be referred to as negative conflict values. Underlying beliefs that task conflict is functional will be referred to as positive conflict values.

Although diverse problem-relevant assumptions potentially serve a positive role by helping teams to clarify the nature of the problem being faced, the process of problem solving is more likely to be complicated by a diversity of conflict values. In teams containing members with diverse conflict values, the appropriateness of disagreeing about the task is not viewed consistently by all members. This can create an ambiguous situation, one which discourages members from stating different points of view, obscures members’ interpretations of each other’s intentions when task-based differences are raised, and hinders the development of a unified approach to discussing, and thereby performing, the task. Moreover, to the extent that members’ views regarding conflict differ, the level of task
conflict that ultimately results is likely to be greater (or less) than the amount that certain members would consider appropriate or would otherwise prefer.

Note that, while the diversity of these perspectives is proposed to complicate member interactions, it will also be argued that similarity of conflict values will not necessarily lead to the emergence of functional team dynamics. For instance, team members might all hold similar views that task conflict is dysfunctional. In teams characterized primarily by negative conflict values, it is expected that the requirements of the task will still present opportunities for members to notice potential differences in the way they view the problem. However, given their dysfunctional views of task conflict, members will tend to overlook, obscure, or otherwise avoid addressing their differences. Moreover, any disagreements that are raised will more likely interject friction into team processes. For this reason, the term ‘composition’ as opposed to ‘diversity’ is used to refer to the manner in which conflict values are distributed in the team. As will become clear, the particular composition of conflict values that is proposed to be the most effective for problem solving teams is a configural property (Kozlowski & Klein, 2000) consisting of low diversity of positive conflict values. In short, it is asserted here that team members should, at least initially, “agree to disagree”.

Demographic differences. Underlying differences, such as the ones described above, are often only noticed by team members through the course of their interaction. However, members’ observable demographic differences can influence their interactions more immediately via the impact of social categorization (Turner, 1985). Demographic, or surface-level, diversity is employed in this dissertation to refer to differences on the basis of members’ immutable personal characteristics (cf. Harrison, Price, & Bell, 1998). Particular attention is devoted to two characteristics, gender and ethnic/ancestral origin.
The examination of demographic diversity as a separate form of diversity, rather than as a proxy indicator of underlying differences, allows for a direct examination of certain assumptions that are characteristic of prior diversity research. More specifically, hypothesized relations between demographic diversity and the diversity of the underlying attributes described above will be tested. In addition, the effects of both surface-level and deep-level diversity will be examined simultaneously to control for any potential confounding in the interpretation of results.

1.2.2 Tracing links between diversity and conflict

A second objective of this dissertation is to specifically examine the two mechanisms that researchers have long-held intervene between team diversity and team outcomes. Summaries of diversity research have noted that, when diversity is theorized and/or found to positively predict performance, the mechanism that is typically used to explain this effect is the information elaboration or decision-making advantage made possible by diverse perspectives (Williams & O’Reilly, 1998; van Knippenberg et al., 2004). In addition, when diversity is theorized and/or found to negatively predict performance, the explanatory mechanism is the essential friction that tends to be introduced in social settings when people differ (McPherson, Smith-Lovin, & Cook, 2001; Turner, 1985). The fact that these intervening mechanisms have largely gone unmeasured, coupled with the “off-the-shelf” availability of seemingly plausible rival hypotheses (e.g., the effect of diversity is either positive or negative), has led to interpretive problems in diversity research.

It has been proposed that part of the reason for the mixture of results in past research has to do with the simultaneous operation of both information-based and person-based
mechanisms (cf. van Knippenberg et al., 2004). Moreover, there is a growing recognition that information elaboration and social category mechanisms are not independent. The conflict literature, in particular, has begun to recognize the inherent interplay between task conflict and relationship conflict (Simons & Peterson, 2000).

In addition to examining conflict spillover (outlined in section 1.2.3), this dissertation also develops hypotheses linking the surface- and deep-level bases of diversity described above to task and/or relationship conflict. First, diversity on the basis of gender and ethnic/ancestral origin is examined as an indirect negative predictor of team viability, which is mediated by relationship conflict. The rationale for this proposed effect is derived, in part, on the basis of existing research that has shown that members of demographically-diverse groups are more prone to turnover (Tsui, Egan, & O’Reilly, 1992). Studying relationship conflict as a mediator of this effect is an attempt to clarify whether this is the result of higher levels of relationship conflict that have been found to exist in demographically-diverse groups (Jehn et al., 1999; Pelled et al., 1999).

Separate and distinct from demographic differences, team members’ deeper-level differences in underlying problem-related assumptions and conflict values will be mapped onto both task and relationship conflict in an effort to better explain not only when task conflict will be more likely to emerge, but also to predict when task conflict will be more likely to incite relationship conflict. The initial diversity of problem-related assumptions is treated as a potential antecedent of task conflict. In addition, the role of conflict values in the model is primarily as a moderator of this effect, as well as a moderator of the relationship between task conflict and relationship conflict. These moderated effects are specified further in section 1.2.4.
1.2.3 Multi-level modelling the relationship between task and relationship conflict

The third, and a major objective of this dissertation is to explore in depth how the distinct bases of diversity described above are potentially related to emergent conflict dynamics, particularly the “conflict spillover” phenomenon. In order to effectively study spillover, it is contended that attention must be directed to relationships operating at both the individual and group levels. Therefore, multilevel theory and analytical techniques are employed to clarify and distinguish the nature of two simultaneous conflict-related processes in groups.

Specifically, an incremental multilevel theory (Hofmann & Gavin, 1998) is offered, which outlines how the combined operation of distinct mechanisms at the individual- and group levels can shed light on the relationship between task conflict and relationship conflict. Spillover is theoretically conceptualized as consisting of two simultaneous processes: 1) the perceptual process by which individual team members’ perceptions of task conflict are interpreted as representative of relationship conflict, and 2) the more overt behavioural process by which unambiguous expressions of task conflict in the group elicit corresponding expressions of relationship tension. Overt expressions (as opposed to perceptions) of conflict are referred to in this model as manifest task conflict and manifest relationship conflict and these are group-level variables indexed by the group means of individual reports. The individual reports themselves are referred to as perceived task conflict and perceived relationship conflict. See Table 1 for more information on the distinctions made at each level for these variables.

Existing intragroup conflict research has not adopted a multi-level approach to studying the nature of the relationship between task and relationship conflict, although
Theorists have begun to call for multilevel research on intragroup conflict more generally (cf. Korsgaard, Jeong, Mahony, & Pitariu, 2008). Here, a multi-level approach is taken to improve upon prior conjectures concerning the operation of conflict spillover by more clearly distinguishing whether spillover is driven by interpretations of potentially ambiguous conflict-related behaviours (e.g., Simons & Peterson, 2000), by more evident displays of conflict, or both.

**Table 1. Select Constructs at the Individual and Group Levels**

<table>
<thead>
<tr>
<th>Variable domain</th>
<th>Individual-level variable</th>
<th>Group-level variable</th>
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<tbody>
<tr>
<td>Problem-relevant assumptions</td>
<td>- Problem-relevant assumptions (individual reports)</td>
<td>- Diversity of problem-relevant assumptions</td>
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<td>Conflict values</td>
<td>- Conflict values</td>
<td>- Composition of conflict values</td>
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<td>- Diversity of conflict values</td>
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<td>- Average of conflict values</td>
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<tr>
<td>Task conflict</td>
<td>- Perceived task conflict (Individual reports)</td>
<td>- Manifest task conflict (Group mean of individual reports)</td>
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<tr>
<td>Relationship conflict</td>
<td>- Perceived relationship conflict (Individual reports)</td>
<td>- Manifest relationship conflict (Group mean of individual reports)</td>
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<tr>
<td>Team viability</td>
<td>- Willingness to work with the same team members in the future (Individual reports)</td>
<td>- Team viability (Group mean of individual reports)</td>
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Similarly, a multi-level approach is applied to understanding the relationship between conflict and team viability. Each team member’s personal behavioural intention to remain in the team (i.e., his or her willingness to work with the same team members in the future) is treated as an individual-level construct that, when aggregated, indexes team viability. This multilevel view of the viability construct is also consistent with the view that viability represents the “capability of members to work together” (Hackman, 1987, p.323, italics
added), while individual reports of *willingness* to work together obviously reference a distinct, but related individual-level construct. Team members may differ in their willingness to work together again primarily by way of their different interpretations of the setting. However, teams will be particularly unable to continue functioning when aggregate levels of willingness are low.

1.2.4 *The moderation of conflict spillover*

The fourth objective of the dissertation is to examine the moderating effects of individual conflict values and their composition on the spillover phenomenon. Central to the model, is the proposition that the overall nature, and diversity, of team members’ conflict values potentially moderates how much task conflict will emerge and the extent to which task conflict and relationship conflict are positively related.

At the individual-level, it is proposed that members’ personal conflict values influence their *interpretations* of task-related disagreements. Specifically, the positive relationship between members’ *perceptions* of task conflict and relationship conflict is proposed to be smaller among those who hold positive conflict values (see model in Appendix 1B). In addition, for teams composed of members who primarily hold *positive* conflict values, the relationship between the underlying diversity of problem-relevant assumptions and manifest task conflict is expected to be more positive than it is for teams containing members who have *diverse* conflict values or who primarily hold *negative* conflict values. Conflict spillover is also proposed to be comparably smaller for teams composed of members who primarily hold *positive* conflict values (see model in Appendix 1A).
1.2.5 Modelling the contingent indirect effects of task conflict

Finally, the model proposes that variations in the degree of conflict spillover have significant implications for how task conflict ultimately influences teams’ short-run work performance and long-run viability. Technically-speaking, the dissertation considers task conflict, relationship conflict, and conflict values as forming two moderated mediation models.

As previously mentioned, the initial composition of conflict values is proposed to moderate the strength of the spillover relationship. As spillover is more prevalent, relationship conflict is proposed to mediate an even greater negative indirect effect of task conflict on team viability. In addition, as spillover is more prevalent, relationship conflict is proposed to suppress (i.e., counteract), to a greater extent, the otherwise positive effect of task conflict on team performance. This is because relationship conflict is proposed to mediate an even greater negative indirect effect of task conflict on performance when spillover is greater. The moderated mediation of task conflict’s effect on performance will be examined at the group level only. The moderated mediation of task conflict’s effect on team viability will be examined at both the individual and group levels.

In this way, not only are task and relationship conflict examined as critical process variables, the extent of their interrelatedness will be highlighted as the core of the effect of task conflict on team outcomes.
Chapter 2: Theory and Hypotheses

An overview of research on group diversity and intragroup conflict, as outlined in Chapter 1, suggests that more attention be directed toward understanding the nature of team members’ underlying differences and the inherent conflict-based dynamics these differences entail. In this chapter, a more thorough review of the existing literature is provided in order to distinguish the present approach from that taken in previous studies. This is followed by a more elaborate discussion of the implications of diverse problem-relevant assumptions and conflict values for intragroup conflict and team effectiveness. Hypotheses corresponding to the model are proposed concurrent with its development. For reference, Appendix 2 contains the full set of hypotheses.

2.1 A critical review of diversity research

In order to set the stage for an in-depth conceptual development of the role played by underlying diversity in teams, it is important to review what has been done before, including the assumptions that have guided previous research. Research on group diversity has often called upon underlying, or “deep-level” differences as part of theoretical explanations. However, these differences have not often figured prominently in existing empirical tests, and their nature is typically underspecified. Complicating the matter, methodological conventions in this area have blurred the important distinction that is made here between members’ demographic characteristics and underlying differences.
2.1.1 Diversity typologies

Previous theories have attempted to resolve the complexity of diversity – its advantages and disadvantages – by delineating the types of diversity that are more likely to facilitate team effectiveness from those more likely to impede it (Jackson, May, & Whitney, 1995; Milliken & Martins, 1996; Pelled, 1996). These prior efforts categorized the bases of diversity along functional or dysfunctional lines, and emerged parallel with a general distinction between surface-level diversity and deep-level diversity. In the diversity literature, the term surface-level diversity is typically used to refer to differences in the more visible, or readily detectable characteristics that members bring to the group, while deep-level diversity is used to refer to essential differences between members’ underlying beliefs, attitudes, knowledge, values, and skills (cf. Harrison, Price, & Bell, 1998; Jackson, et al., 1995).

Various unique typologies have made use of this type of distinction in attempts to make an inherently complex phenomenon more amenable to theorizing and hypothesis generation. Yet, although this surface- and deep-level terminology is quite often employed, there is a certain amount of inconsistency concerning the essence of the distinction. For instance, Jackson et al. (1995) developed a typology that distinguishes the diversity of “readily detectable” characteristics (e.g., gender, age, organizational tenure, departmental membership) from the diversity of members’ “underlying” attributes (e.g., knowledge, experience, attitudes, values). In addition, within each of these categories, some characteristics were considered more pertinent to the task (e.g., departmental membership and knowledge), while others were treated as more pertinent to the social relations in the group (e.g., gender and values). Pelled (1996) offered a typology that appears similar, but is actually quite distinct, particularly because the effort was directed toward classifying
demographic indicators alone, based on the “visibility” and “job relatedness” of these characteristics. For instance, variables such as age and gender were considered both more visible and less job-related than variables such as organizational tenure and functional background.

In comparing the two classification systems, it becomes obvious that they vary in terms of which characteristics are considered more “surface-level” (i.e., visible or readily detectable). Organizational tenure is considered “readily detectable” according to Jackson et al.’s (1995) classification, while it is considered “less visible” by Pelled’s (1996). Yet, even when considering the assignment of characteristics within either of these typologies, it is clear that not all attributes are easily categorized along the lines proposed. Van Knippenberg, et al. (2004), for instance, noted how the task relevance or job-relatedness of a basis of demographic composition may vary significantly based on the nature of the task. In the context of a task-based discussion surrounding a personnel policy decision, for example, they suggested that “...married versus nonmarried individuals, men versus women, or older versus younger individuals may provide different task-relevant perspectives on what is important to employees, even though marital status, gender, and age are typically not seen as relevant criteria. In other words, what are typically seen as social category differences may be associated with task-relevant differences” (p.1017). These authors called for the abandonment of diversity typologies not only because of ambiguous findings resulting from their use, but also based on intuitive counterexamples like these, which run counter to the essence of the categorization.

The major difference between the two typologies outlined above, however, is that one (i.e., Jackson et al., 1995) is a typology that covers both surface- and deep-level bases of potential diversity, and the other (i.e., Pelled, 1996) is a typology of demographic variables
alone. Although the latter typology’s exclusive focus on demographic variables might appear to be overly restrictive, it is not unique in extant diversity research. In fact, demographic differences have been a dominant focus of diversity research conducted within the relational or organizational demography research tradition (Pfeffer, 1983; see Williams & O’Reilly, 1998).

2.1.2 Inconsistent findings using demographic-based diversity classifications

Milliken and Martins (1996) organized the results of previous studies of group diversity according to whether the demographic characteristic being examined was observable (e.g., gender), whether it was indicative of deeper-level belief differences (e.g., functional background), or whether it was representative of cohort membership (e.g., tenure). When summarized this way, results tended to suggest that diversity on the basis of “deeper-level” characteristics (i.e., related to people’s background experiences such as education or work experience) was positively predictive of performance (e.g., Ancona & Caldwell, 1992; Bantel & Jackson, 1989; Smith, Smith, Olian, Sims, O’Bannon, & Scully, 1994; Wiersema & Bantel, 1992). Their review also suggested that diversity primarily signalled by more observable demographic characteristics, such as ethnicity or gender, often negatively predicted group effectiveness. For instance, teams more diverse in terms of racial or ethnic background, gender, or tenure (in the group) were found to experience higher turnover (Jackson et al., 1991; Tsui et al., 1992).

Unfortunately, the simple appeal of these typologies has lead to a fairly unclear body of past research; and a closer look at the results summarized by Milliken and Martins (1996) reveals that mixed effects are quite persistent. For instance, as a counterpoint to the above-
referenced findings concerning the lower social integration of ethnically-diverse teams, McLeod and Lobel (1992) found that ethnically-diverse groups outperformed ethnically-homogeneous groups on a brainstorming task. Moreover, Watson, Kumar, and Michaelson (1993) found that, although ethnically-diverse teams appear to perform poorer in comparison to ethnically-homogeneous teams at the initial stages of interaction, this difference disappears and actually reverses (i.e., favours ethnically-diverse teams) over time in relation to certain performance criteria (e.g., range of perspectives and alternatives generated). These results concerning ethnic diversity are consistent with early research problem solving, in which mixed-gender groups were found to outperform same-gender groups (see Hoffman, 1965).

In all, these results run counter to Milliken and Martins’ general conclusions concerning the effectiveness of teams that are diverse on observable attributes.

In a similar fashion, although certain studies have suggested that performance advantages stem from the diversity of members’ education or backgrounds, the results are not consistent across studies. For instance, Smith et al. (1994) found educational diversity in top management teams positively predicted both firm-level return on investment (ROI) and sales growth. Yet, the same study also found experience diversity (in the team and in the industry) negatively predicted ROI; and functional background diversity predicted neither performance metric. In addition, even studies that have shown positive effects typically failed to adequately demonstrate the operation of intervening mechanisms, which can suggest alternative explanations for these effects (to be discussed further in section 2.1.3).

Upon reflection, it is not surprising that research that has focused primarily on demographic diversity provides little consistency concerning the implications of these differences in team settings. There is great merit in considering the impact of demographic
diversity on team processes and outcomes. However, attention must be devoted to developing theory that is specifically relevant to particular demographic variables and the mechanisms by which they influence team member interactions, rather than assume that “diversity”, in a generic sense, has predictable effects (McGrath, Berdahl, & Arrow, 1995).

Milliken and Martins (1996) stated that “…one of the major reasons why diversity of any type creates difficulty for groups is attributable to complex, and often implicit, differences in perspectives, assumptions, and causal beliefs with which the more superficial or observable differences are correlated” (p. 404). This statement suggests a deep-level, or trait-based explanation for diversity effects (McGrath et al., 1995). Nevertheless, Milliken and Martins were unable to uncover much diversity research that had actually examined these underlying characteristics in their review of the literature. Specifically, across 34 studies (the vast majority of which were field studies), the authors uncovered only two examples of research that directly measured “deep-level diversity” (i.e., value differences). As a result, their attempt to summarize the findings was organized according to the demographic variables’ “observability,” a distinction which others noted, “… does not capture the underlying mechanisms by which various diversity attributes may differentially impact work group outcomes” (Webber & Donohue, 2001, p.142).

2.1.3 Untested mechanisms in demographic diversity research

In addition to calls for clearer specification of the bases upon which team members might differ, researchers have also stressed the important need for research into the processes that intervene between group diversity and outcomes (Lawrence, 1997; van Knippenberg et al., 2004; van Knippenberg & Schippers, 2007). Two dominant mechanisms have been
theorized to explain diversity effects, namely, information elaboration and social categorization. Unfortunately, the direct empirical examination of these intervening processes is notably absent in the existing literature.

2.1.3.1 Information elaboration mechanism

The information elaboration mechanism concerns the “objective” advantage that derives from the variety of task-related viewpoints in diverse teams, particularly when performance requirements are highly complex or unknown. The more diverse the perspectives brought to bear on the task, the more likely it is that a quality solution will be found (Tjosvold, 1991; Triandis, Hall, & Ewen, 1965). This knowledge-based advantage is suggested to occur through the integration of differences – a result of team members’ in-depth exchange and processing of diverse information and perspectives (Tjosvold, 1991; Williams & O’Reilly, 1998; van Knippenberg, et al., 2004).

Communication patterns (Ancona & Caldwell, 1992; Smith et al., 1994), and internal planning and coordination processes (Ancona & Caldwell, 1992) have received a reasonable amount of attention in past diversity research. Yet, studies have sometimes invoked information-based mechanisms without explicitly testing them. As a result, the elaboration of diverse task-related information is often merely implied. For example, Bantel and Jackson (1989) found the functional diversity of top management teams positively predicted firm-level innovations in human resource management practice. However, this study did not include any measure of deep-level diversity or of information elaboration to permit an actual test of the effect’s underlying mechanism. Since their study was cross-sectional, which the authors admitted did not allow for the drawing of causal conclusions, it is equally plausible
that the diversity of the teams in that sample was *a result* of firms’ human resource
management change initiatives (e.g., cross-functional teams are innovative HR practices).

Ambiguity even characterizes the results of diversity research that did account for
intervening processes, but not specifically for information-based diversity or its integration.
For instance, Ancona and Caldwell (1992) found that team functional diversity indirectly
positively predicted innovation-based performance ratings, and found that this effect was
mediated by the degree to which teams communicated with external information sources.

Ancona and Caldwell’s (1992) finding is noteworthy, and the study is more
informative for having examined intervening process variables. Although Ancona and
Caldwell’s study is highly suggestive of a functional diversity effect that is driven by
information elaboration, it is important to note that the authors themselves considered the
issue from two angles. Specifically, they suggested that “external communications may be of
a technical nature, allowing the team to improve the quality of their product…alternatively,
they may be geared toward profile or image management of key outsiders” (p.337).
Particularly because Ancona and Caldwell’s operational measure of innovation consisted of
ratings provided by division managers and the intervening process measure of external
communication included the frequency of communication with division management, the
“image management” alternative, or a social network effect alone (i.e., teams whose
members were more externally socially-connected were viewed more favourably by those to
whom they were connected) are viable competing explanations. Without a measure of the
nature of the differences in information that were brought to bear on the teams’ tasks or of
the extent to which the team elaborated upon such information, it is unclear what type of
information-based mechanism is at play in explaining their results.
2.1.3.2 Social categorization/similarity-attraction mechanism

The second mechanism that has been proposed to intervene between group diversity and outcomes concerns the essential discomfort that individuals tend to exhibit when faced with diversity. This explanation is often invoked through references to two distinct theories (e.g., similarity-attraction/homophily paradigm, Byrne, 1971; McPherson & Smith-Lovin, 1987; and social identity/social categorization theory, Tajfel, Billig, Bundy, & Flament, 1971; Tajfel & Turner, 1986). These theories suggest, respectively, that people are attracted to, and more likely to form connections with, similar others; and that self-categorization and evaluation on the basis of distinctive group or subgroup characteristics forms a natural part of behaviour in social settings.

Of these two distinct theoretical bases, the similarity-attraction mechanism is the most straightforward – summarized appropriately through the maxim “birds of a feather flock together” (cf. McPherson et al., 2001). In a narrative review of this research, McPherson et al. (2001) found that people who are more similar in terms of demographic characteristics tend to bond more closely in social networks. While macro forces are argued to be part of the cause of this phenomenon, the underlying principle of choosing to affiliate with similar others has also been demonstrated (e.g., McPherson & Smith-Lovin, 1987).

Social categorization forms part of a broader theory (social identity theory), which suggests that people maintain positive self images by identifying with a favoured in-group while derogating members of the out-group. Although the bases for categorization vary, observable demographic features are one obviously salient means for categorization during initial interactions in groups. Even in the absence of pre-existing hostility between the groups in question, “…any categorization rule that provides a basis for classifying an
individual as belonging to one social grouping as distinct from another can be sufficient to produce differentiation of attitudes toward the two groups” (Brewer, 1979, p.308). Indeed, the social categorization effect is often surprisingly robust in experiments conducted as part of the “minimal group paradigm,” which outlines how even minor, arbitrary differences, if made salient, can elicit social categorization and a related in-group bias (Tajfel et al., 1971).

Some recent investigations of this mechanism have found that the perception of differences stemming from actual diversity is associated with the formation of subgroups in teams (Zellmer-Bruhn, Maloney, Bhappu, & Salvador, 2008). However, in the diversity literature more broadly, there has been little in the way of direct empirical tests of these specific social-category mechanisms (see van Knippenberg & Schippers, 2007). Nevertheless, these mechanisms have often been called upon to explain observed negative relationships between demographic diversity and social integration (Harrison, Price, Gavin, & Florey, 2002; O’Reilly, Caldwell, & Barnett, 1989; Smith et al., 1994).

2.2 Specifying underlying attributes in group diversity research

An exclusive focus on demographic variables as bases of diversity clearly rests upon the rather shaky assumption that demographic variables, and/or their composition, can serve as markers of certain underlying psychological characteristics and/or processes (Lawrence, 1997; McGrath et al., 1995). That is not to say that there is no evidence to support the existence of links between demographic characteristics and underlying differences. In fact, part of the rationale employed by those who use demographic indictors in this manner is developed in reference to initial studies that examined these links directly.
This practice has been employed particularly in reference to presumed links between team members’ functional role differences (e.g., departmental affiliation) and their underlying differences in beliefs regarding the task. Demography researchers have regularly referred to particular studies of how business executives’ tend to identify problems in line with their functional expertise (Dearborn & Simon, 1959), or how managers’ conflict management styles, goal orientations, and temporal orientations vary by functional department (Lawrence & Lorsch, 1967), or how members of different functional groups possess different “thought worlds” concerning what is most important to the process of new product development (Dougherty, 1992).

The importance of these original studies that traced links between surface-level and deep-level diversity is not in question. However, it does seem to be a questionable practice to rely on these prior results in order to assume that members of demographically-diverse teams in a different sample, at a different time, in a different context will also differ from each other in similar ways. This doubt appears warranted, since Bunderson and Sutcliffe (1995) noted the infrequency with which one of these oft-cited findings (Dearborn and Simon’s 1959 study) had been successfully replicated. Beyer, Chattopadhyay, George, Glick, Ogilvie, and Pugliese (1997) and Walsh (1988) also provided significant, yet unsuccessful attempts to use functional background to predict underlying views concerning organizational performance criteria.

Critiques of the demography approach to studying diversity have noted the importance of further empirical tests of these assumed linkages between demographic differences and underlying characteristics (Lawrence, 1997; McGrath et al., 1995), and that, when these assumptions go untested, the use of demographic proxies for deep-level diversity
essentially sacrifices conceptual clarity for measurement reliability (Priem, Lyon, & Dess, 1999). To test these assumptions, the underlying bases of diversity examined in this dissertation are described in greater detail before summarizing evidence to suggest that these attributes might vary, in the aggregate, between members of observable demographic groups.

2.2.1 An integrative view of organizations: diversity of problem-relevant assumptions

One of the benefits to employing teams to solve complex organizational problems is the potential diversity of underlying views concerning the nature of the problem being faced. This advantage stems from the impact that discussions of these differences have on the ability of teams to flesh out assumptions and achieve a more integrative approach to solving the problem than is possible by any one team member alone.

When investigating this proposition in a given task context, researchers must attend to both internal and external validity concerns when selecting the “content” of members’ underlying views to study. From a theoretical point of view, it is important to identify deep-level attributes that have some direct connection to the problem the team is solving. In fact, Harrison et al. (1998) noted the multitude of possibly relevant beliefs, values, or attitudes that researchers might select as deep-level differences. It was specifically noted how researchers should be guided by characteristics of the teams under study and the nature of their task: “the crucial point is that the relevant deep-level variables in any situation are those that bear directly on the fundamental purposes of the group” (Harrison et al., 1998, p.105)

In fact, the identification of very specific perspective content in reference to the nature of the task is common practice in the team mental model research area (often accomplished via task analysis; e.g., Baker, Salas, & Cannon-Bowers, 1998; Mathieu,
Heffner, Goodwin, Cannon-Bowers, & Salas, 2005). In a related vein, when experimental studies have operationalized perspective-based diversity on the basis of information or initial positions on a specific problem or case (e.g., Stasser & Titus, 1985; Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, & Frey, 2006), the bases of perspective-based diversity are highly unique to the details of the case or situation being discussed.

The more specific the perspective-based content being examined, however, the less comparable are the accumulation of findings across studies. In fact, Walsh (1995) suggested that a moratorium be placed on purely descriptive research into the content of people’s knowledge structures in organizational groups, and that future work proceed within an existent theoretical framework of perspective-based differences.

The present research takes a middle-ground approach by drawing from existent theory on the essential features of organizational problems, while remaining sensitive to the direct “problem relevance” of the deep-level beliefs held by team members in a given context. Mintzberg, Raisinghani, and Théorêt (1976) suggested that, during the initial stages of managerial problem solving in unstructured situations, “the need for a decision is identified as a difference between information on some actual situation and some expected standard” (p.253). Similarly, Moreland and Levine (1992) noted that “every symptom [of a problem] embodies a contrast between realism and idealism” (p.19). This would suggest that the framing of organizational problems amounts to assessing the current state (what is) in comparison to a normative, desired state (what ought to be). Thus, an argument could be made that the essential content of underlying assumptions pertinent to the formulation of a given organizational problem is housed in team members’ normative views of what organizations should be.
Consistent with this assertion, some research has examined the theoretical importance of the diversity of organizational decision makers’ normative views, using the competing values inventory (Quinn & Rohrbaugh, 1981), which asks respondents to rate various organizational characteristics in terms of their overall importance (e.g., Beyer et. al., 1997; Miller, Burke, & Glick, 1998). Using prescriptive ratings (i.e., how much of a characteristic *should be* present in a given organization), as compared to descriptive ratings (how much *is* present), has also been shown to provide more psychometrically sound measures of respondents’ organization-related ideologies (Bunderson, Lofstrom, & Van De Ven, 2000), which can facilitate generalization and the accumulations of results derived from research on these types of beliefs (i.e., rather than research on the diversity of case-specific details).

This is the approach employed here to assess *problem-relevant assumptions*, which are conceptually-defined as normative views concerning organizational characteristics. Naturally, the precise *operational* definition of these perspectives must take into account specific elements of the task, as well as characteristics of the decision makers themselves. Therefore, the nature of the sample and setting will further inform the choice of instrument used to assess these normative views, and further details concerning this decision are contained in Chapter 3.

2.2.2 Leveraging task-based diversity: The composition of team members' conflict values

The diversity of the problem-relevant assumptions discussed above is treated in this dissertation as the requisite variety of viewpoints that, not only forms the essence of complex problem solving, but also leads to the emergence of task conflict in teams. Although this diversity is potentially beneficial, it will be contended here (outlined in detail in sections
2.4.3 and 2.6) that this variety is only effectively leveraged when teams are composed primarily of members who hold positive conflict values (as compared to teams containing members who hold predominantly negative conflict values, or teams that are characterized by diverse conflict values). As noted earlier, the general logic that assumes team members often have different views regarding the problem also implies that members might have different views concerning the functional/dysfunctional role played by task conflict in team settings.

Before delving into the implications of conflict values, however, it is important to review research that has examined related, but distinct conflict-based perspectives, styles and orientations. Research on conflict frames, for instance, has described certain influential variations in the subtleties of negotiation/dispute resolution situations (e.g., Neale, Huber, & Northcraft, 1987), or in people’s interpretations of those details (e.g., Pinkley, 1990; Pinkley & Northcraft, 1994). The methodological approaches employed in this area have entailed either the experimental manipulation of the situation or the elicitation of qualitative descriptions of conflict episodes (Schweitzer & DeChurch, 2001). In both cases, research has found that people differ in terms of the way they internally (i.e., subjectively) represent the more objective characteristics of a given conflict situation.

Conflict frame research relates to the current investigation because it demonstrates that parties’ underlying views of a conflict situation tend to differ along task- and relational-dimensions (cf. Pinkley, 1990), and that these variations have implications akin to “framing” effects in general (cf. Bazerman 1984; Neale & Bazerman, 1985; Tversky & Kahneman, 1981). That is, differences in initial construal affect negotiators’ subsequent negotiating behaviour and their post-negotiation evaluations of their outcomes and of each other (Pinkley & Northcraft, 1994).
In a separate line of research, studies have examined various modes of handling interpersonal conflict in organizational settings (cf. Blake & Mouton, 1964; Rahim & Magner, 1995). Distinct conflict-handling tactics have been classified in terms of how much they reflect concerns over the task or social relations (Blake & Mouton, 1964), or over the focal party’s self-interest vis-à-vis the interests of the other party (Rahim, 2000). Although different situations call for different approaches to handling conflict, the proposition has also been made that the tendency to employ one (or a subset) of these conflict-handling modes consistently, across varying situations, is suggestive of people’s general interpersonal style or conflict-handling orientation. Concerning these styles, research has found conflict styles predispose individuals to enact particular manifestations of conflict. For example, Friedman, Tidd, Currall, & Tsai (2000) found that people tend to enact forms of conflict at work that are in line with their general conflict-approach style.

These distinct literatures indicate that that peoples’ initial assessments of their interpersonal relations, whether housed in cognitive frames or general behavioural orientations, can set in motion a chain of related events (behaviours, evaluations, experiences, etc.) and, as a consequence, influence the manner in which a conflict unfolds in a given setting. Although this past research on subjective differences in conflict assessments and approaches has been informative, these variables differ in important ways from the conflict values that are examined in this dissertation.

Conflict frames are contextualized, initial assessments concerning what lies at the heart of a pre-existent dispute between interacting parties. In addition, although existing research concerning approaches to handling conflict introduces the possibility of general
conflict styles, results of empirical studies suggest that these behavioural orientations are quite flexible in response to situational features (Rahim, 1983; 2002).

The conflict value construct being proposed here is fundamentally different from conflict frames or styles, in that it is more elemental, specific and prescriptive. Conflict values concern the basic value that a person ascribes to the act of disagreeing with others, particularly in relation to internal task-based disagreements among interdependent team members. More specifically, these perspectives reflect how respondents evaluate the role played by these specific types of disagreements along a dysfunctional-to-functional continuum. To the extent that a person’s beliefs regarding task conflict tend toward the dysfunctional end of the continuum, these beliefs will be referred to as negative conflict values. To the extent that a person’s beliefs tend toward the functional end of the continuum, these beliefs will be referred to as positive conflict values.

As such, these perspectives are considered prescriptive mindsets rather than general behavioural orientations; and are theorized, here, as forming one component of individual team members’ respective “team interaction mental models” (cf. Cannon-Bowers, Salas, & Converse, 1993). Research to date has not treated team members’ personal underlying beliefs regarding the value of task-based disagreements as a theoretical construct. This is particularly striking since definitions of conflict often highlight the important role played by perceptions, as opposed to objective conditions (e.g., Wall & Callister, 1995).
2.3 The relationship between demographic diversity and the diversity of team members’ perspectives

Section 2.2 has outlined the underlying bases of deep-level diversity that are influential to the current model. Now, these potential underlying differences will be discussed in relation to demographic diversity. As mentioned previously, demographic diversity is sometimes proposed to explain organizational phenomena by serving as an indicator of underlying differences. Depending on the specific context of the study, and the variables in question, some of these assumed links may be more tenable than others. However, these relationships are usually testable.

In fact, there is always good reason to test, rather than assume, the existence of relationships between variables that have a role to play in explaining a phenomenon of interest. If the degree of correspondence between demographic diversity and actual underlying differences is marginal across multiple studies, it suggests that the practice of categorizing demographic variables along surface-level or deep-level lines (cf. Jehn et al., 1999; Pelled, 1996; Webber & Donohue, 2001) may threaten a study’s internal validity. If the correspondence is high, it suggests that adequate tests of the impact of one form of diversity must first account for the effects of the other to avoid statistical confounding of the results.

In the present study, demographic diversity (gender and ethnic/ancestral origin diversity) is distinguished from diversity in problem-related assumptions and conflict values. Yet, gender and ethnic/ancestral origin are intertwined with normative influences (societal, cultural) that may lead to general differences in individual belief development or other psychological/behavioural orientations that are related to these deep-level variables.
For instance, research on conflict-handling styles and conflict frames has found cultural differences in the general approaches people from different cultures take to resolve conflict, as well as the psychological dimensions they use to frame conflict situations themselves (Rahim, 2002; Gelfand, Nishii, Holcombe, Dyer, Ohbuchi, & Fukuno, 2001). In addition, as summarized by Meyers et al. (1995), studies have found differences between men and women in terms of the aggressiveness of their communication behaviours (e.g., Nicotera & Rancer, 1994) and conflict-resolution tactics (Gayle, Priess, & Allen, 1994; Rahim, 2002).

Some evidence would also support investigating gender and ethnic/ancestral origin as potential sources of problem-relevant assumptions (as they are defined above, i.e., normative views concerning organizations). For instance, a meta analysis found that men and women tend to differ significantly in terms of the importance they ascribed to a variety of different employment attributes (Konrad, Corrigall, Lieb, & Ritchie, 2000). In addition, norms regarding organizational characteristics and employment practices tend to vary internationally (Rousseau & Schalk, 2000). A question remains as to whether people who have ethnic or ancestral links to countries that vary in terms of organizational practices might also internalize different organizational standards.

Of course, evidence supporting broader (i.e., average) differences in beliefs or other psychological characteristics between categorical groups does not mean that categorical, demographic indicators (e.g., gender or cultural/ancestral origin) can serve as valid indicators of these underlying views. As has been recognized in the area of cross-cultural research, a given culture may exhibit “modal reflections of personal attributes” yet members who are united by a common culture may nevertheless exhibit considerable individual-level variation
of beliefs within that culture (Schaubroeck, Lam, & Xie, 2000). Similarly, exploration of
gender-based differences sometimes finds no significant differences between the men and
women sampled, which may indicate that gender differences are a matter of degree and only
evident at the tails of the distribution (Meyers et al. 2005).

The current research proceeds from the general assumption that any basis of
demographic diversity might exhibit links to underlying problem-related assumptions or
conflict values (cf. van Knippenberg et al., 2004). At the same time, no basis of
demographic diversity should be expected to assure that these deep-level differences are
present in demographically-diverse groups. Teams that are diverse “on the surface” may not
experience high levels of information elaboration because members’ underlying beliefs are
more similar than outward appearances may suggest. Conversely, people who may appear to
be similar at first glance may bring very different perspectives to the table.

Without a separation of underlying beliefs from the people who possess them,
research cannot effectively predict these dynamics. As will be discussed further in the
following section, this is particularly important because deep-level diversity and
demographic diversity may simultaneously affect team functioning by way of distinct
processes. In any case, an explicit test of the possible links between demographic diversity
and deep-level diversity can provide a more complete view of the differences that exist
between people in work settings. Accordingly, the following hypotheses regarding the
potential existence of positive relationships between surface-level demographic diversity and
deep-level diversity are promoted here in order to provide conceptual clarity.

Hypothesis 1: The demographic diversity of the team positively predicts deep-level diversity.
Hypothesis 1a: The demographic diversity of the team positively predicts the diversity of problem-relevant assumptions.

Hypothesis 1b: The demographic diversity of the team positively predicts the diversity of conflict values.

Up to this point, this chapter has sorted through some of the mixed findings in diversity research to suggest that diversity is complex and involves both surface-level differences and underlying differences, which may or may not be significantly correlated with each other. It has been considered an important first step to identify the bases of diversity that potentially influence conflict dynamics in teams, and determine the extent to which surface-level demographic differences are associated with these specific underlying differences. Attention is turned next to elaborating the links between these distinct bases of diversity and the two major types of conflict, in order to more clearly articulate the group processes that are proposed to operate within diverse teams.

2.4 Examining conflict as an intervening mechanism between team diversity and team outcomes

It is clear from the above review of existing diversity research that presumed links between team diversity and certain information-based and socially-based processes can be informed by a more direct investigation. Moreover, these mechanisms share obvious links to task and relationship conflict, respectively, which have received far more attention (both theoretically and empirically) as team process variables in studies of naturally-occurring work groups. Therefore, an investigation of the links between diversity and conflict permits
an integration of these two literatures, which can shed light on the conflict-related implications of distinct team member differences.

2.4.1 Relationship conflict as a mediator of the relationship between demographic diversity and team viability

Demography research has amassed noteworthy evidence that suggests teams more diverse on observable demographic characteristics are characterized by higher turnover and turnover intentions, outcomes which share obvious links to one of the dimensions of team effectiveness examined here, team viability.

However, the theoretical basis for explaining the linkage between demographic diversity and turnover frequently rests not in demographic differences per se, but in how these surface-level differences may signal tendencies for members to hold divergent underlying beliefs (Tsui et al., 1992). Particularly during early stages of interaction, before team members’ true underlying differences and similarities become known, it has been proposed that demographic diversity might lead team members to expect each other to differ on important underlying characteristics (McGrath et al., 1995; see Phillips & Loyd, 2006, Zellmer-Bruhn et al., 2008). Regardless of whether underlying differences actually exist, these initial expectations are proposed to have enduring influences on member interactions through social category and similarity-attraction mechanisms.

Research has demonstrably shown that relationship conflict negatively influences team member perceptions of the work setting. More specifically, studies have found that relationship conflict predicts poor performance (Amason & Sapienza, 1997; Jehn et al.,
1999), high work stress (De Dreu & Van Vianen, 2001) as well as low intentions to remain a member of the work unit, low commitment, and low satisfaction (Jehn et al., 1999).

Initially, empirical evidence was not completely clear in terms of the impact of demographic diversity on relationship conflict. For instance, Jehn et al. (1999) found that diversity in terms of gender and age positively predicted relationship conflict. On the other hand, Pelled et al. (1999) found that age diversity negatively predicted relationship conflict, while gender diversity was unrelated to relationship conflict. Subsequent research has helped to clarify the relationship. For instance, it has been shown that the positive relationship between gender diversity and relationship conflict is particularly present early on in the life of groups, and that the relationship is stronger among teams with low team orientation (i.e., members predominantly prefer to work alone; Mohammed & Angell, 2004).

It is worth noting that the current model does not attempt to assess social categorization and similarity attraction directly. However, relationship conflict shares conceptual links to these mechanisms primarily in relation to how the basis of conflict is (or becomes) personalized or identity-related (cf. Janssen, van de Vliert, & Veenstra, 1999). Definitions of relationship conflict regularly refer to interpersonal incompatibility (Amason, 1996; Jehn, 1995). Therefore, as a means of examining the nature of the relationship between demographic diversity and team viability, the current model uses relationship conflict as an intervening process variable. This may help to shed light on whether the reason teams containing members who differ on observable demographic characteristics are less socially integrated is because of a greater tendency for members of these teams to enact person-centered forms of conflict.
Hypothesis 2: Manifest relationship conflict mediates the relationship between team demographic diversity and team viability. Teams that are more demographically diverse have more manifest relationship conflict, which in turn negatively predicts team viability.

2.4.2 The relationship between the diversity of problem-relevant assumptions and manifest task conflict

Hypothesis 2 proposes that the viability of the team may be explained, in part, by members’ negative reactions to their surface-level differences. Yet, underlying differences in beliefs or values are also important bases upon which people judge their similarity to others. It has been noted that the similarity-attraction mechanism, theoretically, applies even more directly to these underlying differences, even though it is often invoked to explain demographic effects (Harrison et al, 1998). In other words, the reason outlined above for how demographic diversity may lead to increased interpersonal friction in groups is the presumption that members’ surface-level differences are used as signals of more profound differences in perspectives, beliefs, and values.

Deep-level diversity is not evident until it is revealed, for instance through expressing task-based disagreements. This dissertation is more focused on the ultimate impact of these expressed differences on team outcomes. In fact, these manifestations of task conflict will be examined as the leading predictor variable in a moderated mediation model (described in section 2.7). As a result, no hypothesis is offered here concerning the indirect effects of diverse problem-relevant assumptions on team viability. It is informative, however, to examine the link between the diversity of problem-relevant assumptions and task conflict.
because task conflict is theoretically derived from differences in information, knowledge, or perspectives that are related to the task at hand (Jehn, 1994). It is expected that teams consisting of members who hold highly diverse problem-relevant assumptions will be more likely to engage in manifest task conflict compared to teams containing members with less diverse assumptions.

Hypothesis 3: The diversity of problem-relevant assumptions positively predicts manifest task conflict.

2.4.3 Conflict value composition as a moderator of the relationship between the diversity of problem-relevant assumptions and manifest task conflict

Although the logic for Hypothesis 3 is plain, there is reason to predict that the relationship being proposed may vary according to the degree to which team members tend to hold positive conflict values. As in any novel situation, members’ views concerning the appropriateness of engaging in task-based disagreements in their work groups will partly derive from the details of the situation itself, but also from the manner in which these details are noticed and interpreted in line with their internal beliefs (Goffman, 1986).

Especially in self-managing teams, the initial assembly of members’ personal perspectives is highly influential to the manner in which procedures, working relationships and, eventually, norms are elaborated, negotiated, and maintained (Arrow, et al., 2000). For instance, when conflict values are highly-overlapping (i.e., less diverse), members are somewhat initially predisposed to engage in similar disagreement-related behaviours and interpretations. This could lead to the, rather straightforward, establishment of working arrangements that are reflective of this consistency.
In addition to the diversity of these underlying perspectives, however, it is important to know the general *functional nature* of members’ conflict values. When members of problem-solving groups primarily hold positive conflict values, they may quickly enact an approach to discussing the situation that enables them, to express more of their underlying differences regarding the problem. On the other hand, if members primarily hold negative conflict values, this would likely have a silencing effect on group discussions, or else quickly steer the group to common ground and attempts to obtain a consensus regarding the problem.

When the conflict values of team members are highly diverse, an inconsistent set of personal views regarding the appropriateness of disagreeing may create a situation lacking coherence, in which certain members initiate debates that other members would prefer to avoid. In teams characterized by a diversity of conflict values, even those members who would otherwise be inclined to discuss their underlying difference regarding the task may feel more inhibited from taking explicit actions to note these differences and to push for such discussions.

It is proposed that, to the extent that group members’ conflict values converge at the “functional” end of the continuum, more of the total diversity of their underlying problem-relevant assumptions is likely to emerge in open discussions. Therefore, the full moderation of the relationship is proposed to be a 3-way interaction between the diversity of problem-relevant assumptions, the diversity of conflict values, and the general nature of conflict values (based on the average of conflict values):

Hypothesis 4: The positive relationship between the diversity of problem-relevant assumptions and manifest task conflict (H3) is moderated by both the diversity and average of conflict values (i.e., a 3-way interaction). The
positive relationship between the diversity of problem-relevant assumptions and manifest task conflict is stronger among teams in which members hold less diverse and more functional (i.e., more positive) conflict values.

2.5 Conceptualizing conflict spillover

Hypotheses 2 through 4 have been offered primarily as a means of outlining how task and relationship conflict are theoretically-rooted in distinct elements of group composition. However, as described in Chapter 1, the relationship between these two forms of conflict, itself, must be better understood in order to tease apart the advantages and possible disadvantages that may stem from engaging in task-related disagreements in teamwork settings. In other words, the traditional theoretical distinction between task-based and person-based conflict must be further developed in order to account for the process by which conflicts over ideas turn into conflicts between people.

Based on the strong positive relationship that is often found between task and relationship conflict (De Dreu & Weingart, 2003), it would appear that people generally react negatively to task conflict. An alternative interpretation, if the causal direction is reversed, is that people who are engaged in relationship conflicts are more likely, as a result of their underlying emotional tension, to disagree with each other on substantive matters as well. In a longitudinal examination of conflict spillover, Peterson and Behfar (2003) did demonstrate that task conflict at one point in time predicted relationship conflict one month later (controlling for initial levels of relationship conflict). Most often, this relationship has been considered as flowing from task- to relationship-conflict (e.g., Mooney, Holahan, & Amason,
2007; Yang & Mossholder, 2004), although the dominant direction of the relationship will likely depend on context.

In the current conceptualization, the causal direction is proposed to flow from task conflict to relationship conflict. Theoretical support for this directional argument derives from the fact that this is a model of the initial conditions of groups and nascent group processes, rather than a model of long-established teams that will likely have developed a more elaborate system of personal relationships and interaction norms. It is assumed here that, in nascent groups, team members do not hold pre-existent relationship conflicts at the outset of their interactions. As a result of the substantive requirements of the task, it is also expected that task-based disagreements will emerge prior to relationship conflicts. Since relationship conflict should be more variable, and take longer to develop in these settings, task conflict assumes causal priority in the current model. This conceptualization also permits treating levels of task-to-relationship conflict spillover as representative of negative reactions to the expression of task-related differences.

2.5.1 A multi-level approach to spillover

Consistent with previous results derived from the study of naturally-occurring work groups, it is expected that the relationship between these two forms of conflict will be positive. However, in order to better understand the operation of spillover, it is important to consider the theoretical levels at which these positive effects are expected to occur.

The relevance of attending to levels of analysis for conflict research can be made more obvious by referring to existent process-related conflict frameworks, in which the relationships between distinct elements of the conflict experience are considered (from latent
roots to behavioural manifestations). For instance, Pondy (1967) proposed that conflict is a process that originates in *latent conflict* conditions that are inherent to situations. Within these situations, he further proposed that conflict entails a process in which people may (or may not) *cognitively perceive* conflict, *affectively experience* conflict, and *behaviourally manifest* conflict. To be clear, the model of conflict being proposed in this dissertation is not wedded to any strict sequential ordering of conflict stages. It is, however, informed by the proposed view of conflict as a *process* entailing distinct, yet interrelated, components (perceptual, emotional, and behavioural).

These distinct elements of the operation of conflict can be used to build a more integrative theory, one which better reflects how people come to perceive and express their understandings of, and reactions to, the differences inherent in their work groups. This way of thinking also helps to emphasize the inherently multi-level nature of conflict. For instance, it has been noted that conflict may be experienced at the individual level, but not expressed behaviourally within the team setting (cf. O'Connor, Gruenfeld, & McGrath, 1993). Conflict that is perceived affects the experience of the perceiver. However, conflict that is expressed has the potential to influence the experiences of others in the group as well. From a multi-level view, spillover may be considered as operating through both perceptual and behavioural (i.e., manifest expressions) mechanisms. In addition, by employing multi-level analytical techniques, these two distinct processes may be modelled simultaneously.
2.5.2 Distinguishing individual-level perceptions of conflict from group-level manifestations of conflict

The relationship between perceived differences and expressed differences is obviously a complex and reciprocal process by which people interpret and potentially communicate about their task-related or personal differences. For instance, the behavioural expression of task conflict might consist of idea-based objections, counterproposals, offering alternatives, directly questioning another’s assumptions, and so on. These behaviours are likely preceded by initial differences that are perceived by the parties, concerning their task-related ideas. Moreover, these perceptions may, themselves, be the result of earlier expressions, verbal exchanges, and discussions.

This same degree of interplay between perceptions and expressions likely characterizes the emergence of relationship conflict in team settings. The behavioural expression of relationship conflict might consist of visual displays of disgust, by verbal insults, by a member’s storming out of a group meeting, or other behavioural signals of relationship tension. Naturally, these behaviours also stem from perceptions and feelings related to more deep-seated interpersonal tensions, which may or may not have been preceded by similarly explicit behavioural acts.

Integral to this conceptualization is the potentially inconsistent link between these outward behaviours and internal perceptions. For instance, an individual team member might wrongly perceive task-based disagreements on the basis of subtle cues and/or misunderstandings. A hesitant acknowledgement of one’s suggestion may be taken as a disagreement when, in fact, it was the result of thoughtful processing of the idea. A facial expression consistent with depth of concentration might be mistaken for intense puzzlement
or confusion. Perceptions of task conflict may also result from legitimate misunderstandings of what another team member has suggested or asked. Similarly, in the absence of *explicit* behavioural expressions of relationship conflict, people may still perceive its presence (rightly or wrongly) on the basis of subtle/ambiguous cues or behaviours that were not intended to convey such meaning at all (e.g., a sigh, avoiding eye contact, sarcasm, etc...).

There is also the possibility that team members might perceive task or relationship conflict and, yet, fail to express themselves in ways that are consistent with their internal experiences. A team member might believe that other team members have different ideas, and yet not engage in much debate about these differences or defend one position over another. A team member might experience relational friction with another team member and, quite conceivably, refrain from acting on impulses to express this feeling directly, or in ways that are explicit and unmistakable.

Obviously, the extent to which team members’ expressions of conflict are dampened versions of their internal thoughts will serve to disconnect the unique experiences of team members. This creates a situation where it is highly conceptually-relevant to study both the within-group variation in conflict reports, which are best viewed as indicators of conflict perceptions; as well as the between-group variation (indexed by the group means of these perceptions), which can be considered variations in the extent to which conflict is behaviourally manifested in the team setting.

Upon closer inspection of the ways in which conflict has been conceptually defined across previous studies, it becomes evident that conceptual definitions do differ in terms of whether “perceptions” or “expressions” are emphasized. However, this distinction has not usually been highlighted and certain common methodological practices in existing group
research (e.g., focusing exclusively on the group mean of individual reports) make it difficult to disentangle the two elements of the conflict phenomenon.

For instance, task conflict has been considered variously as “a condition in which group members disagree” (Pelled et al., 1999, p.2), as well as “a perception of disagreements among team members” (Simons & Peterson, 2000, p.102). The former of these definitions emphasizes a group-level construct, whereas the latter references perceptions, which are more appropriately conceptualized as residing at the individual level. Similarly, relationship conflict has been considered “…a condition in which group members have interpersonal clashes…” (Pelled et al., p.2) or “…a perception of interpersonal incompatibility…” (Simons & Peterson, p.102).

Most interestingly, each of the distinct conceptual definitions cited above was operationally-defined and measured using virtually identical instruments and methods, namely, by taking the group mean of individual team members’ ratings concerning the prevalence of certain characteristics. These were assessed by survey items such as the following: “to what extent are there differences of opinion in your team?” and “How much are personality clashes evident?” (cf. Pelled et al., 1999; Simons & Peterson, 2000).

Here, attention is not being drawn to these survey items to imply that they are inappropriate means of assessing the perception or the expression of conflict in groups. In fact, these studies should not be considered as exceptional because variations in conceptualizations of conflict (without concomitant variations in operational methods) are quite widespread in the literature. For a thorough listing of existing conceptualizations of conflict, which greatly facilitates this type of comparison, the interested reader is directed to the conceptual review by Barki and Hartwick (2004).
The point of making these comparisons is to offer the suggestion that conflict in groups entails both perceptions and expressions, and that measurement instruments such as those referred to above permit the assessment of both constructs. When team members provide individual reports as to the degree of task- or relationship-conflict that “exists” in their team, the individual-level constructs being assessed are perceptual in nature. Concerning the aggregate properties of a perceptual variable such as this, however, group means may actually index something qualitatively distinct. Bliese (2000) noted that frequently: “…the aggregation of lower-level constructs into higher-level variables is likely to create an aggregate-level variable that is simultaneously related to, and different from, its lower-level counterpart” (p.369). In these cases, “…the aggregate variable contains higher-level contextual influences that are not captured by the lower level construct” (Ibid).

The similarities and differences between conflict reports at the individual and group (i.e., aggregate) levels can be formally defined through theoretical relationships, referred to as “fuzzy composition” models (Bliese, 2000), which will be specified in greater detail in Chapter 3. For now, it is sufficient to propose that individual-level reports of conflict are linked to potentially unique interpretations of the group environment, while the group means of these reports are more appropriately considered as referencing characteristics of the groups themselves (e.g., variations in the amount of conflict that is overtly expressed in the setting).

Multilevel methods permit partitioning the within-group, as well as between-group, variance of such reports and can be employed to make these distinctions in empirical tests. These tests can be used to understand whether conflict spillover operates primarily at the individual level, the group level, or both.
It is worth reiterating that, to date, the common methodological practice of exclusively examining the group means of individual team-member reports has virtually precluded the development of an appreciation of the role played by conflict perceptions in groups, since distinct individual-level perceptions are averaged out through the process of aggregation (Simons & Peterson, 2000). This practice has not, however, deterred researchers from conceptualizing conflict spillover as being housed primarily in individuals’ interpretations of task-based disagreements. Unfortunately, inferring how individual-level processes (such as interpretation) operate, based on relationships exhibited in aggregated data, is an interpretive trap known as the ecological fallacy (see Robinson, 1950).

The current model attempts to bring clarity to the study of the conflict spillover phenomenon by examining both conflict perceptions and conflict expressions. At the individual level, the relationship between reports of task and relationship conflict can be considered as the result of an interpretive process. At the group-level, spillover is better conceptualized as the result of an explicit process through which team members express their person-directed reactions to open disagreements about the task.

Hypothesis 5: Task conflict positively predicts relationship conflict at both the individual and group levels.

At the individual-level, perceptions of task conflict are hypothesized to predict perceptions of relationship conflict. This is in keeping with the general notion that encountering underlying differences (even if only perceived) is generally uncomfortable, which might make people sensitive to these differences and prone to misinterpret their scope. The more task conflict individuals perceive in the setting, the more relationship conflict they will perceive.
Hypothesis 5a: At the individual level, perceived task conflict positively predicts perceived relationship conflict.

Over and above this perception-based mechanism, there is the matter of how the overt manifestation of task-based disagreements predicts associated degrees of manifest relationship conflict. That is, after accounting for individual-differences in the perception of task- and relationship-based conflict, group means are conceptualized as representing between-group differences in members’ tendencies to directly express their task- and person-centered disagreements. It is predicted that groups with members who more overtly express their task-based disagreements will also be characterized by overt expressions of interpersonal friction, tension and disliking. At the group level, these variables are referred to as manifest task and relationship conflict.

Hypothesis 5b: At the group level, manifest task conflict positively predicts manifest relationship conflict.

Hypotheses 5a and 5b, when considered jointly, predict an incremental or contextual effect (Hofmann, 2002; Kozlowski & Klein, 2000). In other words, the examination at the group level (Hypothesis 5b) is treated as an effect that exists purely between groups and will be examined after first partialling out the pooled within-group effect of task conflict perceptions on relationship conflict perceptions. What these hypotheses jointly enable is a test of whether spillover is a multilevel phenomenon consisting of both individual-level and group-level mechanisms (i.e., Hypothesis 5). If support is obtained for either Hypothesis 5a or 5b exclusively, then these results can still shed light on how spillover should best be conceptualized and modelled in conflict research.
2.6 The moderation of task-to-relationship conflict spillover

The following section of the chapter focuses on explaining possible variations in the multi-level relationships described above concerning task and relationship conflict. Although the confidence interval surrounding the corrected correlation between task and relationship conflict reported by De Dreu and Weingart (2003) was rather narrow, e.g., $\rho = .52$ ($k = 23; 95\% \text{ CI} = .49, .55$), their tests still suggested a considerable amount of variation in this correlation across studies. Other reviews of field studies have come to similar conclusions (Simons & Peterson, 2000). It is worth bearing in mind that these reviews examined relationships between group-level averages of members’ task and relationship conflict reports.

Toward trying to understand the factors that might explain variations in conflict spillover, it is potentially informative to consider how the results from correlational field studies compare to those derived through experiments, which have been noted to more often corroborate the positive effect of task-based conflict (Jackson et al., 1995; Nemeth & Staw, 1989). One suggestion is that constraints inherent to certain laboratory settings and experimental designs may have prevented the effective analysis of the emergent processes like conflict (Hackman & Morris, 1975). For instance, true relationship conflicts may take considerable time to develop and may depend on the personal identity-oriented stakes that often form the backdrop of teamwork in more natural work settings. Another suggestion is that research conducted in different settings, and using different designs, might not have studied the same phenomena at all (Williams & O’Reilly, 1998).

Rather than focusing on methodological differences across studies per se, these matters are worth considering in relation to the essential contextual differences that exist
between studies that have found positive effects of task conflict (largely experimental) and those that find the opposite (largely correlational field studies). These differences may offer a clue as to the critical manner in which dysfunctional spillover can be avoided.

For instance, Schulz-Hardt et al. (2006) suggested that experimental or quasi-experimental studies of disagreement (or dissent) frequently confound task-based disagreements with structured decision-making (e.g., devil’s advocacy and dialectical inquiry techniques; see Schwenk & Cosier, 1980). Although these techniques have been shown to improve complex decision making, it may be partially as a result of this structure. In fact, Amason and Sapienza (1997) suggested that these structured techniques “legitimize” disagreement. It may be that these imposed decision-making techniques provide a situational explanation/justification for team-member disagreements, which makes them less likely to provoke negative reactions.

Other studies have found that an experimentally-manipulated cooperative, versus competitive, orientation moderates the impact of open disagreements (Tjosvold, 1985). For instance, Tjosvold & Deemer (1980) found that when subjects were encouraged to discuss their differences openly in a group (including one other subject and two experimental confederates), they learned more about each other’s perspectives than they did when they were encouraged to avoid conflict. However, when subjects were made to view their relationship with the other party as inherently competitive (through an experimental manipulation), the open discussion of their differences frequently resulted in an inability to achieve any sort of decision. By contrast, subjects made to view their relationship as inherently cooperative tended to reach integrative decisions through these discussions. Furthermore, subjects in the competitive condition experienced insecurity, negative
expectations, as well as hostility and suspicion toward the other party. Indeed, the authors concluded that the effects of open disagreement will tend to differ as a result of whether the social context is competitive or cooperative (Tjosvold & Deemer, 1980, p.591).

Experimental research, such as the studies cited above, has been more successful at demonstrating the potential value of task-based disagreements for decision making. However, these findings are less directly applicable to the manner in which task conflict potentially affects relationship conflict in self-managing work teams. These teams receive little-to-no formal discussion rules or discussion structures from external authorities. In addition, although members are interdependently responsible for certain work goals, it is by no means assured that they will interpret disagreements with one another as nested within their cooperative interdependence. Instead, in the absence of formally-prescribed roles or structures, members may very well interpret internal disagreements as representative of self-serving interests, power struggles, or “status contests” (Owens & Sutton, 2007).

Therefore, the general conclusion that can be drawn in looking at these experimental and quasi-experimental studies is that the extent to which disagreements are viewed as legitimate and cooperatively-motivated tends to dampen negative reactions. Part of the reason for mixed findings in field research, then, could be that the legitimacy of task-based conflict is not a “given” in these settings but, rather, a social construction. When team members are assembled to work on a task, they bring together a possibly differentiated set of prior experiences and expectations. In the absence of strong situational cues as to the appropriateness of disagreeing, the corresponding ambiguity surrounding task-based disagreements may lead to varied reactions (cf. Mischel, 1977; Terborg, 1981).
There is some evidence to support the proposition that variations in certain types of situational cues influence conflict spillover in work environments. For instance, Simons and Peterson (2000) found that, in groups characterized by high trust, the degree of group-level conflict spillover was reduced. Trust was treated as a team property that inhibits the negative misattribution of task conflict behaviours by removing sinister intentions from consideration.

In a study of individual conflict perceptions, Tidd, McIntyre, and Friedman (2004) found that perceived role ambiguity attenuated the correlation between individuals’ task and relationship conflict experiences at work. Role ambiguity was proposed to attenuate the spillover of these perceptions by providing an external, rather than personal, attribution for co-workers’ task-based disagreements.

For the present purposes, it is intuitively relevant to consider group members’ conflict values as potentially powerful moderators of this interpretive (at the individual-level) or behavioural (at the group-level) process. As with the operation of spillover itself, the moderation of spillover is considered at both levels.

Hypothesis 6: Conflict values moderate the positive relationship between task conflict and relationship conflict at both the individual and group levels.

2.6.1 Moderation of perceptual conflict spillover: The interpretation of task-based disagreements

Individual conflict values are proposed to explain variations in the degree to which perceived task conflicts are positively predictive of perceived relationship conflicts. At this
level of analysis, individual conflict values are proposed to operate as part of a cognitive sense-making process.

Researchers have long-maintained that internal cognitive frameworks facilitate information processing, but that this can also be “double-edged.” On the one hand, these structures help perceivers define ambiguous environmental cues, fill in missing information, and guide subsequent information processing (Taylor & Crocker, 1981; Weick, 1979; 1995), which facilitates social interaction by freeing up the mental resources that would otherwise be continuously engaged in processing environmental cues. On the other hand, the structure of the schema is often “imposed on the elements of the stimulus configuration” (Taylor & Crocker, 1981, p. 94). That is, although schemas can adapt to accommodate incongruent or novel information, they tend to change in this manner infrequently, and slowly. Especially in complex or ambiguous situations, in which details are less objectively verifiable, people’s perceptions are more amenable to non-conscious, internal distortion, through which the details of the situation are made to “fit” with pre-existing cognitive structures (Crocker, Fiske, & Taylor, 1984).

Given conflict values reflect the inherent value that people ascribe to the act of disagreeing, it is proposed that team members who hold more positive conflict values will be less likely to misinterpret task conflict as a form of relationship conflict and, thereby, exhibit less perceptual spillover than those who hold less positive (or more negative) conflict values.

Hypothesis 6a: At the individual level, team members’ conflict values moderate the relationship between perceived task conflict and perceived relationship conflict (H5a). The positive relationship between perceived task conflict and
relationship conflict is smaller among individuals who have more positive conflict values than it is among those who have more negative conflict values.

2.6.2 Moderation of manifest conflict spillover: Overt reactions to manifest task conflict

The composition of conflict values is also proposed to have implications, at the group level, for the degree to which manifest expressions of task conflict prompt corresponding expressions of relational friction. Given this mechanisms is proposed to operate at the group-level, it is theoretically housed in the conflict-related behavioural tendencies that are proposed to vary between groups.

As described previously, an inconsistent (i.e., diverse) set of conflict values is proposed to create a social situation that is normatively ambiguous concerning acts of disagreement. This increases the chance that some members will behave in ways that run counter to others’ internal standards of acceptability, which in turn will likely prompt a mixture of functional and dysfunctional reactions. Faced with a disagreement, some members might react negatively while others engage in further disagreement-related behaviours that continue to offend. Given the variety of conflict-related standards, the resultant mixture of reactions may spiral beyond the initial disagreement and spillover into more obvious signs of relational tension.

When the group is characterized by an overlapping (i.e., less diverse) set of negative conflict values, the appropriateness of disagreeing about the task is viewed more consistently; and yet the view is that these are dysfunctional behaviours. In these groups, it is theorized that any expression of task-based disagreement will almost directly elicit corresponding expressions of interpersonal discomfort. Task-based disagreements that
remain unresolved may continue to crop up to complicate team members’ interactions on the task. In other words, the differences of opinion may persist, but teams with overlapping negative conflict values are not comfortable dealing with them. This may cause the task-based conflict to smoulder and become the basis for more person-specific conflict.

When groups contain members who primarily hold positive conflict values, expressions of task-related disagreements are less likely to lead to corresponding expressions of relationship conflict. This is because these behaviours are viewed as normatively acceptable, even desirable, aspects of team functioning. Members of these teams are expected to engage in open task-related disagreements with each other without incurring any associated interpersonal discomfort.

Therefore, the composition of conflict values is proposed to moderate the extent to which manifest task conflict spills over into manifest relationship conflict. As with Hypothesis 4, the moderating effect of conflict values is proposed to vary according to the extent to which values converge at the more positive, “functional” end of the conflict value continuum (i.e., a three-way interaction hypothesis).

Hypothesis 6b: At the group level, the positive relationship between manifest task conflict and manifest relationship conflict (H5b) is moderated by both the diversity and average of conflict values (i.e., a 3-way interaction). The positive relationship between manifest task conflict and relationship conflict is smaller among teams in which members hold less diverse and more functional (i.e., more positive) conflict values.
2.6.2.1 A note about the difference between group norms and conflict-perspective composition

Given the moderating role assigned above to the composition of conflict values, it is potentially worth distinguishing how the composition of conflict values differs from a group norm. Essentially, the difference is treated here as being three-fold. First, by definition, norms are shared properties of groups, and the degree to which members are assumed to hold the same beliefs is usually tested directly in normative investigations in order to ensure construct validity. It is not necessary, or theoretically consistent, in this examination of personal perspectives (and their composition), to assume that members’ conflict values will be either similar or diverse. In fact, it is expected that the initial composition of these beliefs will vary in ways that are influential for predicting subsequent team processes and properties.

Second, there is the matter of time. Norms take time to develop. In fact, process models outline a series of stages that typically precede the establishment of norms, before they can effectively serve to regulate member behaviour (Gersick & Hackman, 1990; Tuckman, 1965). By contrast, conflict value composition is an initial property of groups, which exists during early stages of team member interactions, and typically precedes the development of norms.

Third, assessing the content of group norms is complicated by the fact that norms can be both prescriptive (i.e., injunctive) and descriptive in nature (Cialdini, Kallgren, & Reno, 1991). Prescriptive norms refer to the way things ought to be done, and are driven by standards of appropriateness, whereas descriptive norms simply refer to the way things are, and are driven by the estimated prevalence or frequency of behaviours. As outlined previously, members’ personal conflict values are treated here as inherently prescriptive
personal views concerning the functional importance of task-related disagreements in team settings.

Indeed, the difficulty in assessing normative content may be responsible for certain, rather surprising, results of prior research into the possible moderating role played by conflict-related norms. For instance, Jehn (1995) found that, for groups with open conflict norms, the effect of task conflict on member liking was more negative than it was for groups with conflict avoidance norms. This finding runs counter to other research that has suggested that groups with broader “cooperative” orientations can better harness the positive effects of task conflict without relational side-effects (Amason & Sapienza, 1997; Tjosvold & Deemer, 1980).

The counterintuitive nature of this effect might be representative of the difference between the descriptive and prescriptive dimensions of the norms being assessed. Members who report the presence of open conflict norms may not be reporting their agreement with (or internalization of) the norm, only its existence. For instance, a sample item from Jehn’s (1995) measure of conflict norms is “conflict is dealt with openly in my work unit”. Group members’ reports may merely indicate the extent to which the group tends to deal with conflict openly (i.e., a descriptive norm concerning the way the group deals with conflict). Each member’s own personal beliefs regarding the function of open disagreements are another matter entirely.

In interpreting her unexpected result, Jehn (1995) did suggest that an alternative, individual-level standard may have been in play “…certain group members may have their own preferences for being open about, or avoiding, conflict, and even productive task conflict may make them uncomfortable” (Jehn, 1995, italics added). It is believed that this
dissertation is the first model to focus upon these types of personal views regarding task-based conflict and, moreover, to examine their influence at both the individual and group levels.

In addition to the moderating roles assigned to these perspectives described above, it is argued in the next section that the moderation of conflict slipover will have implications for the indirect effects of task conflict on team viability and team performance.

2.7 Accounting for conflict spillover in estimating the effects of task conflict

Although task conflict has been found to negatively predict team performance and member satisfaction in general, De Dreu and Weingart (2003) demonstrated that the strength of these relationships tends to vary according to the degree of conflict spillover. Naturally, higher levels of conflict spillover are inherently dysfunctional for teams. Increased relationship conflict threatens short-run performance by distracting members from the task (De Dreu, & Van Vianen, 2001), and weakens long-run viability by increasing interpersonal hostility. Therefore, the implications of task-based disagreements are not reckonable without considering whether (or how much) these disagreements predict relational friction. The extent of spillover will drive the strength of the negative indirect effects of task conflict on outcomes.

It should be noted that some previous studies that have found negative relationships between task conflict and performance (e.g., Lovelace, Shapiro, & Weingart, 2001; Porter & Lilly, 1996) focused exclusively on task-based forms of conflict. The results from these studies are largely inconclusive since the measurement of task conflict was likely confounded with relational tension. The true test of whether task-based disagreements are harmful to
group functioning rests on the degree to which task conflict predicts team effectiveness after accounting for the effects of relationship conflict (e.g., Tekleab et al., 2009).

Accounting statistically for the positive relationships between task and relationship conflict, in addition to the negative effects of relationship conflict on outcomes, can clarify how relationship conflict serves as either a mediator or suppressor of task conflict effects (MacKinnon, Krull, & Lockwood, 2000).

2.7.1 Relationship conflict as a mediator of the relationship between task conflict and team viability

Relationship conflict is proposed to serve as a mediator of the effect of task conflict on team viability. Once again, this is proposed to operate simultaneously at both the individual and group levels.

Hypothesis 7: Relationship conflict mediates the relationship between task conflict and team viability at both the individual and group levels.

At the individual level, perceptual spillover is proposed to negatively influence individual willingness to work with team members in the future. The effect of task conflict perceptions on these individual assessments of willingness is mediated through relationship conflict perceptions. Individuals who perceive higher levels of task conflict will tend to perceive higher levels of relationship conflict and, in turn, will be less likely to report being willing to work with the same team members again.

Hypothesis 7a: At the individual level, perceived relationship conflict mediates the effect of perceived task conflict on individual willingness to work with team members
in the future. Members who perceive more task conflict tend to perceive more relationship conflict (H5a), which in turn negatively predicts their personal willingness to work with team members in the future.

Owing to the proposed nature of individual-level conflict spillover, however, the effect outlined in Hypothesis 7a may be driven purely by perceivers’ unique interpretations of the team setting. At the group-level, the effect is distinguished from members’ potentially unique perceptions and behavioural intentions, in order to focus on relationships between characteristics of the setting itself. Essentially, the group-level relationship tests the proposition that teams with more manifest task conflict are less capable of functioning collectively in the future because of the positive relationship between manifest task conflict and manifest relationship conflict.

Hypothesis 7b: At the group level, manifest relationship conflict mediates the effect of manifest task conflict on team viability. Teams with more manifest task conflict tend to have more manifest relationship conflict (H5b), which in turn negatively predicts team viability.

Figure 1.1 highlights the relevant sections of the complete model contained in Appendices 1A and 1B. No prediction is made that a direct effect of task conflict on team viability will remain once accounting for its indirect effect. As a result, Hypothesis 7 proposes a negative indirect effect of task conflict on team viability – an effect which is fully mediated (i.e., completely indirect) by associated amounts of relationship conflict.

Also represented in Figure 1.1 is the moderation of conflict spillover by conflict values (at the individual and group levels). This is important to acknowledge because, if
task-to-relationship conflict spillover is negligible, there is less reason to expect task conflict to have any detrimental effects on the viability of the team. Low spillover signals that the team can entertain task conflict without corresponding negative reactions. When spillover is low, task conflict will be of no threat to team viability. This is precisely what is hypothesized to occur if team members possess less diverse, and more functional conflict values (as per hypotheses 6a and 6b). As such, conflict values, and their composition, can be considered moderators of the negative mediated effects of task conflict on viability (See Figure 1.1). This proposition is held to apply at both levels.

Hypothesis 8: Conflict values moderate the mediated effect of task conflict on team viability at both the individual and group levels.

Figure 1.1 Hypothesis 8: The moderated mediation of the effect of task conflict on team viability

Hypothesis 8a: At the individual level, team members’ conflict values moderate the mediated negative relationship between perceived task conflict and individual willingness to work with team members in the future (H7a). As a result of the moderation of the positive relationship between perceived task and
relationship conflict by team members’ conflict values (H6a), the mediated effect of perceived task conflict on individual willingness to work with team members is smaller among individuals who have more positive conflict values than among those who have more negative conflict values.

Hypothesis 8b: At the group level, the mediated negative effect of manifest task conflict on team viability (H7b) is moderated by both the diversity and average of conflict values (i.e., a 3-way interaction). As a result of the moderation of the positive relationship between manifest task and relationship conflict at the team level (H6b), the mediated effect of manifest task conflict on team viability is smaller among teams in which members hold less diverse and more functional (i.e., more positive) conflict values.

2.7.2 Relationship conflict as a suppressor of the relationship between manifest task conflict and performance

Attention is now turned to the impact that manifest task conflict is expected to have on team performance. Note that this relationship is considered only at the group level, since performance differences are only examined between groups. Theory would hold that manifest task conflict, considered in isolation, is positive for the performance of complex tasks. This proposition is consistent with supporting evidence obtained from experimental research, and is also consistent with general view that teams should be used to accomplish these types of tasks. However, it is proposed here that the benefits of task conflict may be overcome by the dysfunctional “side effects” that result from conflict spillover, since
increased levels of relationship conflict will distract team members from their focus on the task at hand (De Dreu, & Van Vianen, 2001) and stifle team member motivation.

Given that the direct effect of task conflict on performance is expected to be positive, the main effect of task conflict on relationship conflict is proposed to be positive, and the effect of relationship conflict on performance is proposed to be negative, relationship conflict is theoretically conceptualized as a *suppressor* of task conflict’s positive effects (see Figure 1.2). Mediation and suppression are statistically-equivalent processes, in that they both involve an intervening variable which, when accounted for in estimating the effect of an independent variable on an outcome, will change the size of the independent variable’s direct effect. The primary difference is in the direction of that change, since intervening suppressor variables will tend to increase the direct effect, while mediators decrease this effect (MacKinnon et al., 2000).

Hypothesis 9: Manifest relationship conflict is a suppressor of the relationship between manifest task conflict and performance.

In the relevant sections of the complete model reproduced in Figure 1.2, it is clear how relationship conflict can be viewed as playing the role of a “suppressor” of task conflict’s effect on performance. Hypothesis 9a predicts a positive direct effect of task conflict. Task conflict’s *indirect effect* on performance is negative (Hypothesis 9b), being transmitted by relationship conflict.
Hypothesis 9a: After controlling for manifest relationship conflict, manifest task conflict has a direct positive effect on team performance.

Hypothesis 9b: Manifest task conflict has an indirect negative effect on team performance, which is transmitted by way of manifest relationship conflict. Teams with more manifest task conflict tend to have more manifest relationship conflict (H5b), which in turn negatively predicts team viability.

Figure 1.2 also demonstrates how a suppressor effect is statistically-equivalent to a mediated effect, only that the “mediation” here is inconsistent because the sign of the indirect effect of task conflict through the suppressor variable (in this case, the sign is negative; i.e., the product of the upper-path segments passing through relationship conflict) is opposite to that of the direct effect of task conflict (in this case, positive). The typically positive association between task and relationship conflict (in conjunction with relationship conflict’s deleterious effect on performance) threatens to suppress the otherwise positive function of task conflict.
Applying the same logic as that used to propose the moderated mediation effect in Hypothesis 8, it is proposed in Hypothesis 10 that the strength of task conflict’s negative indirect effect on performance is contingent upon the moderating role played by conflict value composition. When spillover is high, a greater negative indirect effect of task conflict on performance is transmitted through manifest relationship conflict.

Hypothesis 10: At the group level, the indirect negative effect of manifest task conflict on team performance is moderated by both the diversity and average of conflict values (i.e., a 3-way interaction). As a result of the moderation of the positive relationship between manifest task and relationship conflict at the team level (H6b), the indirect negative effect of manifest task conflict on team performance is smaller among teams in which members hold less diverse and more functional (i.e., more positive) conflict values.
Chapter 3: Research Design and Analytical Approach

In Chapter 2, specific distinctions were made concerning the nature of team members’ possible differences. Distinct links were drawn between these aspects of teams and two unique, but related, forms of intra-team conflict. Each of these resultant forms of conflict, in turn, was cast as a unique predictor of team outcomes, including task performance and team viability. It has been argued that the ultimate manner in which this process unfolds hinges upon the composition of team members’ conflict values, since these have been proposed to moderate both conflict emergence (Hypothesis 4) and spillover (Hypothesis 6).

3.1 Research design

Clearly, to design a test of this model requires a consideration of the emergent nature of the phenomena being studied, the temporal sequence of the predicted relationships, and the overall nature of demands inherent to teamwork. Although experimental designs permit more direct control of the initial composition of teams, and can bolster the causal interpretation of relationships, they are deficient in other ways that are important to this research.

First, the options available for manipulating the composition of underlying, deep level variables (e.g., assigning different roles, information, or instructions) would have adverse implications for construct validity, since the deep-level beliefs reflected in the model are theorized to be largely tacit and personal to the individual team member. Moreover, as discussed in Chapter 2, it was suggested that contextual features such as role demands or instructions provided by external parties might serve to legitimize the act of disagreeing.
Therefore, experimentally manipulating these views might influence the very phenomenon this research seeks to understand.

Second, there are practical (and ethical) challenges involved in eliciting true relational friction in a short-term or controlled (i.e., laboratory) setting. Third, the assessments that team members make concerning whether to maintain or terminate their working relationships, which form the heart of the team viability construct, are of somewhat questionable validity unless people have had a chance to work together on a personally-significant task over a sufficiently long period of time.

For all of these reasons, a longitudinal study of naturally-occurring work groups was employed to test all hypotheses of the model. The sample was drawn from university students conducting team projects as part of their course work in an undergraduate program of business administration offered through a large Canadian university. Teams ranged in size between 3-6 members. The task for these student teams was to prepare written reports on topics particularly-relevant to the motivation, behaviour, performance and/or management of people in organizational settings; particularly business settings.

Students were sampled from across 13 classroom sections, which were taught by six different instructors. The classes being taught fell into one of four course offerings, distributed as follows: 10 sections of introductory Organizational Behaviour, 2 sections of introductory Organization Theory, and 1 section of advanced (i.e., 4th year) Human Resource Management. Each of these 13 sections was taught on one of the university’s three campuses. Instructors taught between one and three sections of the same course. In one case, an instructor not only taught two sections of Organizational Behaviour, but also the single section of the Human Resource Management course. The two sections of the Organization
Theory course were taught by the same instructor. The content and structural requirements of these papers varied slightly between classes, and minimally between different sections of the same course. In all cases, group members remained free to select the focal topic of their projects within the general content domain of management and employment relations and, more importantly, were self-managing in terms of their internal group processes.

The importance of integrating diverse perspectives is a natural feature of this task and the ensuing level of performance held important personal stakes for the team members since it would ultimately influence their course grades. Therefore, participants were expected to behave in this setting as they would in other demanding work-related contexts, making their conflict-based experiences realistically comparable to those that occur outside of educational settings.

A unique strength of conducting research in a university classroom setting, compared to other work settings, is that teams are typically composed of members with a limited history of prior interaction. As a result, it is possible to assess the initial composition of a large sample of teams, and track the experiences of these teams across a period of several weeks. This enables cleaner measurement of teams’ initial conditions, since these will not be confounded by pre-existing conflict dynamics, including normative strategies concerning how to deal with conflicts that tend to develop in teams over time (cf. “the legacy of the past”, Arrow et al., 2000). In addition, the timeframe of the group project task is sufficiently long to examine the impact of these initial conditions on subsequent emergent properties, which lends credence to causal interpretations (in spite of the correlational nature of the design).
As will be described in the data collection procedure below, constructs were operationalized using data gathered from two distinct sources. The main source of data was the team members themselves, who completed self-report questionnaire items. The second source of data was archival, from which global properties of teams, including team performance, were assessed.

It is important to note that, although the theoretical model developed in this dissertation primarily pertains to “group-level” phenomena, most of the data that were used to operationalize these constructs, and test the theory, were gathered from individuals. As a result, the next section of the paper not only provides detail concerning the data collection instruments that were employed, but is accompanied by a discussion of the implications of the inherently hierarchical nature of the data (and the phenomena) being examined. The latter part of this chapter includes a discussion of the various theoretical justifications (i.e., composition models) that are used as part of the operationalization of group-level constructs from individual-level data.

3.2 Sample and procedure

Students were invited to participate in the research project through a combined classroom/lab visit and distribution of the invitation letter and consent form (copies of which are included in Appendices 3A-3C). The nature of the research was also explained to them orally, and students were free to decline to participate. The invitation to participate in this research was unrelated to the formal requirements of the course. Students’ active participation in the study entailed providing responses (Likert-type ratings) to short survey
questions that were administered, either using printed surveys in class or through web-based surveys conducted in classroom lab sessions.

The data collection occurred at two different points over the 13 weeks of the semester. The first wave was intended to occur prior to students’ active work on the group project task. Three variables were assessed at Time 1: demographic characteristics, problem-relevant assumptions, and conflict values. Time 2 occurred at the completion of the task, at which time three different variables were assessed: task conflict, relationship conflict, and team viability.

Ideally, all students would have been approached during the same week of the semester with the invitation to participate and the opportunity to complete the Wave 1 survey. However, owing to the need to coordinate classroom visits across the three campuses, as well as respect the instructors’ unique classroom plans/schedules, there was a discrepancy in the timing of the initial visit for some classes. In the end, 8 of the 13 class sections were informed of the study (with the option to participate in the Wave 1 data collection) in the second week of the semester. For the remaining 5 class sections, the initial point of contact, as well as the invitation and opportunity to participate in Wave 1 of the study occurred in the seventh week of the semester. The second wave of data collection was timed around the completion of the group project, which in all cases occurred in either the $12^{th}$ or $13^{th}$ week of the semester. As a result, the time interval between data collection time periods for 8 of the class sections was between 10 and 11 weeks. For the remaining 5 sections, the time interval was between 5 and 6 weeks.

Although this discrepancy in the timing of the Wave 1 survey exists, initial descriptive examination of all study variables revealed that none of these varied significantly
in terms of when the timing of data collection occurred. In addition, all the analyses to be reported in Chapter 4 were re-run with the inclusion of a dummy predictor variable that was coded 1 if the timing in between survey waves was between 5 and 6 weeks (or zero if the timing in between waves was between 10 and 11 weeks). This dummy coded variable was never statistically significant in itself, and its inclusion did not significantly alter any of the other parameter estimates reported in the tables of Chapter 4.

Of the 546 students who were invited to participate in the study, 423 (77.47%) participated in the study’s first wave of data collection. Of these respondents, 357 participated in Wave 2 (an attrition of 15.6%). At Time 2, 22 additional participants were recruited even though they had not provided data at Time 1 (379 total). Survey data provided by participants at only one time period were kept as these responses could still be used as part of the operationalization of team-level constructs. 51.4% of the sample (at Time 1) was female. In addition, the sample was primarily made up of students reporting the following ethnic/ancestral origins: East Asian (51.4%), South Asian (11.6%), Eastern European (6.2%), and Southeast Asian (4.2%).

3.2.1 Time 1 measurement

The research focus during this wave of data collection was on the diversity or composition variables of the model – what have been referred to previously as groups’ initial conditions.

Problem-relevant assumptions. As acknowledged in Chapter 2, there is a variety of underlying differences in assumptions that could potentially lead to subsequent disagreements between team members who must identify an organizational problem and
develop an approach toward solving it. Given the task for all teams in the current sample was to write analytical reports related to human behaviour and/or related organizational policies in the employment context, a measure of the importance of distinct employment characteristics was used as the instrument for assessing normative perspectives concerning organizations.

The instrument was based on an inventory developed by Montes (2005), through a review of research concerning the content of employees’ psychological contracts (e.g., Robinson, Kraatz, & Rousseau, 1998; see Rousseau, 1995). Specifically, the measure contains a list of potentially-motivational characteristics of employment, sometimes referred to as ‘organizational inducements’ in the literature (e.g., Porter, Pearce, Tripoli, & Lewis, 1998). Essentially, these characteristics are what organizations often provide to their employees in exchange for their efforts at work, and are meant to motivate (i.e., “induce”) employees to reciprocate with greater contributions toward the organization. Respondents were asked to consider how important it is, in general, for organizations to provide each inducement item to employees as a part of the employment exchange relationship. Appendix 4 (instrument ii) provides the 20 items contained in the scale.

As mentioned in Chapter 2, there is precedent in using individual ratings of the importance of organizational characteristics in research on cognitive diversity in teams (e.g., Chattopadhyay, Glick, Miller, & Huber, 1999; Kallith, Bluedorn, & Gillespie, 1999). Yet, inventories are often developed for use with a specific population; and it is important that the measures used to operationalize task-related diversity are not only related to the task at hand, but are also conceptually meaningful to respondents. For example, an inventory commonly used in managerial samples (the competing values inventory; Quinn & Rohrbaugh, 1983)
was initially designed on the basis of data provided by subject matter experts (i.e., organizational scholars). It is best employed in studies of decision-makers who possess a depth and breadth of knowledge concerning the functioning of organizations, which was considered greater than that of the current participants.

Items referencing characteristics of employment, however, are very meaningful for university students, who are typically at a stage of life where their current employment experiences and/or the prospect of future employment are highly influential to their ways of thinking about organizational issues. In addition, there is an extensive literature on job attribute preferences, which has often employed samples of business school students (Konrad, Corrigall, Lieb, & Ritchie, 2000), and the specific instrument chosen for use here was originally developed for use in a university student sample (Montes, 2005).

Consistent with past research that has used these types of employment inducement inventories, it was expected that respondents’ item ratings would cluster together as representative of general underlying beliefs concerning the importance of *types* of employment inducements (cf., Irving & Montes, 2009). This was examined in the present research through pilot testing the instrument in a separate sample (*n*=115), which was drawn from the same population. The tentative factor structure that was derived through an exploratory factor analysis of the ratings obtained from the pilot test was then fit to the main study data using confirmatory factor analytic methods.

From the pilot data, principal components analysis with oblique rotation suggested the majority of items clustered into one of three main groups (see Table 2). These three components, together, explained 51% of the variance in these items.
Table 2. Principal Components Analysis of Organizational Inducement Importance Ratings

<table>
<thead>
<tr>
<th>Organizational Inducement</th>
<th>Principal component component 1</th>
<th>component 2</th>
<th>component 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing responsibility and autonomy</td>
<td>0.768</td>
<td></td>
<td></td>
</tr>
<tr>
<td>An exciting and challenging work environment</td>
<td>0.738</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunity for advancement</td>
<td>0.682</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunity to be involved in decisions</td>
<td>0.641</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunity to form professional networks</td>
<td>0.545</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of marketable skills</td>
<td>0.500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective and supportive supervision when needed</td>
<td></td>
<td>0.796</td>
<td></td>
</tr>
<tr>
<td>Tasks that closely match the job description</td>
<td></td>
<td>0.702</td>
<td></td>
</tr>
<tr>
<td>Job-related training</td>
<td></td>
<td>0.687</td>
<td></td>
</tr>
<tr>
<td>Consistent and timely pay checks</td>
<td></td>
<td>0.504</td>
<td></td>
</tr>
<tr>
<td>Time off when needed</td>
<td></td>
<td></td>
<td>-0.727</td>
</tr>
<tr>
<td>Flexible work schedule</td>
<td></td>
<td></td>
<td>-0.696</td>
</tr>
<tr>
<td>Long-term job security</td>
<td></td>
<td></td>
<td>-0.554</td>
</tr>
<tr>
<td>Support with personal problems</td>
<td></td>
<td></td>
<td>-0.474</td>
</tr>
<tr>
<td><strong>Eigenvalues</strong></td>
<td><strong>4.205</strong></td>
<td><strong>1.731</strong></td>
<td><strong>1.223</strong></td>
</tr>
</tbody>
</table>

*loadings below .40 are left blank

Upon visual inspection of these item loadings, component 1 was labelled “skill development”, and component 3 was labelled “support”. These two categories are similar to those that have been derived through comparable methods (cf. Irving & Montes, 2009).

Compared to the skill development- and support-based items, the second component appears to contain a more heterogeneous mix of fairly “traditional” characteristics of employment (training, supervision and pay checks) and was, therefore, labelled “traditional”. However, its conceptual ambiguity is noticeable, and will be revisited below in the discussion of the confirmatory factor analysis results.
To cross-validate this exploratory factor structure, a confirmatory factor analysis was employed on the ratings of these items provided by 351 respondents of the main study, using latent variable measurement modeling in SEM. Modification indices suggested one item, “Opportunity for advancement”, might also load on the “traditional” factor. Rather than retain this conceptually-ambiguous item, it was removed from the solution. The resultant three-factor model, which is otherwise consistent with the previously-derived pattern of loadings, provided an adequate fit to the data [Chi-Square=169.45, df=62; NFI = 0.93; CFI = 0.95; RMSEA = 0.070].

The internal consistency reliability estimates of these three indices are as follows: ‘skill development’ (α=.76), ‘support’ (α=.67), and ‘traditional’ (α=.62). Given both the lingering conceptual ambiguity regarding the “traditional obligation” belief category and its low reliability, it was decided not to examine this set of beliefs in the remainder of the model. Although the reliability of the “support-based” items is also somewhat low, the set of items is considered adequately representative of a common category of employment inducements.

The individual-level means of the ratings of items representing the skill-development and support-based categories of employment inducements were calculated and the diversity of each of the two types of perspectives was used to operationalize the diversity of problem-relevant assumptions (to be discussed further in the section on group-level construct operationalization).

Conflict values. In order to gauge respondents’ underlying views regarding the functional importance of task-based disagreements in team settings, a measurement instrument was developed specifically for the present study, on the basis of an existing descriptive index, called the Intragroup Conflict Scale, or ICS (Jehn, 1995).
The ICS has been used in a number of studies to assess the overall frequency or amount of task conflict and relationship conflict that group members tend to experience while working together. Often, the format and/or wording of the scale has been modified in order to assess either the typical levels of conflict experienced over time, or the particular levels of conflict associated with a specific event, decision, or task. In all cases, the ICS (and related conflict scales) typically asks respondents to rate conflict descriptively (e.g., from 1 – “none” to 5 – “a great deal”; Jehn, 1995). In addition, the respondent’s own group serves as the item referent in the ICS items (e.g., “How much conflict about the work you do is there in your work unit?”). Table 3 contains items from Jehn’s (1995) scale and, as a point of comparison, a modified version of the ICS employed by Pearson, Ensley and Amason (2002).

To assess conflict values, conflict-related items inspired by these ICS scales were developed, which are contained in Table 4. See the complete Conflict Values Scale in Appendix 4, instrument iii. Respondents were asked to rate these items in a format very similar to that used by Webber et al. (2000) to assess mental model similarities and differences in groups (cf. Webber, Chen, Payne, Marsh, & Zaccaro, 2000). The instrument first asked respondents to consider how teams are used in organizations to solve complex problems. As part of this, respondents were asked to consider the behaviours in which team members might engage during the process of problem solving. The purpose of this instruction was to encourage respondents to draw from their own cognitive model of potentially effective or ineffective team characteristics.
Table 3. Items Contained in the Intragroup Conflict Scale

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do people in your work unit disagree about opinions regarding the work being done?</td>
<td>1. How much disagreement was there among the members of your group over their opinions?</td>
<td></td>
</tr>
<tr>
<td>2. How frequently are there conflicts about ideas in your work unit?</td>
<td>2. How many disagreements over different ideas were there?</td>
<td></td>
</tr>
<tr>
<td>3. How much conflict about the work you do is there in your work unit?</td>
<td>3. How many differences about the content of decisions did the group have to work through?</td>
<td></td>
</tr>
<tr>
<td>4. To what extent are there differences of opinion in your work unit?</td>
<td>4. How many differences of opinion were there within the group?</td>
<td></td>
</tr>
<tr>
<td>Relationship conflict</td>
<td>1. How much friction is there among members in your work unit?</td>
<td>1. How much personal friction was there in the group during decisions?</td>
</tr>
<tr>
<td>2. How much are personality conflicts evident in your work unit?</td>
<td>2. How much were personality clashes between members of the group evident?</td>
<td></td>
</tr>
<tr>
<td>3. How much tension is there among members in your work unit?</td>
<td>3. How much tension was there in the group during decisions?</td>
<td></td>
</tr>
<tr>
<td>4. How much emotional conflict is there among members in your work unit?</td>
<td>4. How much emotional conflict was there among the members of your group?</td>
<td></td>
</tr>
<tr>
<td>5. How much anger was there among the members of the group</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Following this initial instruction, the list of descriptors contained in Table 4 was provided, and respondents were asked to assess the likely impact each of the characteristics would have (i.e., hypothetically) on a team’s ability to perform effectively. Ratings were provided on a scale ranging from -5 (‘this characteristic would severely hurt a team’s chance of success’) to +5 (‘this characteristic is vital for a team’s chance of success’), with zero as a neutral point (‘this characteristic would neither help nor hurt a team’s chance of success’). As such, each of the four exemplars of task-based conflict (see the left column of Table 4) was assessed along an 11-point continuum ranging from highly dysfunctional to highly functional (see Appendix 4, instrument iii, for the Conflict Values Scale).
Table 4. Items Contained in the Conflict Values Scale

<table>
<thead>
<tr>
<th>Task-conflict descriptors</th>
<th>Relationship conflict descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Group member disagreements about the work being done</td>
<td>1. Evident personality clashes between members of the group</td>
</tr>
<tr>
<td>2. Differences about the content of decisions among the member of the group</td>
<td>2. Tension in the group during decisions</td>
</tr>
<tr>
<td>3. Differences of opinion regarding the task among the members of the group</td>
<td>3. Anger among the members of the group</td>
</tr>
<tr>
<td>4. Group member disagreements over different ideas</td>
<td>4. Personal friction in the group during decisions</td>
</tr>
</tbody>
</table>

It should be noted that respondents were also asked to rate the items representative of relationship conflict (see the right column of Table 4) in order to provide them an opportunity to distinguish disagreements about task-related ideas and opinions from other, more plainly dysfunctional characteristics of team settings such as the relational tension indexed by the remaining items. However, these ratings of the relationship-conflict descriptors, themselves, were not used to operationalize conflict values. Conflict values were calculated by taking the mean of each respondent’s functionality ratings of the four items representative of task conflict (Cronbach’s alpha = .76).

As was expected, the individual mean ratings of the relational friction characteristics were vastly skewed (long tails to the right), indicating that most rated these characteristics as plainly dysfunctional (see histograms of individuals’ mean ratings in Figures 2.1 and 2.2). By contrast, the ratings of the functionality of the task-conflict items exhibited a more normal distribution, with roughly 50% of respondents providing average ratings on either side of the neutral point. It is the composition of these widely-ranging beliefs regarding the function of task-based disagreements that are proposed here as a moderator of task conflict emergence and spillover.
Figure 2.1 Histogram of mean reports of functionality of relationship conflict

Figure 2.2 Histogram of mean reports of functionality of task conflict
Demographic variables. Demographic survey questions referenced respondent gender (male or female) and ethnic/ancestral origin (see Appendix 4, instrument i, for the wording of these questionnaire items). Respondents were instructed to identify as many categories as were appropriate to fully capture their ethnic/ancestral origin. Many of the students in this sample would be classified as Canadian, but also vary considerably in terms of their ethnic/ancestral origin. In cases in which people identified with the ‘Canadian’ category, in addition to another, this other category was used to represent the unique aspect of their origin. Most respondents identified with one primary category (often in addition to ‘Canadian’). Only 13 respondents identified themselves using the ‘Canadian’ category by itself.

The origin of respondents who identified with multiple categories (other than ‘Canadian’) was classified as “mixed background” (11 respondents). Some respondents provided their own descriptors in an optional open-ended blank, which were classified into one of the existing categories whenever possible. When not possible, this was usually the result of the respondent’s use of a very general category (e.g., ‘European’ or ‘Asian’). In these cases, general categories were created to accommodate this form of identification. As can be seen from Table 5, the most frequently employed categories of ethnic/ancestral origin used by respondents of the sample were East Asian, South Asian, and Eastern European (see the measurement instrument in Appendix 4 for the specific country examples that were provided for each of the categories).
Table 5. Classification of Ethnic/Ancestral Origin

<table>
<thead>
<tr>
<th>Category of identification</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asian</td>
<td>199</td>
</tr>
<tr>
<td>South Asian</td>
<td>36</td>
</tr>
<tr>
<td>Eastern European</td>
<td>28</td>
</tr>
<tr>
<td>Southeast Asian</td>
<td>18</td>
</tr>
<tr>
<td>Canadian</td>
<td>13</td>
</tr>
<tr>
<td>Southern European</td>
<td>13</td>
</tr>
<tr>
<td>Mixed background</td>
<td>11</td>
</tr>
<tr>
<td>Western European</td>
<td>11</td>
</tr>
<tr>
<td>Arabian</td>
<td>8</td>
</tr>
<tr>
<td>Caribbean</td>
<td>5</td>
</tr>
<tr>
<td>European (non-specific)</td>
<td>4</td>
</tr>
<tr>
<td>Asian (non-specific)</td>
<td>3</td>
</tr>
<tr>
<td>Latin, Central or South American (including Mexico)</td>
<td>3</td>
</tr>
<tr>
<td>Israeli</td>
<td>2</td>
</tr>
<tr>
<td>African</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>N=355</td>
</tr>
</tbody>
</table>

3.2.2 Time 2 measurement

Time 2 coincided with the completion and submission of the team project. In all classes, projects were due at the end of the semester (in the 12th or 13th week). Students were contacted once again and asked to report, by survey, on the extent to which they experienced the two forms of conflict while working together, as well as their willingness to work with the same team again. Importantly, the timing of Wave 2 occurred soon after the projects were completed and submitted, but before the groups received their project evaluation and feedback.

The timing of Wave 2 was selected for two main reasons. First, it was important to assess task and relationship conflict at such a time as to adequately account for variations in the onset and peak of potential conflicts. For instance, had Wave 2 occurred significantly prior to the completion of the project, it may have missed capturing critical conflict-related
dynamics that often occur in the final stages of work toward an important deadline. Second, Wave 2 was completed prior to teams’ performance evaluations (e.g., project grades) in order to avoid the contamination that knowledge of performance has on retrospective accounts of conflict dynamics and perceptions of social integration (Peterson & Behfar, 2003; Staw, 1975).

Task and relationship conflict. To assess conflict, the 6-item task conflict and 5-item person conflict (i.e., relationship conflict – see items in Appendix 4, instrument iv) scales developed by Janssen, van de Vliert, and Veenstra (1999) were administered at Time 2. Four reverse-worded items (two for each form of conflict) are contained in the original version of this inventory. However, a confirmatory factor analysis found that a theoretically-consistent two-factor solution fit the data better without the inclusion of these reverse-worded items. This was even the case when a comparison was made with a model that retained all items, but also specified a latent “reverse-worded item” factor (as suggested by Williams, Ford, & Nguyen, 2002).

In consideration of the impact of potential measurement error introduced by these reverse-worded items, the four reverse-worded items were dropped (sample reverse-worded relationship conflict item: “The personal relationships were always excellent”). As a result, task conflict was assessed with four items (α=.72), sample item: “There were regularly different opinions on task-related issues”; and relationship conflict was assessed with three items (α=.88), sample item: “Some team members didn't get along personally”. All items were rated on a seven-point scale ranging from 1 - strongly disagree to 7 - strongly agree.

Viability: Willingness to work together. Team members completed survey items designed to index the viability of the group. Viability was assessed in a manner similar to
previous studies of team viability (e.g., Tekleab et al., 2008) and social integration (e.g., Harrison et al., 2002). Two items referenced the team as a whole: “I would like to work with members of this team again” and “This group is not capable of functioning as a unit” (reverse-scored). The latter item was taken from Barrick, Stewart, Neubert, and Mount (1998). In addition, respondents rated their willingness to work with each of the team members uniquely (the survey instrument specified each person by name; e.g., “I would be willing to work with «team member's name» on a future class project).

Since each team member rated his or her willingness to work in the future with each of the other team members, the total number of items completed by respondents varied according to the size of the team. For instance, each respondent of a 5-person team was asked to provide answers to the two team-referent items, and four remaining items, one in reference to each of the other teammates. All willingness items were rated on a seven-point scale ranging from 1 - strongly disagree to 7 - strongly agree, and were averaged to represent the individual-level willingness to work with these same team members in the future. Due to the variations in the overall number of items, Cronbach’s alpha was calculated on the basis of three items; the two team-referent items, and an item representing the individual-level average of the member-specific items (α=.85).

Table 6, on the next page, is provided as a means of summarizing the individual-level variables just described, including their conceptual definition, how they were operationally measured, the hypotheses/relationships in which they play a part (i.e., at the individual-level), and the survey time period in which they were assessed.
Table 6. Description and Operationalization of Individual-level Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Conceptual definition</th>
<th>Operationalization:</th>
<th>Hypothesis</th>
<th>Time period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Problem-relevant assumptions</td>
<td>Individual assumptions concerning the nature of the problem being solved</td>
<td>- Individual-level scale means of two types of employment inducement importance:</td>
<td>-</td>
<td>T1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- skill-development inducement importance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- support-based inducement importance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Conflict values</td>
<td>Individual beliefs concerning the functional role of task-related disagreements in teamwork settings</td>
<td>Individual-level scale means of conflict values scale</td>
<td>H6a; H8a</td>
<td>T1</td>
</tr>
<tr>
<td>3. Perceived task conflict</td>
<td>Individual perception of the amount of task conflict that has occurred in the group</td>
<td>Individual-level scale means. 4-item rating scale (Janssen, van de Vliert, &amp; Veenstra, 1999); reverse-worded items removed.</td>
<td>H5a;H6a</td>
<td>T2</td>
</tr>
<tr>
<td>4. Perceived relationship conflict</td>
<td>Individual perception of the amount of interpersonal friction and discord that has occurred in the group</td>
<td>Individual-level scale means. 3-item rating scale (Janssen, van de Vliert, &amp; Veenstra, 1999); reverse-worded items removed.</td>
<td>H5a;H6a</td>
<td>T2</td>
</tr>
<tr>
<td>5. Willingness to work with members in the future</td>
<td>Individual willingness to work with the same team members in the future</td>
<td>Individual-level scale means. 4-7 item rating scale assessing members’ willingness to work with the team (2 items) and with each of the other members of the group (i.e., 2-5 member-specific ratings).</td>
<td>H7a; H8a</td>
<td>T2</td>
</tr>
</tbody>
</table>
3.2.3 Global group-level variables

Global group-level variables refer to those that are global properties of groups, meaning that they are not decomposable across the within-group units (i.e., individuals). Variables such as team membership, team size, and team performance apply to each member of the group in a direct correspondence (e.g., the group size is the same for each member). In multi-level models, these global properties, as well as nesting identifiers (e.g., team or classroom), are assigned “downward” to individual members of the same group.

All global properties of groups in the current sample were assessed on the basis of archival data. Team size was determined on the basis of course rosters and/or the cover pages of groups’ final reports, and was used as a control variable in all hypothesis tests. Two other properties of groups concern the data hierarchy. That is, students who worked together in a team were assigned the same identifying team number, and teams that shared a classroom were assigned a common identifier. These membership-related properties are essential for adequate variance partitioning in multi-level tests.

Performance. Consent was sought from students, as part of the invitation to participate (see consent form in Appendix 3B), to use their written projects as an archival data source for assessing team performance. Four categories of “benchmark” performance criteria were derived through an examination of the descriptions of the group assignments, which instructors had provided to the students through either the course syllabi or separate written instructions. These criteria included ‘Importance of Topic’, ‘Validity of Reasoning’, ‘Proposed Application of Results’, and ‘Flow of Presentation’ of the written report. The ‘Proposed Application of Results’ criterion was further subdivided into the ‘Novelty’ and
‘Usefulness’ of the applications proposed (cf. Amabile, 1983). Two trained coders assigned scores (between 1 and 5) to the final written projects in reference to each of these criteria. Each rater initially assessed each paper independently. Highly discrepant ratings (e.g., a difference of 3 between independent ratings) were resolved by the two raters themselves in a subsequent round.

Ratings of each component of performance were averaged between the raters to minimize idiosyncratic differences in the application of rating criteria, which were presumed to exist between raters owing to the complexity of the papers being graded. The inter-rater reliability was calculated for each dimension using the intra-class correlation (Shrout & Fleiss, 1979), which employed a two-way random effects model of the average of these ratings, and used a consistency definition of correlation rather than an absolute agreement definition (McGraw & Wong, 1996). The reliability of these average ratings is as follows: Importance of Topic (.804; F=5.11, p<.001), ‘Validity of Reasoning’ (.732; F=3.73, p<.001), ‘Novelty of Application’ (.777; F=4.49, p<.001), ‘Usefulness of Application’ (.710; F=3.45, p<.001), ‘Flow of Presentation’ (.702; F=3.361, p<.001).

3.3 Composition models of team member reports and aggregate team properties

The following section of the chapter considers the issues that are involved when research involves group-level properties that are not global in nature. Researchers examining inherently multilevel phenomena must distinguish between the levels of their measurement, data, analysis, and constructs (Hofmann, 2002). This is significant to the present research, since most group-level constructs were operationalized through some form of aggregation of individual-level measures.
A variety of forms of aggregation can be employed in order to use individual-level data to represent theoretical constructs at higher levels. However, without proper consideration of the conceptual links that operate between the individual-level constructs and their group-level analogues, questions can arise as to whether researchers should meaningfully interpret results that are based on these aggregated data.

Owing to the importance of these matters for the interpretation of results, the dissertation now provides theoretical arguments for how the individual level variables of interest in the present study are related to their group-level analogues. This type of theoretical rationale has been referred to as a composition model (James, 1982).

Composition models are essentially concerned with the construct validity of variables that are derived through aggregation. Certain implications concerning the operationalization of group-level constructs naturally follow from the composition model, including the choice of aggregate operator (e.g., mean, standard deviation, ratio, minimum, maximum, etc...), and whether any additional evidence (for e.g., within-group agreement) is required to justify the construct’s existence (Chan, 1998; Morgeson & Hofmann, 1999; Xie & Johns, 2000).

Like all theories, composition models range between the simple and the complex. For certain aggregate variables, these models are rather straightforward, as is the case concerning the group-level operationalization of the current model’s Time 1 variables. At other times, as will become evident in the discussion concerning the aggregation of the Time 2 variables, a group-level operationalization of individual data requires more careful and deliberate justification.
3.3.1 Time 1 group-level properties: Operationalizing initial conditions

The operational decisions required to create group-level constructs on the basis of Time 1 measures are rather clear and simple, since the theoretical interest is directed toward the way certain individual-level characteristics are distributed within the group. The type of composition model used to operationalize these types of aggregate properties has been called a dispersion model (Chan, 1998), and it assumes little to no conceptual similarity exists between the variables across levels. Dispersion models can be used to index the manner in which social category membership (e.g., gender) is distributed; as well as the distribution of variables that are measured along continua (e.g., underlying beliefs).

Demographic diversity. Ethnic and gender diversity are rather clear examples of how lower-level constructs (e.g., a given team member’s ethnic origin) are conceptually distinct from group-level properties (e.g., the diversity of members’ ethnic origins). Given these variables are measured categorically, a formula was employed that captures how widely (or narrowly) the members of the group are distributed across different categories of membership (Blau, 1977):

\[ D = 1 - \sum_{i=1}^{N} p_i^2 \]

In this formula, \( p \) indicates the proportion of individuals in a given category and \( N \) equals the number of categories represented. In terms of gender diversity, only two categories were provided (male and female). For ethnic/ancestral origin, the 15 categorical distinctions (previously presented in Table 4) were available. For each of these demographic bases (gender and ethnic/ancestral identity), a diversity score using the above formula was calculated for each team.
Theoretically, this index varies in range, between zero and one (as the number of distinct categories upon which members are classified approaches infinity). The maximum diversity score of the gender-based index is .50, which represents a team in which the number of respondents identifying themselves as male equals the number identifying themselves as female. A score of zero on the gender-based diversity index either represents all-male or all-female teams. Intermediate scores represent teams consisting of unequal sized male- and female- subgroups. For ethnic/ancestral origin diversity, the maximum diversity score obtained in this sample of teams was .83, which corresponds to a six-person team in which each of the team members identified with a different ethnic/ancestral category. These diversity indices were used to test Hypotheses 1a and 1b, and were also entered as statistical control variables in the remaining hypothesis tests.

**Diversity of problem-relevant assumptions.** As previously described, measures of problem-relevant assumptions were ascertained at the individual level. However, the primary theoretical role of these beliefs rests not in and off themselves but, rather, in the degree to which members’ beliefs are diverse. Given they were measured on interval-level scales, the diversity of these assumptions was operationalized using the within-group standard deviation (Edwards, Klein, Shipp, & Lim, 2003; Harrison & Klein, 2007). The standard deviation essentially indexes the degree to which scores are distributed around the mean. A score of zero indicates all members’ problem-relevant assumptions are the same and higher scores indicate a greater diversity of assumptions.
3.3.1.1 Accounting for the group mean in estimating diversity effects

As it pertains to the impact of deep-level diversity in the current model, there are two distinct reasons why it is additionally necessary to account for the group mean when estimating effects. The first reason is purely to account for possible statistical confounds, in which the mean is controlled in order to obtain a cleaner interpretation of the effect of assumptions diversity on task conflict (e.g., Hypothesis 3). The second reason is of a more substantive nature, and pertains to the theoretical propositions that have been made previously concerning the moderating role played the *composition* of conflict values (Hypotheses 4 and 6).

*The mean as a statistical confound.* Concerning the role of problem-relevant assumptions, no theoretical predictions have been made concerning the individual beliefs themselves; nor has any substantive prediction been offered concerning the general level of these beliefs in the group (e.g., the average level of importance that members assign to employment inducements). The focus is purely on the *diversity* of these beliefs. This is consistent with the discussion in Chapter 2 concerning the productive function that is often achieved through members’ attempts to integrate their *different* perspectives concerning the task. It is differences alone that are proposed to cause members to more carefully attend to the nature of the problem, at least when these differences are noticed and discussed.

Nevertheless, researchers have noted that the mean and the standard deviation of a set of responses tend to be related when data cluster toward either the lower or upper bounds of a response scale. This relationship is particularly evident when one considers that, in order for a group mean to fall very near to either end of the response scale (high or low); the standard deviation would need to be low. As such, what might appear to be the effect of the standard
deviation may, in fact, be the effect of the mean (in full or in part). To account for the possible presence of this confound, Harrison and Klein (2007) suggested researchers who are interested in testing diversity effects with measures of standard deviation should, first, statically control for the within-group mean of the attribute in question.

Hypothesis 3 proposes that the diversity of problem-relevant assumptions (irrespective of the mean) positively predicts manifest task conflict. However, the mean and standard deviation of the skill-development inducement importance measure are significantly negatively correlated in these data (see Table 14). This implies that, when group members’ beliefs regarding these inducements are similar, they also tend to reflect a greater importance of these inducements. In other words, when these assumptions cluster together within teams, they are more likely to do so at the upper end of the scale. Therefore, in the formal tests of Hypothesis 3 (and Hypothesis 4), the influence of the diversity of problem-relevant assumptions will be examined after first taking into account the group mean of these assumptions in order to avoid spurious interpretation.

3.3.1.2 The mean as qualifier of diversity effects

Unlike the methodological reason outlined above, there are valid theoretical reasons to consider the group means of conflict values in addition to their diversity. In fact, when the average level of an attribute is an aggregate property of substantive importance to a research question, the additive composition model is used to justify employing the mean as a construct (Chan, 1998). In additive composition models, the presence of within-group variation has no implications for the construct’s “existence”.
As outlined in the development of Hypotheses 4 and 6b (as well as Hypotheses 8b and 10), it is hypothesized that groups primarily composed of members who hold positive conflict values will have a resultant conflict experience that is markedly different from that experienced by groups primarily composed of members who hold negative conflict values, or of members who hold widely-varying conflict values.

Particularly when the conflict values are clustered together (i.e., low standard deviation), it is substantively important to delineate groups according to whether members’ beliefs cluster together toward the positive end of the continuum (i.e., group members tend to believe that task-based conflict is functional) or toward the negative end of the continuum (group members tend to believe task-based conflict is dysfunctional).

In these cases, the mean is reflective of the general nature of the conflict values that tend to be shared by the members of the group. In short, Hypotheses 4, 6b, 8b, and 10 all involve three-way interaction hypotheses, in which the average level of the attribute is proposed to qualify the moderating influence of the standard deviation. Groups primarily containing members who have positive conflict values (i.e., low standard deviation and high mean) are hypothesized to exhibit a more veridical correspondence between the degree of their underlying problem-relevant diversity and their level of manifest task conflict (Hypothesis 4). The extent of manifest conflict spillover is proposed to be less pronounced for these teams (Hypothesis 6b). Moreover, manifest task conflict is proposed to have smaller negative indirect effects on the viability and performance of these teams (Hypotheses 8b and 10, respectively).
3.3.2 Time 2 group-level variables: Operationalizing “fuzzy” emergent properties

The operational decisions required to create group-level indicators of task conflict, relationship conflict, and team viability are less clear-cut compared to those discussed above concerning the initial team composition variables. This is because the aggregate properties examined at Time 2 are assessed with group means and the resultant group-level constructs share conceptual links to their level-1 variables rather than being straightforward distributional properties of these variables.

When a measure of central tendency among members of a unit is chosen to index an aggregate construct, the composition model should also specify the degree of conceptual similarity (i.e., isomorphism) that is shared by variables across levels and, by extension, the related implications concerning the level of agreement among lower-level units.

Sometimes, such as when additive composition models apply, there is no theoretical role played by within-group agreement. At other times, such as when measuring group norms, theory would expect (even demand) that members of the same group provide highly similar reports, since the “sharedness” of these beliefs forms part of the construct’s definition. In other words, given the definition of ‘norm’, it follows that what is proposed to be represented in an individual team member’s report of the group norm is the group norm. If individual reports vary widely, it would be difficult to suggest that a norm, in fact, exists.

For many group constructs, including those studied here, the degree of isomorphism between individual- and aggregate-properties would not be classified as isomorphic; nor would it be considered non-isomorphic. It has been noted that this is particularly the case for aggregate properties that are theorized to form part of bottom-up emergence processes (Bliese, 2000).
Conflict is treated here as an overall process, originating in contextual features, and exhibiting itself through perceptions of incompatibility, associated emotional reactions, and behavioural expressions (cf. Pondy, 1967; Rahim, 2002). As such, perceptions of conflict will only tend to converge at the group-level in proportion to the degree of overt manifestation (behavioural expression). In absence of related behavioural expressions, conflict will reside primarily (and likely, to varying degrees) in the minds of individual group members.

Team viability is another aggregate group-level property derived on the basis of members’ individual assessments of willingness to work with each other again. The capability of a team to function as a performing unit is qualitatively distinct from a given team member’s own willingness to work with the team again. However, the aggregate of these individual beliefs is quite consistent with the theoretical definition offered by Hackman (1987), and individual willingness is obviously theoretically related to collective ability. The combined theoretical relatedness and distinctiveness of the conflict and viability constructs at the individual and group levels of indicate they correspond to fuzzy composition models (Bliese, 2000).

3.3.2.1 Theoretical role of agreement concerning “fuzzy” elements of the team environment

In fuzzy composition models, the major question arises not concerning the choice of aggregate operator but, rather, concerning the role of within-unit agreement as evidence to support the decision to aggregate. This matter has been considerably debated in relation to research on organizational climates (see Glick, 1985 and James, Joyce, & Slocum, 1988). In this debate, some would contend that the reliability of the aggregate construct, not the degree
of within-unit agreement, should be used to determine the appropriate level of theory. Others have argued that, in the absence of agreement, aggregate properties (particularly, those indexed by the mean) are conceptually ambiguous.

Out of these debates, has emerged a general tendency for researchers of group-level phenomena to rely on group-by-group assessments of agreement (e.g., $r_{wg}$ or $r_{wgj}$ of individual team members’ ratings) to determine whether each group’s mean should be retained for subsequent analyses (see for e.g., Castro, 2002). However, LeBreton and colleagues (see LeBreton & Senter, 2008) have recently suggested that prevalent customs, such as the use of singular “cut-off” standards (e.g., $r_{wgj} > .70$), should be replaced with more conceptually-grounded aggregation decisions related to the nature of the variables in question. Indeed, the reality of multilevel phenomena is becoming clearer as researchers have begun to abandon the universal application of agreement-based indices, which are best suited for studying aggregate constructs that are isomorphic to their individual-level components.

Over the course of working together, a general consensus is likely to emerge concerning whether or not team members tended to have different ideas concerning the task. Therefore, in relation to task conflict perceptions, a certain degree of within-group agreement is somewhat reasonable to expect. That being said, as discussed in the conceptual development of Chapter 2, perceptions concerning “differences of opinion” are still likely to be somewhat idiosyncratic.

As it pertains to relationship conflict, the current model actually predicts some degree of within-group variance in perceptions, particularly in teams composed of members who possess non-overlapping conflict values. If some team members view the presence of task-based disagreements negatively and others view these positively, the current theory (i.e.,
Hypothesis 6a) would actually predict some within-group disagreement concerning perceptions of relationship conflict in a given team. Obviously, the application of within-group agreement cut-off criteria to filter out those groups exhibiting low levels of within-group agreement on relationship conflict would filter out important aspects of the phenomenon being studied.

Concerning team viability, as well, it is theoretically consistent to propose that a team with one member who reports a low level of willingness to work with the team again, and three members who report high levels of willingness, is still conceptually less viable than a team in which all members agree to work together willingly.

In short, there is no theoretical reason to exclude teams that exhibit low levels of within-group agreement on the three emergent properties being studied here. Rather, for each of the Time 2 variables, particularly relationship conflict and team viability, there is reason to believe that within-unit agreement will be higher or lower depending on what stage of construct emergence the group happens to have reached at the time the variables were assessed. For groups exhibiting low agreement, it would be inappropriate to conclude that the aggregate constructs do not exist. Rather, in accordance with the theoretical model being offered here, an absence of complete agreement would merely imply that the phenomenon in question (e.g., relationship conflict) has not fully manifested itself at the group-level.

Table 7 provides a summary of the nature of the group variables just described, their operationalization, and the hypotheses in which they play a part.
**Table 7. Description and Operationalization of Group-level Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition:</th>
<th>Operationalization</th>
<th>Composition Model</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demographic diversity</td>
<td>The diversity of team members’ self-categorization in terms of gender and ethnic/ancestral origin</td>
<td>Composite index using Blau’s (1977) formula for categorical variable heterogeneity.</td>
<td>Dispersion model</td>
<td>H1a; H2</td>
</tr>
<tr>
<td>2. Diversity of problem-relevant assumptions</td>
<td>Diversity of team members’ problem-relevant assumptions</td>
<td>Within-group standard deviation of individual-level inducement importance ratings (skill-development and support-based inducements)</td>
<td>Dispersion model</td>
<td>H1a; H3; H4</td>
</tr>
<tr>
<td>3. Diversity of conflict values</td>
<td>Diversity of team members’ beliefs concerning the functional role of task-based disagreements in teamwork settings.</td>
<td>Within-group standard deviation of individual-level conflict values</td>
<td>Dispersion model</td>
<td>H1b; H4; H6b; H8b; H10</td>
</tr>
<tr>
<td>4. Average of conflict values</td>
<td>Average of team members’ conflict values</td>
<td>Group mean of individual-level conflict values.</td>
<td>Additive model</td>
<td>H4; H6b; H8b; H10</td>
</tr>
<tr>
<td>5. Manifest Task Conflict</td>
<td>The expression of disagreements concerning the task among members of the group</td>
<td>Group mean of perceived task conflict</td>
<td>Fuzzy composition model</td>
<td>H3; H4; H5b; H6b; H7b; H8b; H9; H10</td>
</tr>
<tr>
<td>6. Manifest Relationship Conflict</td>
<td>The expression of interpersonal friction and discord among the members of the group</td>
<td>Group mean of perceived relationship conflict</td>
<td>Fuzzy composition model</td>
<td>H2; H5b; H6b; H7b; H8b; H9; H10</td>
</tr>
<tr>
<td>7. Team Viability</td>
<td>The collective ability of the team to continue working together in the future</td>
<td>Group mean of individual willingness to work with team members in the future</td>
<td>Fuzzy composition model</td>
<td>H2; H7b; H8b</td>
</tr>
<tr>
<td>Variable</td>
<td>Definition:</td>
<td>Operationalization</td>
<td>Composition Model</td>
<td>Hypothesis</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>8. Performance</td>
<td>Quality of the written report</td>
<td>Average ratings provided by two coders. Assessed on four dimensions: (Importance of Topic, Validity of Reasoning, Proposed Application of Results, Flow of Presentation)</td>
<td>Global (No composition model)</td>
<td>H9; H10</td>
</tr>
<tr>
<td>9. Team size</td>
<td>Number of people on the team</td>
<td>The recorded membership of teams, as reported in class rosters, and confirmed by number of authors on the final report.</td>
<td>Global (No composition model)</td>
<td>All (control variable)</td>
</tr>
</tbody>
</table>
Chapter 4: Results

Chapter 4 consists of two major parts. In Part 1 (4.1), the current data’s descriptive statistics are presented. This section includes a discussion of issues surrounding missing data, the description of variance within and between groups, as well as related implications for group-mean reliability. The second part (4.2) presents the results from the formal tests of the model’s hypotheses.

4.1 Descriptive statistics

Prior to conducting the formal tests of the hypotheses, an initial description of general characteristics of the dataset can facilitate certain operational decisions. These decisions include addressing possible bias that is introduced through within-group missing data.

4.1.1 Within-group missing data

When group means and within-group distributions of team member attributes are used as predictors, missing data can introduce bias into what become the estimates of these aggregate properties. Particularly when cases within a group are missing as a result of non-random causes, estimates of the standard deviation (as well as other estimates of inter-rater agreement and reliability) have been found to be biased (Newman & Sin, 2009). The implications of using less-than-complete within-group data has also been shown to misrepresent the true correlation between diversity indices such as the standard deviation and other substantive variables, particularly if the true correlation is small (Allen, Stanley, Williams, & Ross, 2007).
In spite of recent simulation-based studies that have been able to demonstrate these implications of missing data within groups (Allen et al., 2007; Newman & Sin, 2009), no conclusions have emerged concerning the minimally acceptable within-group response rate. Allen et al. (2007) note how past practice is governed primarily by researchers’ own choices of minimal within-group response rates, which are then used as means of screening teams for inclusion in hypothesis tests. These decision rules typically amount to using percentages of respondents, sometimes coupled with a minimum raw number of respondents per group.

In studies summarized by Allen et al. (2007), which were conducted between 1984-2005, these decision rules span a fairly wide range, with cut-off response rates ranging between 40% and 100%. Most studies that used decision rules such as these employed cut-offs somewhere between 50% and 66% inclusively.

Most empirical research will contend with within-team response rates less than 100%. Therefore, researchers must address this issue, which entails a simultaneous concern with the influence of missing data on the error of measurement, as well as the statistical “power-based” implications of excluding a number of groups with less-than-perfect within-group response rates. The two simulation-based studies cited above found that bias is quite prevalent in measures of aggregate properties and estimates of correlations even within conventional response rate cut-off values (e.g., 60%-80%). As a result, Allen et al. (2007) refrained from suggesting particular percentage-based rules for excluding groups from analysis. They did, however, suggest that researchers include much more information concerning the application of decision rules, as well as provide descriptive statistics concerning the average amount of missing data per team, and the distribution of actual
response rates across the teams included in analyses, in order to inform the interpretation of results.

In this dissertation, a within-group response rate of at least 60% (per group, per wave) was used to screen groups for inclusion in the hypothesis tests. This decision was made to minimize error while retaining sufficient numbers of teams for subsequent analysis. The application of this rule resulted in a sample of 382 individuals within 78 groups. Teams consisted of between 3 to 6 members each, with an average group size of 5.10.

Consistent with the recommendations of Allen et al. (2007), Tables 8 and 9 report the average within-group response rates resulting from the application of this decision rule, as well as the minimum response rate, the standard deviation of response rates, and the percentage of teams containing complete data (i.e., 100% response rate) for each measurement period, Time 1 and Time 2, respectively. For additional information, Tables 8 and 9 contain these statistics separately for teams of each size, as well for the total sample of 78 teams.

Table 8. Summary of Response Rates per Group, Time 1

<table>
<thead>
<tr>
<th>team size</th>
<th>frequency</th>
<th># of members reporting at T1</th>
<th>avg. response rate (T1)</th>
<th>min response rate (T1)</th>
<th>std. dev. response rate (T1)</th>
<th>pct. complete (T1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3  - - -</td>
<td>100.00%</td>
<td>100.00%</td>
<td>0</td>
<td>100.00%</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>8 9 - -</td>
<td>88.24%</td>
<td>75.00%</td>
<td>0.1286</td>
<td>52.94%</td>
</tr>
<tr>
<td>5</td>
<td>27</td>
<td>2 6 19 -</td>
<td>92.59%</td>
<td>60.00%</td>
<td>0.1259</td>
<td>70.37%</td>
</tr>
<tr>
<td>6</td>
<td>31</td>
<td>0 2 11 18</td>
<td>91.94%</td>
<td>66.67%</td>
<td>0.1043</td>
<td>58.06%</td>
</tr>
<tr>
<td>total sample</td>
<td>78</td>
<td>13 17 30 18</td>
<td>91.67%</td>
<td>60.00%</td>
<td>0.1166</td>
<td>62.82%</td>
</tr>
</tbody>
</table>
As is clear from Tables 8 and 9, the average level of missing data in these 78 teams is quite small. Moreover, complete data was obtained from 62.82% of teams (49 of 78 teams) at Time 1, and 50% of teams (39 of 78 teams) at Time 2. It is additionally informative to note the average percentage of missing data per team was 8.33% for Wave 1, 12.14% for Wave 2; and the maximum amount of missing data at the team-level (in either measurement period) was 40% (equivalent to 2 respondents missing from a five-person team). The small extent of missing data builds confidence that the aggregate properties of groups (e.g., conflict value composition, group-level conflict) are closely approximated in these data for most teams.

Table 9. Summary of Response Rates per Group, Time 2

<table>
<thead>
<tr>
<th>team size</th>
<th>frequency</th>
<th># of members reporting at T2</th>
<th>avg. response rate (T2)</th>
<th>min response rate (T2)</th>
<th>std. dev. response rate (T2)</th>
<th>pct. complete (T2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3 - - -</td>
<td>100.00%</td>
<td>100.00%</td>
<td>0</td>
<td>100.00%</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>6 11 - -</td>
<td>91.18%</td>
<td>75.00%</td>
<td>0.1231</td>
<td>64.71%</td>
</tr>
<tr>
<td>5</td>
<td>27</td>
<td>4 11 12 -</td>
<td>85.93%</td>
<td>60.00%</td>
<td>0.1448</td>
<td>44.44%</td>
</tr>
<tr>
<td>6</td>
<td>31</td>
<td>0 7 11 13</td>
<td>86.56%</td>
<td>66.67%</td>
<td>0.1321</td>
<td>41.94%</td>
</tr>
<tr>
<td>total sample</td>
<td>78</td>
<td>13 29 23 13</td>
<td>87.86%</td>
<td>60.00%</td>
<td>0.1343</td>
<td>50.00%</td>
</tr>
</tbody>
</table>

4.1.2 Within-group variance, between-group variance, and group mean reliability

As mentioned previously, the group means of individual reports of task conflict, relationship conflict, and willingness to work with team members again are treated as indicators of manifest task conflict, manifest relationship conflict, and team viability, respectively. Although agreement is not considered necessary to these constructs’ definitions (given the fuzzy composition model), a reasonable level of group mean reliability is still important for tests of the model’s group-level hypotheses. Group means that lack reliability
pose challenges for uncovering interrelationships between aggregate properties, even when these aggregate variables form part of fuzzy composition models that are not premised on within-group agreement (Bliese, 2000).

In order to examine these data both for the adequacy of these composition models and as a step toward assessing the reliability of group means, a set of one-way ANOVAs was conducted on the responses to the Time 2 variables. These models essentially treated group membership (e.g., team number) as a categorical predictor of task and relationship conflict perceptions, as well as individual reports of willingness to work with team members again.

F-tests derived from the ANOVAs indicate whether groups exhibit significant variation on the aggregate variables. In addition, the variance partitioning (estimated by the mean sums of squares) can also be used to calculate the size of the ICC(1), which reflects the proportion of variance on these individual-level variables that is explained by group membership. The results of these analyses are presented in Table 10.

It can be seen by the significant F-tests that the degrees of between-group variation in individual reports of conflict and willingness are all statistically significant. However, it is notable that the between-group variance of task conflict perceptions is relatively small in comparison to the between group variance of either of the other two reports.

On the basis of these between- and within-group estimates, ICC(1) was calculated using the standard formula (Bartko, 1976):

\[
\text{ICC(1)} = \frac{(\text{MSB} - \text{MSW})}{(\text{MSB}+[k-1]*\text{MSW})}
\]

Where MSB=mean squares between

MSW=mean squares within

k= group size
Average group size is appropriate to use for k when group sizes do not vary appreciably (Bliese, 1998), as is the case here. The average group size for the ANOVA analyses was 5.10, leading to the estimates of ICC(1) in the far right-hand column of Table 10. These essentially suggest that 10% of the variance in reports of task conflict, 41% of the variance in reports of relationship conflict, and 36% of the variance in reported willingness can be explained by differences that occur between groups. These figures attest to the fact that the group context serves as a significant influence on members’ reports of all three variables. Particularly with respect to the last two variables, the sizes of these ICC(1) values are considerable.

Table 10. One-way Analysis of Variance of Reports of Group Experience

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
<th>Sig.</th>
<th>ICC(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual reports of task conflict</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>113.708</td>
<td>76</td>
<td>1.496</td>
<td>1.600</td>
<td>.004</td>
<td>0.105</td>
</tr>
<tr>
<td>Within Groups</td>
<td>249.720</td>
<td>267</td>
<td>.935</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>363.427</td>
<td>343</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual reports of relationship conflict</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>436.395</td>
<td>76</td>
<td>5.742</td>
<td>4.482</td>
<td>.000</td>
<td>0.406</td>
</tr>
<tr>
<td>Within Groups</td>
<td>342.085</td>
<td>267</td>
<td>1.281</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>778.481</td>
<td>343</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual reports of willingness to work together again</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>300.661</td>
<td>76</td>
<td>3.956</td>
<td>3.874</td>
<td>.000</td>
<td>0.360</td>
</tr>
<tr>
<td>Within Groups</td>
<td>272.670</td>
<td>267</td>
<td>1.021</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>573.330</td>
<td>343</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.1.2.1 Relationship between ICC(1) and reliability of group means.

The ICC(1) values, in conjunction with the number of respondents per group, have direct implications for the reliability of the group means, which is equivalent to the ICC(2) at large group sizes. When group sizes are small, group-mean reliability can be calculated according to the following formula (Shrout & Fleiss, 1979). See Bliese (1998) for a discussion of the role of group size on these reliability estimates.

\[
\text{Group-mean reliability} = \frac{k(\text{ICC}(1))}{1+(k-1)} \times \text{ICC}(1)
\]

Where \( k \) = group size

The group mean reliability estimates of these aggregate properties in the total sample of 78 teams are contained in Table 11. As can be seen, the group-mean reliability varies depending on the effective size of the group (i.e., the number of responses obtained per group). Particularly for the larger groups, the group means of relationship conflict and team viability are reliable in these data. However, the low group-mean reliability concerning task conflict is of some concern.

<table>
<thead>
<tr>
<th>Respondents per team</th>
<th>Group-mean reliability ( N=78 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Task conflict ICC(1)=0.10</td>
</tr>
<tr>
<td>3</td>
<td>0.250</td>
</tr>
<tr>
<td>4</td>
<td>0.308</td>
</tr>
<tr>
<td>5</td>
<td>0.357</td>
</tr>
<tr>
<td>6</td>
<td>0.400</td>
</tr>
</tbody>
</table>
When ICC(1) values are not large, one option to boost the reliability of group means is to increase the number of respondents sampled per level-2 unit (Bliese, 1998; LeBreton & Senter, 2008). However, “small group” research is inherently constrained in this respect because within-group sample sizes readily approach natural ceilings. The size of groups in the current sample, for instance, ranges between 3 and 6 members and, as reported previously, there is very little missing data per team on average.

Indeed, the group-mean reliability in small group research hinges more directly on the relative magnitude of the between group variance (i.e., the ICC(1)). As described by James (1982), ICC(1) values will be low when there is either high within-group variability or low between-group variability (or both). In the present case, it would appear that broader contextual features of the task may have naturally restricted the range of between-group variability on task conflict (see Table 10). In fact, the group means of task conflict in these data do tend to cluster around the middle of the range (M=3.98; SD=0.588; IQR=0.68; N=77). The inter-quartile range (IQR) of these group means is particularly important to note, since it indicates that 50% of the groups had mean levels of task conflict somewhere between 3.30 and 4.66 out of 7. Indeed, only 3 teams had group means of task conflict below 3 and 2 teams had group means above 5. This restriction in the between-group variance most likely stems from the fact that all groups completed a similar task, which appears to have required similar levels (in this case, moderate levels) of task-based disagreements.

Bliese (1998) noted that, in instances where theory supports aggregation but group means are unreliable, researchers may consider using some form of within-group agreement index. This would appear to be a reasonable option for the current data since the dissertation was developed as a means of better understanding the implications of task-based
disagreement in groups, but it does not actually contain hypotheses that are directed toward predicting within-group variance in reports of task conflict. As such, it was determined that groups evidencing very low levels of within-group agreement on task conflict would be excluded to ensure a more reliable assessment of the group mean and, in turn, enable a clearer examination of between-group differences in task conflict. This was accomplished through the calculation and assessment of the $r_{wgj}$ estimate of within-group agreement.

4.1.2.2 Reliability-based screening using within-group agreement on task conflict

When estimating within-group agreement to a response scale using $r_{wgj}$, it is important to specify the null distribution (i.e., the theoretical distribution of scores used to denote an absence of agreement) in consideration of possible response tendencies (James, Demaree, & Wolf, 1984; LeBreton & Senter, 2008). Given the reports of task conflict in the current sample appear to exhibit a triangular distribution (i.e., central tendency), perhaps because of natural range restriction in the setting, it was particularly important not to employ a rectangular distribution as the theoretical null (see James et al., 1984). Instead, the expected variance of the null was calculated using formulas provided by Messick (1982) for a triangular (i.e., denoting central tendency) distribution.

$r_{wgj}$ is a group-level property, as opposed to being a property of an entire data set (like ICC(1)). Therefore, the application of an agreement cut-off level is applied to teams individually. A liberal agreement-based exclusion cut-off of .30 was chosen. $r_{wgj}$ scores below .30 can be interpreted as indicators of extensive disagreement within the team, whereas scores between .30 and .50 indicate low agreement (see LeBreton and Senter, 2008).
Application of this selection criterion resulted in a removal of 18 teams from the sample, leaving 60. The average $R_{wij}$ for these remaining teams was $M=.72$, $SD=.16$.

The current decision to exclude groups exhibiting a lack of agreement on task conflict is made in consideration of the possibility that these within-group differences in task conflict perceptions might be “systematic” across certain groups and, therefore, potentially informative to model in subsequent research (LeBreton & Senter, 2008). However, variations on these beliefs are not of primary theoretical interest in the current model. More importantly, the majority of the tests of this model pertain to group-level (i.e., manifest) conflict (see Table 7), which require reliable estimates of the variation in conflict occurring between teams.

A recalculation of the ICC(1) and related group-mean reliability estimates, using this sample of 60 teams, shows the impact of excluding groups that exhibited very low within-group agreement on task conflict perceptions (see Tables 12 and 13 below; average group size for this sample of teams is 5.13). Specifically, the ICC(1) for task conflict increased to 0.196, which had the effect of significantly raising the group-mean reliability of task conflict. While still somewhat below conventional standards, particularly for smaller groups, it was felt that using a more stringent agreement-based exclusion criterion would have had the effect of removing too many groups from the sample. In addition, most groups had more than three respondents at Time 2. Specifically, the average number of respondents per group at Time 2 was 4.5 respondents (10 groups had 3, 22 groups had 4, 16 groups had 5, and 12 groups had 6).
Table 12. Re-calculation of One-way Analysis of Variance of Reports of Group Experience

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
<th>Sig.</th>
<th>ICC1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual reports of task conflict</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>90.127</td>
<td>59</td>
<td>1.528</td>
<td>2.249</td>
<td>.000</td>
<td>0.196</td>
</tr>
<tr>
<td>Within Groups</td>
<td>142.652</td>
<td>210</td>
<td>.679</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232.779</td>
<td>269</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual reports of relationship conflict</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>344.365</td>
<td>59</td>
<td>5.837</td>
<td>4.486</td>
<td>.000</td>
<td>0.405</td>
</tr>
<tr>
<td>Within Groups</td>
<td>271.944</td>
<td>209</td>
<td>1.301</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>616.310</td>
<td>268</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual reports of willingness to work together again</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>210.646</td>
<td>59</td>
<td>3.570</td>
<td>3.545</td>
<td>.000</td>
<td>0.332</td>
</tr>
<tr>
<td>Within Groups</td>
<td>211.496</td>
<td>210</td>
<td>1.007</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>422.142</td>
<td>269</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 13. Re-calculated Group-mean Reliability Estimates of Team Conflict and Viability

<table>
<thead>
<tr>
<th>Respondents per team</th>
<th>Group-mean reliability N=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Task conflict ICC(1)=0.20</td>
</tr>
<tr>
<td>3</td>
<td>0.429</td>
</tr>
<tr>
<td>4</td>
<td>0.500</td>
</tr>
<tr>
<td>5</td>
<td>0.556</td>
</tr>
<tr>
<td>6</td>
<td>0.600</td>
</tr>
</tbody>
</table>
4.1.3 Outliers and leverage

In addition to the 18 teams that showed little agreement on task conflict, one other team was removed from the sample because it was found to be an extremely influential outlier in the subsequent tests of Hypotheses 4 and 6, which effectively meant that it singly determined the statistical significance of these tests. Particularly owing to its extreme outlier status, this group was considered non-representative of the population from which the other cases were drawn. The final sample for hypothesis testing comprised 59 groups, 294 individuals.

4.2 Hypothesis tests

The following section describes the hypothesis tests, which were conducted on data provided by the groups that satisfied the reliability-based conditions described above (N=59 groups, 294 individuals). The means, standard deviations, reliabilities, and bivariate correlations of the variables are presented in Table 14.

The tests of the model are described below in logically coherent sets. The order in which these are presented mirrors that in which the hypotheses were originally provided in Chapter 2, and is closely organized around the full specification of each of the effects contained in the model. For the most part, tests of the “main effect” between two variables (e.g., Hypothesis 3) are presented in conjunction with any related tests of moderation (e.g., Hypothesis 4) to enable a quick assessment as to whether main effects should be interpreted directly. These moderation tests are simple extensions of the initial main effect models, which facilitates jointly summarizing these results in the same tables.
Indirect effects, regardless of whether they are considered as part of a mediation (e.g., Hypotheses 2 and 7) or suppression (Hypothesis 9) framework, were estimated using a product of coefficients approach (Krull & MacKinnon, 2001), rather than the causal steps approach outlined by Baron and Kenny (1986), since the former methodology has been found to overcome power-based concerns inherent to the latter (see MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The estimate of the mediated effect is derived through multiplying two coefficients estimated in separate regressions. In the first regression, a coefficient is estimated concerning the effect of the independent variable on the mediating variable. In the second regression, a coefficient is estimated concerning the effect of the mediating variable on the outcome (controlling for the effect of the independent variable on the outcome). The significance of this indirect effect (i.e., the product of these coefficients) is determined through estimating the confidence limits of the product, which first requires a derivation of its standard error using formulas that account for the non-normal distribution of the population parameters that results when products of coefficients are used (for formulas, see MacKinnon et al., 2002).
Table 14. Descriptive Statistics, Reliabilities and Correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>mean</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Team size</td>
<td>5.15</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Ethnic diversity</td>
<td>0.48</td>
<td>0.25</td>
<td>0.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Gender diversity</td>
<td>0.35</td>
<td>0.18</td>
<td>0.20</td>
<td>0.19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Task conflict</td>
<td>3.90</td>
<td>0.57</td>
<td>0.41</td>
<td>-0.08</td>
<td>-0.20</td>
<td>0.37</td>
<td>-0.16</td>
<td>0.06</td>
<td>-0.40</td>
<td>-0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Relationship conflict</td>
<td>2.36</td>
<td>1.13</td>
<td>-0.01</td>
<td>-0.16</td>
<td>0.10</td>
<td>0.39</td>
<td>(0.88)</td>
<td>-0.52</td>
<td>-0.04</td>
<td>0.04</td>
<td>0.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Team viability</td>
<td>5.47</td>
<td>0.87</td>
<td>0.05</td>
<td>0.00</td>
<td>-0.03</td>
<td>-0.31</td>
<td>-0.69</td>
<td>(0.85)</td>
<td>0.04</td>
<td>-0.11</td>
<td>-0.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Conflict value mean</td>
<td>6.07</td>
<td>1.03</td>
<td>0.06</td>
<td>-0.22</td>
<td>-0.10</td>
<td>-0.17</td>
<td>-0.08</td>
<td>0.08</td>
<td>(0.76)</td>
<td>-0.06</td>
<td>-0.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Conflict value diversity</td>
<td>1.74</td>
<td>0.56</td>
<td>-0.01</td>
<td>0.16</td>
<td>0.06</td>
<td>-0.10</td>
<td>0.17</td>
<td>-0.03</td>
<td>-0.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Problem-relevant assumption (Skill dev.) mean</td>
<td>5.65</td>
<td>0.44</td>
<td>0.08</td>
<td>0.14</td>
<td>0.14</td>
<td>0.18</td>
<td>0.00</td>
<td>-0.04</td>
<td>-0.27</td>
<td>0.21</td>
<td>(0.76)</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Problem-relevant assumption (Skill dev.) diversity</td>
<td>0.72</td>
<td>0.32</td>
<td>-0.14</td>
<td>0.06</td>
<td>0.13</td>
<td>-0.18</td>
<td>0.05</td>
<td>-0.14</td>
<td>-0.03</td>
<td>0.07</td>
<td>0.49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Problem-relevant assumption (Support) mean</td>
<td>5.33</td>
<td>0.39</td>
<td>-0.13</td>
<td>0.00</td>
<td>0.14</td>
<td>0.10</td>
<td>0.04</td>
<td>-0.10</td>
<td>-0.17</td>
<td>0.15</td>
<td>0.46</td>
<td>-0.05</td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>12. Problem-relevant assumption (Support) diversity</td>
<td>0.87</td>
<td>0.35</td>
<td>0.12</td>
<td>0.09</td>
<td>0.25</td>
<td>-0.07</td>
<td>0.01</td>
<td>0.10</td>
<td>-0.15</td>
<td>0.03</td>
<td>0.20</td>
<td>0.12</td>
<td>-0.08</td>
<td></td>
</tr>
<tr>
<td>13. Performance: Importance of Topic</td>
<td>3.22</td>
<td>1.07</td>
<td>0.23</td>
<td>0.04</td>
<td>0.18</td>
<td>0.09</td>
<td>-0.26</td>
<td>0.27</td>
<td>-0.14</td>
<td>-0.01</td>
<td>0.18</td>
<td>0.20</td>
<td>-0.03</td>
<td>0.15</td>
</tr>
<tr>
<td>14. Performance: Validity of Reasoning</td>
<td>3.30</td>
<td>0.89</td>
<td>0.39</td>
<td>0.00</td>
<td>-0.20</td>
<td>0.13</td>
<td>-0.20</td>
<td>0.17</td>
<td>0.38</td>
<td>0.01</td>
<td>-0.04</td>
<td>-0.13</td>
<td>-0.14</td>
<td>-0.12</td>
</tr>
<tr>
<td>15. Performance: Novelty of Application</td>
<td>2.55</td>
<td>1.01</td>
<td>0.02</td>
<td>0.18</td>
<td>-0.02</td>
<td>-0.01</td>
<td>-0.12</td>
<td>0.00</td>
<td>0.12</td>
<td>-0.01</td>
<td>-0.12</td>
<td>0.28</td>
<td>0.00</td>
<td>0.14</td>
</tr>
<tr>
<td>16. Performance: Usefulness of Application</td>
<td>3.13</td>
<td>0.89</td>
<td>0.04</td>
<td>0.14</td>
<td>-0.17</td>
<td>0.07</td>
<td>-0.17</td>
<td>0.17</td>
<td>0.15</td>
<td>0.00</td>
<td>-0.15</td>
<td>0.06</td>
<td>-0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>17. Performance: Clarity/Flow of Writing</td>
<td>3.79</td>
<td>0.94</td>
<td>0.23</td>
<td>0.07</td>
<td>-0.12</td>
<td>0.10</td>
<td>-0.29</td>
<td>0.26</td>
<td>0.21</td>
<td>-0.03</td>
<td>0.19</td>
<td>-0.23</td>
<td>0.03</td>
<td>-0.07</td>
</tr>
</tbody>
</table>

Group level correlations (n = 59) are below the diagonal (n=58 for correlations with ethnic diversity, and n=46-50 for correlations with performance criteria). Where applicable, correlations of individual-level values (n=251-280) are above the diagonal. Correlations in bold are significant at p < .05 (two-tailed); Cronbach’s alpha estimates, α, are included in parentheses along the diagonal where applicable.
Table 14. Descriptive Statistics, Reliabilities, and Correlations (continued)

<table>
<thead>
<tr>
<th>Variables</th>
<th>mean</th>
<th>s.d.</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Performance: Importance of Topic</td>
<td>3.22</td>
<td>1.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Performance: Validity of Reasoning</td>
<td>3.30</td>
<td>0.89</td>
<td>.19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Performance: Novelty of Application</td>
<td>2.55</td>
<td>1.01</td>
<td>.17</td>
<td>.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Performance: Usefulness of Application</td>
<td>3.13</td>
<td>0.89</td>
<td>.06</td>
<td>.42</td>
<td>.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Performance: Clarity/Flow of Writing</td>
<td>3.79</td>
<td>0.94</td>
<td>.42</td>
<td>.66</td>
<td>.17</td>
<td>.28</td>
<td></td>
</tr>
</tbody>
</table>

\( n = 46-50 \) for correlations between performance criteria. Correlations in bold are significant at \( p < .05 \) (two-tailed); inter-rater reliability estimates (intra-class correlation coefficients) are included in square brackets along the diagonal for performance criteria.
4.2.1. Conducting multilevel analysis

All of the hypotheses were tested using mixed-effects regression models. Given the theory outlined, the logic of using multi-level methods to examine individual experiences in teams, and to distinguish these from group properties, should be clear. In addition to this theoretically-grounded rationale, an additional level of “nesting” also exists in these data, which is important to recognize and take into account during analyses. Teams were sampled from across different classrooms, which have unique features (e.g., differences in instructors, instructional methods, class content, etc...). No substantive variables of interest have been identified as operating at the classroom level in the present model. Yet, the question as to whether group means should be treated as “independent observations” within classrooms (i.e., because all groups within a given classroom share the features of that environment) is an important empirical question that can be assessed in a straightforward manner by testing for random intercepts at the classroom level. Therefore, variance at this level was examined in all tests in order to safeguard against the drawing of inappropriate conclusions. Although the estimates of classroom-level (i.e., level-3) variance are not reported in Tables 16-23, it is worth noting that these were non-significant values in all cases.

When estimating multilevel models, the choice concerning the centering of predictors should be made explicit. In these data, all predictor variables that lacked a meaningful zero point were centered at the respective grand means of the sample (Hofmann & Gavin, 1998). The indices of demographic diversity were left uncentered, since a score of zero denotes homogeneity, and these values did occur within the bounds of these data. The problem-relevant diversity scores, which were used as predictors in Hypothesis 3, also have meaningful zero points (i.e., zero denotes perfect overlap of team members’ underlying
assumptions). However, a value of zero on these variables is not contained in the current sample of groups (i.e., minimum score on these diversity variables was 0.22). Therefore, these variables were also centered at the grand means of the sample. Particularly for conflict and viability, since effects are estimated at both the individual and group levels, grand mean centering enables a more straightforward estimate of the presence of contextual effects as compared to other centering alternatives (e.g., group-mean centering; see Hofmann & Gavin, 1998).

A sequence of steps was followed in testing these models, which allowed an estimation of the amount of between- and within-group variance in the data taken as a whole, as well as derivations of the amount of variance at each of these levels that is explained by the inclusion of statistically-significant predictors. In multi-level models, these derivations result in what are called ‘quasi R-squared values’. Unlike R-squared in OLS regression, derived estimates of the variance explained by significant predictors in multi-level models are *approximate* in nature, and should be interpreted accordingly (see Hox, 1995).

The following sequence of steps was taken in each of the mixed-effect regressions. First, a model was estimated without any predictors or random components, which simply provides the mean of the outcome variable in question and an estimate of overall variance in this outcome. This model is estimated primarily to provide the baseline model fit information, which is used as a comparison point in evaluating whether subsequent models provide an improvement in overall fit.

Second, an “unconditional means” model was estimated, which essentially relaxes the assumption that the intercept from the first model (i.e., the overall mean of the outcome variable) is fixed across levels of the data hierarchy. If relaxing this assumption improves the
fit of the model, conducting this step will partition the overall variance in the outcome, and
give an estimate as to how much variance in the outcome exists at each level (e.g., how much
variance resides within groups and how much variance resides between groups).

Third, it is customary in multilevel modelling for predictors to be entered in sets,
starting from the lowest level and proceeding upwards. Therefore, in the models estimated
here, group-level predictors were only entered into the regression after first estimating a
“Level-1” model (if hypotheses called for individual-level predictors). It is worth
highlighting that part of the reason for this practice is related to the ability of certain
individual-level variables to account for significant amounts of between-group variance in
outcomes. Group properties (i.e., predictors that vary only between groups) cannot, by virtue
of the data structure, explain individual-level variance because these variables only vary
between groups. However, depending on the “clustering” of individual-level variables (i.e.,
how these characteristics are differentially-distributed across groups), individual-level
predictors can (and sometimes do) account for between-group variance in the outcomes as
well as individual-level variance (Bliese, Chan, & Ployhart, 2007).

Fourth, Level-2 predictors of group-level intercepts were entered. These predictors
are only able to predict variance in group-level intercepts (i.e., group means). In addition, the
inclusion of group-level aggregates of level-1 variables that were previously entered in Step
3 permits the tests of contextual effects (i.e., incremental multi-level models). For
hypotheses regarding moderation, separate models were estimated with and without
interaction terms in order to estimate the increase in variance explained that derives from
significant interaction terms.
After the completion of these four steps, the amount of variance explained by the significant level-1 and level-2 predictors was estimated – these values appear in the tables as “$R^2$ values”. The estimated amount of within-group variance that was explained by significant level-1 predictors was calculated by subtracting the within-group variance remaining after the estimation of the level-1 model (i.e., estimate derived in step 3) from the within-group variance that was estimated in the unconditional means model (i.e., step 2) and dividing this amount by the within-group variance remaining after the estimation of the unconditional means model (i.e., step 2).

The estimated amount of between-group variance explained was calculated by subtracting the between-group variance remaining after the estimation of the level-2 model (step 4) from the between-group variance remaining after the estimation of the level-1 model (step 3), and dividing this amount by the between-group variance remaining after the estimation of the level-1 model (step 3). This manner of estimating the amount of level-2 variance explained by group-level predictors is able to account for any level-2 variance that may have initially been explained by the non-random manner in which level-1 predictor variables “cluster” within groups (Bliese et al., 2007).

4.2.1 Testing relationships between demographic diversity and perspective-based diversity

This section describes the tests of Hypotheses 1a and 1b. Team demographic diversity was examined as a predictor of the diversity of underlying problem-relevant assumptions and the diversity of conflict values. In these tests, the outcome variable is a team property. However, since teams are naturally nested within classrooms, the existence of possibly significant levels of classroom-level variance (random intercepts between
classrooms) was tested using mixed-effects regression. The mixed-effects regressions found the diversity of these beliefs in teams did not vary across classrooms. Therefore, to simplify the presentation of the effects, the tests were re-run at the group-level only using Ordinary Least Squares (OLS) regression.

Table 15 presents the results of these three separate OLS regression analyses. The effects of both bases of demographic diversity were estimated simultaneously, and the model controlled for the influence of team size and the mean of the underlying belief in question (Harrison & Klein, 2007). Because these hypotheses do not involve manifest task conflict, the sample of 78 teams (i.e., those which had no more than 40% within-team missing data) was used in order to increase the statistical power of the tests.

**Table 15. Regression of deep-level diversity on surface-level diversity**

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Diversity of skill-based inducement beliefs</th>
<th>Diversity of support-based inducement beliefs</th>
<th>Diversity of conflict values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>t</td>
<td>B</td>
</tr>
<tr>
<td>Intercept</td>
<td>2.81</td>
<td>6.21**</td>
<td>1.78</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group mean of belief in question</td>
<td>-.37</td>
<td>-5.25**</td>
<td>-.23</td>
</tr>
<tr>
<td>Group size</td>
<td>-.03</td>
<td>-.85</td>
<td>.02</td>
</tr>
<tr>
<td>Hypothesized effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnic/ancestral diversity</td>
<td>.11</td>
<td>.97</td>
<td>.18</td>
</tr>
<tr>
<td>Gender diversity</td>
<td>.29</td>
<td>1.57</td>
<td>.43</td>
</tr>
</tbody>
</table>

** p<.01 *p<.05

There is little evidence to support Hypothesis 1a or 1b. The estimate of a positive relationship between teams’ gender-based diversity and the diversity of team members’ beliefs regarding the importance of support-based inducements in organizations approached statistical significance (p<.08). In all, the demographic diversity of the team does not significantly positively predict the diversity of these particular underlying beliefs. These
results are informative given that diversity researchers often assume the existence of links between demographic and underlying perspective-based diversity. These tests reveal that, in the current dissertation, such an assumption would be inappropriate.

4.2.2 Testing proposed links between diversity, team conflict, and viability

These tests concern the proposition that demographic differences are related to team conflict and team viability. Hypothesis 2 examines the proposition that manifest relationship conflict mediates the negative impact of demographic diversity on team viability. Hypothesis 3 simply tests the proposition that the diversity of problem-relevant assumptions positively predicts manifest task conflict.

Hypothesis 2. This group-level hypothesis was tested through a mixed-effects regression model, which first accounted for variance at the individual level (i.e., level-1, within-group relationships between conflict- and viability-relevant perceptions). To test this mediation hypothesis using the product-of-coefficients approach involved conducting two regression models. Table 16 contains the first of these regressions, which examines the effect of demographic diversity on manifest relationship conflict. As a means of ensuring accurate estimates of demographic diversity effects, these models first controlled for task conflict and team size.

Table 16 indicates that, after accounting for the effect of variations in task conflict at both levels, the demographic diversity of the team does not significantly predict group-level relationship conflict. The absence of an effect of demographic diversity on manifest relationship conflict precludes the possibility that relationship conflict can play a mediating
role between demographic diversity and team viability. Therefore, no support is obtained for Hypothesis 2.

**Table 16. Regression of Manifest Relationship Conflict on Group Demographic Diversity**

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Relationship conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \gamma )</td>
</tr>
<tr>
<td>Level -1 predictors (Fixed effects)</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>2.25</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
</tr>
<tr>
<td>perceived task conflict</td>
<td>.41</td>
</tr>
<tr>
<td></td>
<td>( R^2_{\text{within-group}} )</td>
</tr>
<tr>
<td>Level-2 predictors (Fixed effects)</td>
<td></td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
</tr>
<tr>
<td>group size</td>
<td>-0.31</td>
</tr>
<tr>
<td>manifest task conflict</td>
<td>.60</td>
</tr>
<tr>
<td>Hypothesized effects</td>
<td></td>
</tr>
<tr>
<td>ethnic/ancestral diversity (Hypothesis 2)</td>
<td>-.50</td>
</tr>
<tr>
<td>gender diversity (Hypothesis 2)</td>
<td>1.08</td>
</tr>
<tr>
<td></td>
<td>( R^2_{\text{between-group}} )</td>
</tr>
</tbody>
</table>

** p<.01 *p<.05

As a post hoc exploration of the possible direct effects of demographic diversity on team viability (although not hypothesized), the planned second regression of team viability on demographic diversity and conflict was conducted and the results are contained in Table 17. As can been seen from Table 17, there is no support in these data for the proposition that demographically-diverse teams are less viable than teams that are demographically homogeneous. The results in Table 17 do provide a glimpse into the detrimental effect of relationship conflict on team viability, which is examined as a potential mediator of the effects of task conflict in later tests (i.e., Hypotheses 7 and 8).
Table 17. Regression of Team Viability on Manifest Relationship Conflict

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Relationship conflict</th>
<th>( \gamma )</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level -1 predictors (Fixed effects)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>5.55</td>
<td>23.55**</td>
<td></td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>perceived task conflict</td>
<td>.14</td>
<td>1.68</td>
<td></td>
</tr>
<tr>
<td>Hypothesized effects</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>perceived relationship conflict</td>
<td>-.30</td>
<td>-4.82**</td>
<td></td>
</tr>
<tr>
<td>( R^2_{\text{within-group}} )</td>
<td>0.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level-2 predictors (Fixed effects)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>group size</td>
<td>.07</td>
<td>.62</td>
<td></td>
</tr>
<tr>
<td>ethnic/ancestral diversity</td>
<td>-.42</td>
<td>-1.21</td>
<td></td>
</tr>
<tr>
<td>gender diversity</td>
<td>.39</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td>manifest task conflict</td>
<td>-.28</td>
<td>-1.34</td>
<td></td>
</tr>
<tr>
<td>Hypothesized effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>manifest relationship conflict</td>
<td>-.22</td>
<td>-2.14*</td>
<td></td>
</tr>
<tr>
<td>( R^2_{\text{between-group}} )</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** \( p<.01 \) * \( p<.05 \)

_Hypothesis 3._ Hypothesis 3 tests the proposition that manifest task conflict is positively predicted by the degree to which team members hold diverse problem-relevant assumptions. To test this hypothesis, mixed-effects regressions of task conflict on the problem-relevant diversity variables were run, controlling for group size, demographic diversity, and the group-level means of the problem-relevant assumptions themselves (Harrison & Klein, 2007). The predictors of task conflict in these hypotheses reside exclusively at the group-level, yet it is still important to conduct multilevel regression in order to separate the between-group variance on task conflict from the within-group variance.

The choice to control for demographic diversity is consistent with the view that any form of diversity might exhibit links to task conflict, and that demographic diversity might be
correlated with underlying task-related perspectives that were not measured in this dissertation. In addition, controlling for demographic diversity helps to account for possible confounding owing to the fact that the estimates of the relationship between demographic diversity and problem-relevant assumption diversity approached statistical significance for Hypothesis 1a.

Model 1 in Table 18 (and Table 19) contains the results of the test of Hypothesis 3. Considering main effects alone, neither of the two deep-level diversity variables appears to be associated with the group mean of task conflict. In other words, teams more diverse in terms of their underlying beliefs regarding the importance of employment inducements are not characterized by greater levels of manifest task conflict. There also appears to be no significant relationship between demographic diversity and manifest task conflict. The failure to support Hypothesis 3 does not rule out the possibility that the strength of this relationship is conditional. In fact, Hypothesis 4 proposes that the relationship between problem-relevant assumption diversity and manifest task conflict is moderated by conflict value composition (both diversity and average).

Model 2 in Table 18 presents the results of the test of Hypothesis 4 in relation to the diversity of beliefs regarding the importance of skill-development inducements. Model 2 in Table 19 presents the results of the same hypothesis test, but in relation to support-based inducement importance. These models required the inclusion of all of the predictor variables from the test of Hypothesis 3, two additional variables involved in the moderation hypothesis (conflict value diversity and conflict value average), and the necessary 2-way and 3-way product terms. It is evident in Table 18 that no additional predictive capacity is gained through the inclusion of these product terms with respect to skill-development belief
diversity. In addition, although the results are not presented in Table 18, a follow-up test examined only the two-way interaction terms. Results were similarly non-significant.

Table 18. Regression of Manifest Task Conflict on the Diversity of Problem-relevant Assumptions (Skill-development Inducement Importance)

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Task Conflict (Model 1)</th>
<th>Task Conflict (Model 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \gamma )</td>
<td>t</td>
</tr>
<tr>
<td>Intercept</td>
<td>4.14</td>
<td>20.66**</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>group size</td>
<td>.32</td>
<td>3.58**</td>
</tr>
<tr>
<td>ethnic/ancestral diversity</td>
<td>-.28</td>
<td>-.95</td>
</tr>
<tr>
<td>gender diversity</td>
<td>-.34</td>
<td>-.79</td>
</tr>
<tr>
<td>group mean of assumptions (skills)</td>
<td>.23</td>
<td>.98</td>
</tr>
<tr>
<td>group mean assumptions (support)</td>
<td>.12</td>
<td>.54</td>
</tr>
<tr>
<td>Hypothesized effects (Hypothesis 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>diversity of assumptions (skills)</td>
<td>-.09</td>
<td>-.30</td>
</tr>
<tr>
<td>diversity of assumptions (support)</td>
<td>-.20</td>
<td>-.89</td>
</tr>
<tr>
<td>( R^2 ) between-group</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model 2. Level-2 predictors (Fixed effects)

Interaction-Term Block

<table>
<thead>
<tr>
<th></th>
<th>( \gamma )</th>
<th>t</th>
<th>( \gamma )</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>group mean of conflict values (MCV)</td>
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<td>-1.24</td>
<td></td>
<td></td>
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<tr>
<td>diversity of conflict values (DCV)</td>
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<td>-1.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>diversity of assumptions (skills) * MCV</td>
<td>-.02</td>
<td>-.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>diversity of assumptions (skills) * DCV</td>
<td>-.39</td>
<td>-1.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCV * DCV</td>
<td>.06</td>
<td>.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>diversity of assumptions (skills) * MCV * DCV</td>
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<td>-.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Delta R^2 ) between-group</td>
<td></td>
<td></td>
<td></td>
<td>-0.04</td>
</tr>
</tbody>
</table>

** p<.01 *p<.05
Table 19 Regression of Manifest Task Conflict on the Diversity of Problem-Relevant Assumptions (Support-based Inducement Importance)

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Task Conflict (Model 1)</th>
<th>Task Conflict (Model 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma$</td>
<td>$t$</td>
</tr>
<tr>
<td>Model 1. Level-2 predictors (fixed effects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>4.14</td>
<td>20.66**</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>group size</td>
<td>.32</td>
<td>3.58**</td>
</tr>
<tr>
<td>ethnic/ancestral diversity</td>
<td>-.28</td>
<td>-.95</td>
</tr>
<tr>
<td>gender diversity</td>
<td>-.34</td>
<td>-.79</td>
</tr>
<tr>
<td>group mean of assumptions (skills)</td>
<td>.23</td>
<td>.98</td>
</tr>
<tr>
<td>group mean assumptions (support)</td>
<td>.12</td>
<td>.54</td>
</tr>
<tr>
<td>Hypothesized effects (Hypothesis 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>diversity of assumptions (skills)</td>
<td>-.09</td>
<td>-.30</td>
</tr>
<tr>
<td>diversity of assumptions (support)</td>
<td>-.20</td>
<td>-.89</td>
</tr>
<tr>
<td>$R^2_{between-group}$</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Model 2. Level-2 predictors (fixed effects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction-Term Block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>group mean of conflict values (MCV)</td>
<td>-0.10</td>
<td>-1.20</td>
</tr>
<tr>
<td>diversity of conflict values (DCV)</td>
<td>-0.18</td>
<td>-1.29</td>
</tr>
<tr>
<td>diversity of assumptions (support) * MCV</td>
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<td>-0.13</td>
</tr>
<tr>
<td>diversity of assumptions (support) * DCV</td>
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<td>0.10</td>
</tr>
<tr>
<td>MCV * DCV</td>
<td>-0.05</td>
<td>-0.35</td>
</tr>
<tr>
<td>diversity of assumptions (support) * MCV * DCV</td>
<td>-1.38</td>
<td>-1.89</td>
</tr>
<tr>
<td>$\Delta R^2_{between-group}$</td>
<td>0.04</td>
<td></td>
</tr>
</tbody>
</table>

** p<.01 *p<.05

Results are similar for the test of Hypothesis 4 in relation to the diversity of support-based inducement importance beliefs. It should be noted that in Model 2 of Table 19, the three-way interaction term approached conventional levels of statistical significance (p<.07), suggesting that the composition of conflict values (the diversity of conflict values and the group mean of conflict values) comes close to moderating the relationship between the diversity of these problem-relevant assumptions and task conflict.
Although the results are not strong enough to provide support for the hypothesis, as a means of exploring this marginally-significant effect, lines were plotted indicating the relationships between the diversity of support-based inducement importance beliefs and manifest task conflict at the various combinations of average conflict values and conflict value diversity. The nature of this result is depicted in Figure 3. For groups containing members who hold less diverse and primarily functional conflict values (low standard deviation, high mean), the relationship between the diversity of their underlying perspectives on support-based employment practices and manifest task conflict is positive. This effect is consistent with the form of the effect for this type of group, which was predicted in the lead up to Hypothesis 4. While this effect is significantly greater (i.e., is more positive) compared to two of the three other classifications of conflict value composition, it does not differ significantly from the relationship exhibited by teams containing members with highly diverse perspectives and a generally-low mean. Moreover, for groups falling under the two remaining classifications, the relationship between the diversity of their underlying perspectives and manifest task conflict is strongly negative, an effect which was not proposed.

Since the interaction term was not statistically significant, these results do not support Hypothesis 4. Moreover, exploration of the marginally-significant effect that was uncovered did not reveal that these relationships differed in the precise manner that was proposed in Hypothesis 4.
Figure 3. Three-way Interaction of the Diversity of Problem-relevant Assumptions, the Diversity of Conflict Values, and the Average of Conflict Values
4.2.3 Testing the multilevel nature, and moderation, of conflict spillover

The hypothesis tests now turn to examining conflict spillover at both the individual and group levels. Hypotheses 5a and 5b, jointly, predict the simultaneous operation of two effects. First, variations in individual team members’ task conflict perceptions are predicted to explain within-group variance in perceived relationship conflict (Hypothesis 5a). Second, after accounting for this individual-level effect, the group mean is predicted to explain between-group variance in manifest relationship conflict (Hypothesis 5b). It is useful to highlight that the latter effect is identical to proposing that the group mean of task conflict significantly predicts the group mean of relationship conflict.

By employing multi-level regression, these two models can be estimated simultaneously to ensure that estimates of the effects at each level are not confounded with each other. The simultaneous estimation of these parameters also enables a test of the differential contributions made by the individual- and group-level variables in accounting for variations in conflict reports (and variations in the mean of these reports).

In addition to these main effects, Hypotheses 6a and 6b propose these relationships are moderated at the individual and group levels, respectively. At the individual level, team members’ conflict values are proposed to moderate the degree of spillover that resides between the perceptions of task and relationship conflict (H6a). At the group level, the composition of conflict values in the group (mean and diversity) is proposed to moderate the group-level relationship between manifest task conflict and relationship conflict (H6b).

Hypotheses 5a and 5b. Table 20 includes the estimates of the main effects of perceived task conflict at the individual level and manifest task conflict at the group level. Perceived task conflict positively predicts perceived relationship conflict. Over and above
this “perceptual spillover” at the individual-level, results also indicate that the inclusion of the group mean of these perceptions adds additional predictive capability. In fact, the significance of the parameter associated with the group-mean of task conflict perceptions provides support for the presence of a contextual effect. This latter effect is interpreted in line with the theoretical argument that overt expressions of task-based disagreements among members of the group (i.e., manifest task conflict) predict expressions of relationship conflict. Combined, both of these effects lend support to Hypothesis 5.

Table 20. Test of the Contextual Effect: Regression of Relationship Conflict on Task Conflict at level-1 and level-2

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Relationship conflict</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Level -1 predictors (Fixed effects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>2.30</td>
<td>6.06**</td>
</tr>
<tr>
<td>Hypothesized Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>perceived task conflict (Hypothesis 5a)</td>
<td>.41</td>
<td>4.37**</td>
</tr>
<tr>
<td>R^2 within-group</td>
<td></td>
<td>0.08</td>
</tr>
<tr>
<td>Level-2 predictors (Fixed effects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>group size</td>
<td>-.33</td>
<td>-1.76</td>
</tr>
<tr>
<td>ethnic/ancestral diversity</td>
<td>-.47</td>
<td>-.84</td>
</tr>
<tr>
<td>gender diversity</td>
<td>.95</td>
<td>1.17</td>
</tr>
<tr>
<td>Hypothesized effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>manifest task conflict (Hypothesis 5b)</td>
<td>.60</td>
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</tr>
<tr>
<td>R^2 between-group</td>
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<td>0.07</td>
</tr>
</tbody>
</table>

** p<.01 *p<.05

Hypotheses 6a and 6b. The main effects described above are proposed to be contingent on the nature of team members’ own conflict values (Hypothesis 6a), as well as the configuration of these values at the group level (Hypothesis 6b). Model 2 in Table 21 contains the results of the mixed-effects regression model that was employed to test the individual-level moderation hypothesis. The individual-level product term (perceived task
conflict * individual conflict values) was non-significant, and its inclusion resulted in worse model fit. Thus, Hypothesis 6a was not supported. The positive relationship between task and relationship conflict perceptions at the individual level is not moderated by the nature of team members’ own conflict values.

Hypothesis 6b was tested through the inclusion of the three-way interaction term (manifest task conflict * the group mean of conflict values * diversity of conflict values), as well as the three related 2-way interaction terms required to gauge its significance. Coefficients for these terms are contained in Model 2 of Table 22. The overall fit of the model improved, but this appears to have been the result of significant two-way interaction terms; the hypothesized three-way interaction term was not statistically significant. This rejects the form of the interaction as it was hypothesized in Hypothesis 6b. Specifically, it rejects the proposition that the moderating effect of conflict value diversity would be qualified by the average of conflict values in the group.

Although the more complex three-way interaction hypothesis was not supported, it is evident in the results of Model 2, Table 22, that the diversity of conflict values exhibits a significant moderating influence on manifest conflict spillover. This finding was followed up through a test of Model 3 (presented in Table 22), which included only the 2-way interaction term between manifest task conflict and the diversity of conflict values. This two-way interaction term is statistically significant. This result finds that one component of conflict value composition – the diversity of conflict values – serves as a moderator of the group-level spillover of task-to-relationship conflict.
<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Relationship conflict (Model 1)</th>
<th>Relationship conflict (Model 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma$</td>
<td>$t$</td>
</tr>
<tr>
<td>Model 1. Level -1 predictors (Fixed effects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>2.34</td>
<td>6.05**</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
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<tr>
<td>conflict values</td>
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<td>-1.05</td>
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<tr>
<td>Hypothesized Effects</td>
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<td></td>
</tr>
<tr>
<td>perceived task conflict</td>
<td>0.42</td>
<td>4.43**</td>
</tr>
<tr>
<td>$R^2_{\text{within-group}}$</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>Model 1. Level-2 predictors (Fixed effects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>group size</td>
<td>-0.34</td>
<td>-1.82</td>
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<tr>
<td>ethnic diversity</td>
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<td>-0.97</td>
</tr>
<tr>
<td>gender diversity</td>
<td>0.93</td>
<td>1.18</td>
</tr>
<tr>
<td>group mean of conflict values</td>
<td>0.13</td>
<td>0.90</td>
</tr>
<tr>
<td>diversity of conflict values</td>
<td>0.52</td>
<td>2.05*</td>
</tr>
<tr>
<td>Hypothesized effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>manifest task conflict</td>
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<td>2.31*</td>
</tr>
<tr>
<td>$R^2_{\text{between-group}}$</td>
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<td></td>
</tr>
<tr>
<td>Model 2. Level-1 predictors (Fixed Effects) Interaction Term</td>
<td></td>
<td></td>
</tr>
<tr>
<td>perceived task conflict * conflict values</td>
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<td></td>
</tr>
<tr>
<td>$\Delta R^2_{\text{within-group}}$</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

** p<.01 *p<.05
Table 22. Test of the Moderation of the Relationship between Manifest Task Conflict and Manifest Relationship Conflict

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Relationship conflict (Model 1)</th>
<th>Relationship conflict (Model 2)</th>
<th>Relationship conflict (Model 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma$</td>
<td>$t$</td>
<td>$\gamma$</td>
</tr>
<tr>
<td>Model 1. Level-1 predictors (Fixed effects)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>2.34</td>
<td>6.05***</td>
<td>2.58</td>
</tr>
<tr>
<td>Control Variables</td>
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<td></td>
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<tr>
<td>conflict values</td>
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<td>-1.05</td>
<td>-0.05</td>
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<tr>
<td>Hypothesized Effects</td>
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</tr>
<tr>
<td>perceived task conflict</td>
<td>0.42</td>
<td>4.43***</td>
<td>0.42</td>
</tr>
<tr>
<td>$R^2_{within-group}$</td>
<td>0.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1. Level-2 predictors (Fixed effects)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>group size</td>
<td>-0.34</td>
<td>-1.82</td>
<td>-0.29</td>
</tr>
<tr>
<td>ethnic diversity</td>
<td>-0.55</td>
<td>-0.97</td>
<td>-0.77</td>
</tr>
<tr>
<td>gender diversity</td>
<td>0.93</td>
<td>1.18</td>
<td>0.84</td>
</tr>
<tr>
<td>group mean of conflict values (MCV)</td>
<td>0.13</td>
<td>0.90</td>
<td>0.19</td>
</tr>
<tr>
<td>diversity of conflict values (DCV)</td>
<td>0.52</td>
<td>2.05**</td>
<td>0.42</td>
</tr>
<tr>
<td>Hypothesized effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>manifest task conflict</td>
<td>0.67</td>
<td>2.31**</td>
<td>0.38</td>
</tr>
<tr>
<td>$R^2_{between-group}$</td>
<td>0.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2/Model3. Level-2 predictors (Fixed Effects)</td>
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<tr>
<td>Interaction Terms</td>
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</tr>
<tr>
<td>manifest task conflict * MCV</td>
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<td></td>
</tr>
<tr>
<td>manifest task conflict * DCV</td>
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<td>2.59**</td>
<td>0.94</td>
</tr>
<tr>
<td>MCV * DCV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>manifest task conflict * MCV * DCV</td>
<td>-.47</td>
<td>-.79</td>
<td></td>
</tr>
<tr>
<td>$\Delta R^2_{between-group}$</td>
<td>0.10</td>
<td>0.10</td>
<td></td>
</tr>
</tbody>
</table>

** $p<.01$ * $p<.05$
Figure 4 is a plot of two lines depicting the relationship between manifest task conflict (along the x-axis) and manifest relationship conflict (along the y-axis) at low and high levels of conflict-value diversity (one standard deviation below and above the mean of the sample). From Figure 4, it is clear that the positive relationship between manifest task and relationship conflict (i.e., group-level spillover) is significantly smaller for teams composed of members who hold less diverse conflict values. In fact, for these teams, the relationship between group-level task and relationship conflict is not statistically different from zero.

4.2.4 Accounting for conflict spillover in estimating the effects of task conflict on outcomes

The remaining hypothesis tests concern the impact that manifest task conflict has on team outcomes. At this point, it is worth summarizing the support that has already been obtained for relationships that have some bearing on these remaining tests. First, the multilevel view of conflict spillover proposed in Hypothesis 5 was supported: perceived task conflict was found to positively predict perceived relationship conflict; and manifest task conflict was found to positively predict manifest relationship conflict. This suggests that examining the possible indirect effects of task conflict on team viability and team performance by way of conflict spillover (i.e., Hypotheses 7 and 9) should continue.

In addition, the positive group-level relationship between the two manifestations of conflict was found to be significantly moderated by the group diversity of conflict values. As such, it is particularly informative to examine the diversity of conflict values as a possible moderator of the indirect effects of manifest task conflict on team viability (Hypothesis 8b) and team performance (Hypothesis 10).
Figure 4. – Conflict Value Diversity as a Moderator of the Positive Relationship between Manifest Task Conflict and Manifest Relationship Conflict.
The moderation of individual-level conflict spillover by team members’ conflict values was not supported. This means that, although tests of Hypothesis 7a should continue, the subsequent test of Hypothesis 8a, which rested on the assumed moderation of individual-level conflict spillover is unnecessary. Owing to the failure to find support for Hypothesis 5a, Hypothesis 8a is rejected as well.

4.2.4.1 The indirect effects of task conflict on team viability

Hypothesis 7a predicts that perceptions of task conflict negatively predict individual willingness to work with team members again through related perceptions of relationship conflict. Hypothesis 7b predicts that expressions of task conflict negatively predict team viability through related expressions of relationship conflict. The first regression model required to estimate these indirect effects (using the product of coefficients approach) is the regression of relationship conflict on task conflict. The results of this regression were discussed as part of the tests of Hypotheses 5 and 6, and the results supporting these predicted relationships are reported in Table 20 and Table 22 (Model 3).

Results from the second regression required to calculate task conflict’s indirect effects on viability are reported in Table 23. To examine the effect of manifest task conflict, over and above the perceptual effect, required the simultaneous estimation of the level-1 and level-2 effects. As before, significant effects of group means (after accounting for the within-group relationship) were interpreted as evidence of a contextual effect. Table 23 indicates that, after accounting for the effect of individual perceptions of conflict, the addition of group-level characteristics, particularly the degree of manifest relationship conflict, also significantly predicted team viability.
Given the individual-level “perceptual spillover” effect was not found to be moderated, the indirect effect of perceived task conflict on individual willingness to work with team members can be estimated through calculating the product of the relevant coefficients. Figure 5.1 displays the components of this indirect effect as well as the indirect effect itself, which is -.127.

Table 23. Regression of Individual Willingness to Work with Team Members (Team Viability) on Conflict

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Relationship conflict</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Level -1 predictors (Fixed effects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>5.55</td>
<td>23.55**</td>
</tr>
<tr>
<td>Hypothesized Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>perceived task conflict</td>
<td>0.14</td>
<td>1.68</td>
</tr>
<tr>
<td>perceived relationship conflict</td>
<td>-0.30</td>
<td>-4.82**</td>
</tr>
<tr>
<td>$R^2_{\text{within-group}}$</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>Level-2 predictors (Fixed effects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>group size</td>
<td>0.07</td>
<td>0.62</td>
</tr>
<tr>
<td>ethnic/ancestral diversity</td>
<td>-0.42</td>
<td>-1.21</td>
</tr>
<tr>
<td>gender diversity</td>
<td>0.39</td>
<td>0.78</td>
</tr>
<tr>
<td>Hypothesized effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>manifest task conflict</td>
<td>-0.28</td>
<td>-1.34</td>
</tr>
<tr>
<td>manifest relationship conflict</td>
<td>-0.22</td>
<td>-2.14*</td>
</tr>
<tr>
<td>$R^2_{\text{between-group}}$</td>
<td>0.14</td>
<td></td>
</tr>
</tbody>
</table>

** p<.01 * p<.05

Although conventional significance estimates (p-values) assume normally-distributed parameters when drawing inferences from the sample to the population, the distribution of a product of two parameter estimates is often asymmetric (MacKinnon & Fairchild, 2009). This means that the statistical significance of each of the two components of the indirect effect cannot be used, by themselves, to estimate the significance of the indirect effect. Instead, a derivation of the standard error of the product of the coefficients is required.
Direct effect = .143  
Indirect effect = - .127  
Total effect = .016

**Figure 5.1. The Indirect Effect of Perceived Task Conflict on Individual Willingness to Work with Team Members Again.**

The program PRODCLIN (MacKinnon, Fritz, Williams, & Lockwood, 2007) can enable these complex computations to be done by computer. PRODCLIN uses the two parameter estimates that are multiplied to derive the indirect effect (as well as their individual standard errors), and also takes into account the asymmetric distribution of the product before constructing confidence limits for the indirect effect. As mentioned previously, compared to other estimations of the significance of indirect effects (e.g., Baron & Kenny, 1986), tests of significance derived through this form of estimation have been shown to have greater statistical power (MacKinnon et al., 2002).

Using an alpha level (Type I error rate) of .05, PRODCLIN generated the .95 confidence interval around the indirect effect of -.127 reported above. At this level, the lower limit was -.210, and the upper limit was -.059. Since the confidence limit does not include zero, the effect is statistically significant (p<.05). Therefore, the negative effect of perceived task conflict was found to be mediated by perceived relationship conflict, which
provides support for Hypotheses 7a. Since the direct effect of perceived task conflict is not significant, this means its effect is completely mediated by relationship conflict perceptions.

*Hypothesis 8b.* Given the relationship between task conflict and relationship conflict varies as a function of the diversity of conflict values (Hypothesis 6b), and relationship conflict is cast as a mediator of the relationship between manifest task conflict and team viability (Hypothesis 7b), the indirect effect of manifest task conflict on team viability must be treated as conditional (Hypothesis 8b). For a given level of task conflict, relationship conflict will be greater when the diversity of team members’ conflict values is high. This greater level of relationship conflict will transmit a more potent negative indirect effect of task conflict on team viability. In other words, a moderated mediation model must be estimated (Edwards & Lambert, 2007).

To derive the indirect effects of task conflict under conditions of low- and high-diversity of conflict values required the use of reduced form equations in which the moderating effect of conflict value diversity was incorporated into the “first stage” estimates of the effect of task conflict on relationship conflict (see Edwards and Lambert, 2007). The results of these calculations at low and high values of conflict value diversity are displayed in Figures 6.1 and 6.2.

In all, these results indicate that, in conditions of low diversity of conflict values, the indirect effect of manifest task conflict on team viability does not differ from zero. By contrast, in conditions of high diversity of conflict values, the indirect effect is statistically significant, and negatively predictive of team viability.
Direct effect = -0.275  
Indirect effect = 0.003  
Total effect = -0.272

Figure 6.1. Indirect Effects of Manifest Task conflict on Team Viability for Groups with Low Diversity of Conflict Values

Direct effect = -0.275  
Indirect effect = -0.230  
Total effect = -0.505

Figure 6.2 Indirect Effects of Manifest Task conflict on Team Viability for Groups with High Diversity of Conflict Values
To reiterate, estimating the significance of the indirect effect that is derived through the product-of-coefficients approach (and PRODCLIN) requires both the parameter estimates for the first and second stage effects, as well as their standard errors. Since the first stage of these indirect effects (i.e., the relationship between manifest task and relationship conflict) is moderated, the standard errors of the simple slopes at low and high levels of conflict value diversity were first derived by hand, using formulas provided in Aiken & West (1991, p.16), before subsequently employing these standard errors as part of the PRODCLIN calculations. The derived standard error of the effect of manifest task conflict on relationship conflict is 0.5817 at low levels of conflict-perspective diversity and 0.5198 at high levels of diversity. The standard error of the second stage effect (i.e., between manifest relationship conflict and team viability) was taken directly from the statistical output generated as part of the tests summarized in Table 23 (this standard error is 0.1050). Using this information, the confidence limits calculated by PRODCLIN are reproduced in the Table 24 at a Type I error rate of p<.05.

Table 24. Confidence Limits for the Significance of the Indirect Effect of Manifest Task Conflict on Team Viability (alpha level=0.05)

<table>
<thead>
<tr>
<th>Moderation Condition</th>
<th>Indirect effect estimate</th>
<th>lower limit</th>
<th>upper limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Low conflict value diversity</td>
<td>-0.015</td>
<td>-.2692</td>
<td>.2783</td>
</tr>
<tr>
<td>2. High conflict value diversity</td>
<td>-0.230</td>
<td>-.6025</td>
<td>.0041 1</td>
</tr>
</tbody>
</table>

1 Note: although the confidence interval at p = 0.05 does include zero, zero is excluded from the interval at p=0.056. This indirect effect is just on the borderline of conventional levels of statistical significance.
4.2.4.2 The indirect effects of task conflict on team performance

Hypothesis 9 examines the effects of task and relationship conflict on team performance. In this examination, relationship conflict is considered a suppressor of task conflict’s direct positive effect, because it transmits a negative indirect effect between task conflict and performance.

The estimate of task conflict’s direct effect on performance is made once accounting for both the nature/strength of the relationship between task conflict and relationship conflict as well as the negative effect that relationship conflict is expected to have on performance. This is accomplished simply by regressing team performance on both forms of conflict. The impact of conflict on each of the five criteria of performance was estimated separately. Teams’ demographic composition and size were included as control variables. In addition, although the paper requirements were highly similar, they still varied somewhat by course. Therefore, the course (recall that class sections are nested within one of four courses) was included as a potential upper-level source of variance. As has been the case throughout these tests, no statistically significant amounts of variance were found to reside at the upper levels of the data hierarchy. Accounting for course, no variance was found to exist between classroom sections. However, the presence of some non-negligible variance between courses on the performance-related outcomes was noted. OLS regression was used to examine the impact of conflict on group performance, controlling for the course type with three dummy variables. These results are presented in Table 25 below.
Table 25. Regression of Performance Criteria on Team Conflict

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Importance of Research Question</th>
<th>Validity of Reasoning</th>
<th>Novelty of Recommendation</th>
<th>Usefulness of Recommendation</th>
<th>Flow of Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>t</td>
<td>B</td>
<td>t</td>
<td>B</td>
</tr>
<tr>
<td>Intercept</td>
<td>3.90</td>
<td>8.62**</td>
<td>3.41</td>
<td>9.00**</td>
<td>2.18</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course 1</td>
<td>-1.25</td>
<td>-4.10**</td>
<td>.78</td>
<td>3.08*</td>
<td>.18</td>
</tr>
<tr>
<td>Course 2</td>
<td>-.44</td>
<td>-.75</td>
<td>-.06</td>
<td>-.12</td>
<td>-.31</td>
</tr>
<tr>
<td>Course 3</td>
<td>-1.24</td>
<td>-2.30*</td>
<td>-.39</td>
<td>-.87</td>
<td>NA</td>
</tr>
<tr>
<td>group size</td>
<td>.18</td>
<td>.94</td>
<td>.29</td>
<td>1.84</td>
<td>-.06</td>
</tr>
<tr>
<td>ethnic/ancestral diversity</td>
<td>-.43</td>
<td>-.74</td>
<td>.18</td>
<td>.37</td>
<td>.85</td>
</tr>
<tr>
<td>gender diversity</td>
<td>.05</td>
<td>.06</td>
<td>-1.07</td>
<td>-1.56</td>
<td>-.12</td>
</tr>
<tr>
<td>Hypothesized effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>manifest task conflict (H9a)</td>
<td>.22</td>
<td>.80</td>
<td>.11</td>
<td>.47</td>
<td>.10</td>
</tr>
<tr>
<td>manifest relationship conflict (H9b)</td>
<td>-.35</td>
<td>-2.78**</td>
<td>-.16</td>
<td>-1.54</td>
<td>-.10</td>
</tr>
</tbody>
</table>

**p<.01; *p<.05
From Table 25, it can be seen that teams characterized by greater levels of relationship conflict made less convincing arguments concerning the importance of their chosen project topics. In addition, their written reports exhibited less “flow” or clarity of presentation. Across these sub dimensions of performance, the effect of task conflict did not significantly predict performance. Thus, no support was obtained for Hypothesis 9a.

Consistent with Hypothesis 10, the indirect effects of task conflict on performance were examined accounting for the moderation of manifest conflict spillover by the diversity of conflict values. The following figures (and Table 26) contain the estimates of these effects for the two performance criteria that were negatively predicted by relationship conflict. Table 26 reveals the statistical significance of these indirect effects under the two diversity conditions (calculated using PRODCLIN). When teams are composed of members with highly diverse conflict values, manifest task conflict negatively predicts team performance on these two dimensions of performance, indirectly, through manifest relationship conflict.

Direct effect = .218  
Indirect effect = .005  
Total effect = .223

![Diagram](image)

Figure 7.1. Indirect Effects of Task Conflict on Team Performance (importance of topic) for Groups with Low Diversity of Conflict Values
Direct effect = .218  
Indirect effect = -.356  
Total effect = -.138

Figure 7.2. Indirect Effects of Task conflict on Team Performance (importance of topic) for Groups with High Diversity of Conflict Values

Direct effect = .181  
Indirect effect = .004  
Total effect = .185

Figure 8.1. Indirect Effects of Task conflict on Team Performance (flow of presentation) for Groups with Low Diversity of Conflict Values
Direct effect = .181
Indirect effect = -0.264
Total effect = -0.083

Figure 8.2. Indirect Effects of Task conflict on Team Performance (flow of presentation) for Groups with High Diversity of Conflict Values

Table 26. Confidence Limits for the Significance of the Indirect Effects of Manifest Task Conflict on Performance Outcomes

<table>
<thead>
<tr>
<th>Performance dimension</th>
<th>Moderation Condition</th>
<th>Indirect effect estimate</th>
<th>lower limit</th>
<th>upper limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of topic</td>
<td>1. Low diversity of conflict values</td>
<td>0.005</td>
<td>-0.409</td>
<td>0.422</td>
</tr>
<tr>
<td></td>
<td>2. High diversity of conflict values</td>
<td>-0.356</td>
<td>-0.864</td>
<td>-0.011</td>
</tr>
<tr>
<td>Flow of presentation</td>
<td>1. Low diversity of conflict values</td>
<td>0.004</td>
<td>-0.5296</td>
<td>0.5481</td>
</tr>
<tr>
<td></td>
<td>2. High diversity of conflict values</td>
<td>-0.264</td>
<td>-0.686</td>
<td>0.002(^1)</td>
</tr>
</tbody>
</table>

\(^1\) Note: although the confidence interval at \(p = 0.05\) does include zero, zero is excluded from the interval at \(p=0.057\). This indirect effect is just on the borderline of conventional levels of statistical significance.
Chapter 5 Discussion and Conclusions

This dissertation’s central focus has been to highlight conflict spillover as the essential mechanism for explaining why task conflict negatively impacts groups, and to identify the nature and diversity of team members’ conflict values as an important moderating variable that can shed light on when these dysfunctional effects will be more likely to occur. In so doing, it has been maintained that, as long as team members’ initially “agree to disagree”, task conflict will not threaten the viability of teams, and may even improve team performance. While not all hypothesized relationships of the model were supported, the overall test of the model has provided noteworthy support for several of its major components.

5.1 Discussion of key contributions

In this section, the dissertation’s primary objectives are revisited in light of the results presented in Chapter 4. This discussion begins by addressing the evidence supportive of the current approach to conceptualizing/operationalizing group diversity. Following this, the discussion turns to the dissertation’s multilevel approach to examining conflict spillover, and offers an interpretation of the relationships that were uncovered between task and relationship conflict at each level. Lastly, the evidence concerning the diversity of conflict values as a moderator of group-level conflict spillover is discussed in relation to what this reveals about conflict and about how it should be managed in groups. The implications of these findings are considered in relation to both organizational theory and practice. This section concludes by acknowledging certain of the present study’s limitations, which also provides an opportunity to outline future research directions in this area.
5.1.1 A theoretically-grounded view of diversity attributes

One objective of this dissertation was to employ greater specificity in the conceptual definition and operational measurement of diversity. As part of this approach, deliberate steps were taken to ensure a clear separation of surface- and deep-level bases of diversity. The results indicate the merit of taking such an approach. For instance, attending more carefully to the conceptualization of deep-level diversity led to the identification of team members’ underlying conflict values, a variable which has not been used in examinations of team processes to date, but which was shown to play a significant role here in shaping these processes.

Individuals in the sample were shown to vary widely in terms of their conflict values. In addition, differences in conflict values between team members were found to be largely independent of the demographic diversity of teams. Most importantly, between-team differences in the diversity of members’ conflict values were found to significantly moderate conflict spillover. By delving into a more thorough and theoretically-grounded consideration of the underlying team-member differences that influence subsequent conflict-related processes, this dissertation has bridged literatures on conflict and diversity in a way that adds value to each area.

The specificity of the approach taken in this model contrasts with that taken in prior research on group diversity, in which different indicators of demographic diversity have sometimes been used to index underlying differences in members’ views and/or values. It is important to note how the results concerning the moderation of manifest conflict spillover would not have been uncovered here had the current model focused on demographic diversity as a substitute variable for deep-level differences. In fact, the demographic
diversity of teams did not predict the diversity of any of the underlying beliefs that were identified as playing a role in the current model. Thus, in spite of the existence of evidence to support aggregate differences between demographic groups in previous research, the results of this dissertation would suggest it is an unnecessary risk for researchers to assume the presence of these underlying differences in demographically-diverse groups. Rather, if the theoretical explanation being offered for diversity effects is housed in an assumed correspondence between surface- and deep-level differences, it would be more prudent and informative for research to focus directly on these underlying differences.

In a related departure from previous research, this dissertation made independent predictions concerning the impact of surface-level diversity and deep-level diversity. This separation enabled a more nuanced examination of how both surface- and deep-level diversity are related to the effectiveness of teams through distinct theoretical mechanisms. It was proposed that surface-level, demographic diversity affects relationship conflict (and, in turn, team viability) through team members’ associated expectations regarding more fundamental, underlying differences. These expectations were assumed to be greater among members who differ on surface-level characteristics (gender and ethnic/ancestral origin). By contrast, the proposed relationship between deep-level diversity (of problem-relevant assumptions) and task conflict was anchored in predictions regarding the way these differences in beliefs were substantively related to the group task. Team members who held more diverse problem-relevant assumptions were expected to discuss these differences, which would lead to increased manifestation of task conflict.

Regarding these particular hypotheses (i.e., Hypotheses 2 and 3), which pertain to the main effects of surface- and deep-level diversity on conflict, the test results revealed little
support. Teams that were demographically diverse had no more relationship conflict than did teams that were demographically similar. As a result, there was no support for the idea that elevated levels of relationship conflict in diverse groups might be part of the reason why these groups have been found to experience lower social integration in previous research. In addition, the underlying diversity of team members’ problem-relevant assumptions was not found to exhibit the hypothesized relationship with manifest task conflict.

The failure to find support for Hypotheses 2 and 3 should not call into question the worth of distinguishing more clearly between surface- and deep-level differences in groups. What it does reveal is how, once researchers begin to acknowledge the importance of making this distinction, they are left with additional, even more challenging tasks related to the conceptualization of diversity.

Regarding surface-level differences, for instance, research suggests that demographic diversity will have different effects on group processes depending on the distinct manner in which differences are distributed across members of diverse teams, as well as the extent to which differences are made salient (Lau & Murnighan, 1998; Pearsall, Ellis, & Evans, 2008). Research has also found that people often vary in their perceptions of the objective diversity of the groups in which they work, variations which may be explained by their underlying views concerning the value of diversity itself (Homan, Greer, Jehn, & Koning, 2010).

Regarding the lack of support for the proposed effects of underlying differences in problem-relevant assumptions on manifest task conflict, this dissertation’s results should not deter researchers from devoting more careful attention to the nature of underlying differences that theoretically influence team processes. On the contrary, the identification of theoretically-meaningful bases of task-related conflict should continue. What these results
do confirm is the extent to which conceptualizing and measuring “task-relevant” beliefs is a challenge in any deep-level diversity research study (Harrison et al., 1998). It could be that the choice to examine underlying beliefs regarding employment obligations as a basis of deep-level diversity hindered the test of Hypothesis 3. These beliefs may not have figured prominently in these groups’ work-related discussions. The lack of support for these hypothesized relationships will be taken up further in the discussion of limitations and future directions.

5.1.2 Implications of a multi-level view of conflict spillover

The key findings emerging from this research come from tests of hypotheses that were developed in order to improve upon existent conceptualizations of conflict and its ultimate implications in groups. Adopting a multilevel approach to studying conflict and conflict spillover has added to the general understanding as to why task and relationship conflict are often positively correlated. Support for the incremental multilevel model of conflict spillover confirms that conflict is a multi-level phenomenon. More specifically, it highlights how conflict spillover is partly driven by differences that exist between groups in terms of how openly conflict is expressed, but also partly by differences between team members in terms of how much conflict is perceived to exist in the group.

This distinction between the unique ways that conflict is experienced (in the minds of team members), and expressed (in the interactions between team members) provides a fuller view of the scope of conflict and its implications. It offers different explanations for how task conflict potentially leads to relationship conflict and identifies unique outcomes of conflict at each of these levels.
One implication of conflict spillover at the individual level is that, regardless of the nature or amount of conflict that is expressed within the group, those team members who disproportionately perceive that differences in ideas and opinions regarding the task have occurred will also be less willing to remain members of the group as a result of corresponding perceptions that group members’ personal relationships have been strained. Given perceptual conflict spillover is derived on the basis of within-group variations in conflict reports, its existence suggests that people in the same group setting may see different amounts of conflict. In addition, these perceived differences in conflict perceptions were found to predict individual willingness to work with the same team members again, which has suggestive implications for individual withdrawal behaviours more generally. As such, these variations in conflict perceptions also represent a threat to the ongoing functional capability of teams themselves. To the extent that team members are interdependently responsible for executing the team task, even one member who lacks the willingness to work with the others can hinder subsequent team performance. It is worth noting that prior approaches to studying conflict, which typically focus exclusively on the group level of analysis, will overlook these important variations in individual team member experience.

The results concerning conflict at the individual level provide theoretically consistent evidence for the notion that conflict spillover is the result of an interpretive process. However, spillover appears to be more than this. Support was also found for the contextual effect of manifest task conflict as a predictor of manifest relationship conflict. Here, the mean of conflict perceptions has been treated as an indicator of the extent to which conflicts are expressed openly between team members. Therefore, the positive relationship between the two forms of conflict at the group level suggests that conflict spillover is also partly a
behavioural process through which the active discussion of task-based disagreements generates associated expressions of interpersonal hostility. Each of these two aspects of spillover provides unique information concerning conflict in groups and suggests the operation of distinct mechanisms, related to either the experience or expression of conflict.

It is contended here that conflict spillover at the group level is more social, interactive and behavioural than it is at the individual level. Teams that are marked by more manifest expressions of task-based disagreements (e.g., members who engage in open debates, draw explicit attention to their underlying differences, or otherwise directly state they have disagreements with each other) will tend to draw out correspondingly explicit expressions of relationship discord (i.e., insults, emotional outbursts, or otherwise clear expressions of disdain). This suggested mechanism is distinct, however, from the proposal that task conflict is often misattributed as relationship conflict (cf. Simons & Peterson, 2000), a mechanism which is conceivably in operation at the individual level (i.e., perceptual). As was discussed in the theoretical rationale outlined in Chapter 2, both the interpretive and behavioural mechanisms will obviously be interrelated as part of a broader process by which conflict unfolds (cf. Pondy, 1967). However, distinguishing them from one another provides greater clarity on the operation of conflict and possible points of intervention in team processes.

Another manner in which spillover appears to operate differently at each level concerns the fact that the diversity of conflict values was found to moderate manifest conflict spillover. Contrary to predictions, perceptual conflict spillover was found to exist generally across all groups, and did not vary according to whether the individual perceiver had positive or negative conflict values.
Given manifest conflict spillover was moderated by conflict value diversity, the above discussion concerning the tendency for overt expressions of task conflict to elicit corresponding expressions of relationship conflict only applies to describing a portion of the groups that were examined in this dissertation – those teams that were composed of members with initially diverse conflict values. By contrast, manifest conflict spillover did not hold for teams primarily composed of members who held similar conflict values. The expression of task conflict was unrelated to relationship conflict in these groups.

Contrary to the theoretical proposition that teams would be most effective when members primarily held functional views regarding task conflict, the moderating effect of conflict value diversity did not vary by the general functional nature of team members’ conflict values (i.e., the group average of conflict values). In other words, teams containing members who primarily held dysfunctional views of task conflict had comparable levels of conflict spillover to those of teams containing members who tended to “agree” on the functional importance of task conflict. It appears that when team members’ views regarding conflict are initially diverse, it creates an ambiguous social setting, in which members are particularly susceptible to offend one another (or take offense) through open disagreements.

Perhaps, normative ambiguity (rather than the particular view concerning the appropriateness of disagreeing) is the fundamental driver of dysfunctional reactions to task-based disagreements. When members initially hold consistent, yet dysfunctional views regarding conflict, they might quickly derive work routines that are able to address differences in members’ task-based points of view, without actually engaging in a more thorough debate of these differences. In other words, since all members in this situation view disagreements in a similarly dysfunctional way, they may also share a more “politically-
correct” manner of exchanging ideas and opinions without actually challenging each others’ views. In these groups, the collective effort might be targeted at reducing, not addressing, the essence of the disagreement, and initial differences may be identified as topics to be discussed “with care” in subsequent discussions. By essentially avoiding more probing approaches to discussing their differences, members would be able to avoid having these “disagreements” spill over into relational tension. However, as implied above, perhaps the task-based disagreements that these teams would tend to have are less reflective of the kind of active debate and the fleshing out of underlying assumptions that has been proposed to play an important role in team problem-solving.

5.1.3 Conditions under which task conflict impairs team effectiveness

Although it has been suggested in the existing literature that task conflict’s negative effects may be contingent upon the degree to which task conflict and relationship conflict are positively correlated (De Dreu & Weingart, 2003), it has been argued in this dissertation that the implications of this proposition should be articulated in terms of moderated mediation models, in which the negative effects of task conflict are treated as indirect (mediated by relationship conflict) and conditional. To the extent that moderators of conflict spillover (such as conflict values) can be identified, researchers will come to better understand the conditions under which task conflict’s negative effects on team outcomes can be lessened.

Results of this investigation show that only teams consisting of members with diverse conflict values were unable to sustain high levels of overt task-based disagreements without experiencing comparable levels of relationship conflict. Because of these variations in spillover, this research indicates that task conflict was only detrimental for teams composed
of members with diverse conflict values. When members of these teams engaged in open task-based disagreements, they were less effective in the performance of their assigned task, and less capable of functioning collectively in the future.

The hypothesis that manifest task conflict would have positive effects on performance after accounting for relationship conflict did not hold. Even in teams that were able to avoid manifest conflict spillover (i.e., those containing members with similar conflict values), the impact of these overt task-based disagreements was not found to improve performance. Nevertheless, it is noteworthy that these teams did not suffer any performance detriments as a result of manifest task conflict, and that task conflict did not reduce the capability of these teams to continue to function in the future.

Understanding the group-level linkages between manifestations of task conflict and team outcomes is important, given that task conflict is likely to occur in the course of working on complex tasks. Indeed, the limited extent of between-group variability found in task conflict reports provided by teams in this study suggests that moderate levels of task conflict may have formed an elemental component of the tasks these groups were assigned to perform. Although there is no evidence here to suggest that higher levels of expressed task conflict led to increased performance, it is clear that task conflict undermined certain elements of task performance, and significantly affected the long-term viability of teams that were unable to avoid conflict spillover. Therefore, a case can be made that, if the nature of the task makes task-based disagreements likely, then teams that are able to have these disagreements without suffering corresponding levels of interpersonal hostility, performance detriments, or decreased willingness to work together will certainly have performed effectively.
Given task conflict will be required to varying extents according to the nature of the task, the goal of conflict research should not necessarily be to uncover ways that task conflict can be minimized. Rather, the goal should be to identify ways of minimizing the potential for task conflict to have negative effects. This dissertation has been consistent with this goal by shifting the focus away from the main effects of task conflict in teams, toward an examination of the moderation of conflict spillover, which can better explain how team members respond to these natural aspects of their work.

5.2 Limitations and future directions

The empirical study that was conducted to test this model’s hypotheses employed a longitudinal correlational design. The use of correlational designs in research has advantages and disadvantages. The advantages were previously discussed in Chapter 3 and pertain to the fact that certain of the phenomena being examined are difficult to experimentally manipulate, or involve conflict-based dynamics, which are less likely to emerge in experimentally-controlled and/or short-term laboratory investigations. However, there are limitations that come with conducting correlational research. Some of these are discussed next in order to facilitate the interpretation of the main findings, and to set the stage for future research investigations that can, hopefully, lead to convergent results through different methods.

First, correlational research designs do not provide the ability to draw conclusions as to causal processes. Theoretical arguments were provided in Chapter 2 for why conflict spillover can be usefully interpreted as a general negative reaction to task-based disagreements (i.e., task conflict leads to relationship conflict). In addition, the results discussed above concerning the diversity of conflict values as a moderator of conflict
spillover are more interpretable when spillover is considered as flowing from task to relationship conflict, rather than from relationship to task conflict (e.g., would higher levels of expressed relationship conflict tend to lead to more expressed task-based disagreements in teams containing members with diverse conflict values?). Nevertheless, in spite of this theoretical position, the evidence here of a positive association between these two variables does not confirm that task conflict precedes relationship conflict in a causal sequence. Therefore, the current discussion of results should be received, bearing in mind alternative explanations. For instance, it is possible that teams primarily tend to vary on relationship conflict and that, when relationship conflict increases, members will tend to disagree more about the task as a result. More likely, task and relationship conflict are interrelated components of a complex, reciprocal, and dynamic process. Assessing the emergent state of conflict at a given time can provide an indication of the extent to which the more dynamic elements of this process have regularized (Kozlowski & Ilgen, 2006)

Another feature of the empirical test of the model that limits the extent to which conclusions can be generalized has to do with the research setting itself. Part of the rationale for using student teams to test the current theoretical model pertained to aspects of the setting that are realistically comparable to other work settings (e.g., task deadlines, performance implications, and self-management). In many respects, the university classroom setting is superior to more tightly controlled and context-free laboratory settings. However, there are certain other features of organizational work contexts that are different from university classrooms. For instance, the nature of diversity in the workplace is often different from that in university classrooms and includes additional components (e.g., age, functional background, and educational diversity). In addition, although classroom teams must work
together for an extended period, the period has a more well-defined end date. As a consequence, the implications of team members’ interactions in class-related workgroups may be restricted to the task at hand. Team members may be less concerned with some of the broader concerns that often from the backdrop of team member interactions in more formal employment settings, where membership in the team/organization is ongoing and people are mindful of the “shadow of the future”. These and other differences between the university classroom setting and other work settings should be taken into account when considering the generalizability of these results.

Correlational research also relies on the naturally-occurring variation of study variables (e.g., of member attributes, of team properties, etc…), variation which is sometimes constrained owing to features of the setting, the sampling, or the nature of the variables themselves. In the current study, the power of certain hypothesis tests, particularly the three-way interactions involving the composition of conflict values was somewhat reduced by the manner in which conflict values were distributed across the sample. For instance, although the model hypothesized a three-way interaction to explain the relationship between task conflict and relationship conflict, support was only found for a two-way interaction (i.e., the interaction of manifest task conflict and conflict value diversity). It is believed that this failure to support the three-way interaction is partly to do with the naturally-occurring variation in the composition of conflict values across groups in this sample. Specifically, the mean and the standard deviation of conflict values are negatively correlated in these data, at a moderate level of significance. As a result, when team members’ conflict values tended to be similar in this sample, these values also tended to be more positive. This natural correlation
in these data means that there were fewer teams that contained members who shared negative conflict values, compared to those containing members who shared positive conflict values.

Before drawing firm conclusions regarding whether conflict spillover truly does operate similarly for teams primarily consisting of members who hold positive conflict values and those primarily consisting of members who hold negative conflict values, future research should employ different samples or alternative methods that enable tests of the full range of conflict value composition. Given this is the first study to employ the conflict values scale, it is not certain the extent to which the mean and variance of conflict values will tend to positively correlate across all samples. However, future correlational research into the effects of conflict value composition should proceed bearing this possibility in mind. One way of overcoming this challenge is to ensure as large a sample of teams as possible.

Clearly, another way to address challenges related to the degree of naturally-occurring variation in conflict value composition is to conduct experimental research, in which the conflict value composition of the team would be manipulated. This can be accomplished through assigning team members to groups according to their conflict values (i.e., conflict values would be measured beforehand). It is possible that experimental research could also be conducted with complete random assignment of members to groups, and with a manipulation of shared conflict values through the manner in which instructions outlining the role played by disagreements would be administered (e.g., “disagreements can often impair team performance, and should be avoided” versus “disagreements can often improve team performance, and should be encouraged”). Of course, this manner of manipulation may draw into question whether the “conflict values” assigned to team
members in such a study are consistent with members’ pre-existent personal beliefs regarding the functional value of conflict.

An interesting avenue to explore in future research would be to test whether structured planning-based interventions (for instance, the development of team charters; Mathieu & Rapp, 2009) might be able to overcome the threat that is presented when members otherwise hold diverse conflict values. Team charters have been examined as a means by which teams develop “codified plans for how the team will manage teamwork activities” (Mathieu & Rapp, 2009, p.91) prior to actively beginning work on a task. As to how these might relate specifically to the study of conflict spillover, research could randomly assign members to teams and then manipulate whether the teams are asked to develop a team charter. The charters could also be independently evaluated not only along traditional lines (see Mathieu & Rapp, 2009), but also according to whether they include language regarding the function of team-member disagreements and/or address how task-related disagreements should be handled. Differences in terms of subsequent conflict spillover could be examined in relation to the charter/no charter conditions. In addition, the inclusion of conflict-related content in the charter could be examined as a mediator of the effect of team charters on conflict spillover. As part of a study of team charters, team members could subsequently be surveyed using the conflict values scale developed here to see if the act of developing a team charter leads to a greater convergence of conflict values in teams.

The fact that this study was conducted on teams who were in complete control of their internal work processes is both another potential advantage (i.e., because this is the autonomous nature of the teams to which this theory is meant to apply) and disadvantage. For instance, in light of the failure to find the expected effects between the diversity of
problem-relevant assumptions and manifest task conflict (Hypothesis 3), it is possible that, although all teams wrote papers that related to problems inherent to the management of people in organizational settings, the specific bases of deep-level diversity that were studied (underlying beliefs regarding the importance of organizational inducements) may not have figured prominently in work-related discussions. Given the domain of problem-relevant knowledge is vast, researchers are challenged to anticipate which underlying belief differences will be relevant to the task-related discussions of naturally-occurring groups. Laboratory examinations, in which the topic of the discussion can be more closely controlled (e.g., around a specific employee-employer relations case) may be better suited to examining hypotheses related to the emergence of task conflict from different underlying problem-relevant assumptions.

Although this dissertation has identified conflict values as an important variable to examine further in the field of intragroup conflict research, more work must be done to clarify the nature of this variable and the reasons it does or does not operate in predicting conflict spillover. In the current study, it was found that individuals’ personal conflict values did not moderate the positive relationship between their perceptions of task and relationship conflict. Perhaps the lack of support for this hypothesis speaks to the power of situational factors in shaping conflict perceptions. Members may have underlying views regarding the functional role played by task conflict in teams, which may not be strong enough to influence their interpretations of the conflict that tends to unfold in a given setting over time. Perhaps conflict values are particularly influential on the interpretations of initial disagreements in teams. Yet, as evidence continues to accumulate in the setting, these underlying assumptions may be replaced with more situation-specific evidence.
Alternatively, team members’ conflict values may be particularly influential in shaping their interpretations of the disagreements that others have with them. Yet, these standards may be less influential to the way they interpret the disagreements that unfold between other team members in the setting. The reports of perceived conflict used in this study, in addition to providing an opportunity for respondents to report on the conflict that they had personally experienced with others in the setting, were likely influenced by the level and type of conflict that existed between other members in the group. Toward examining whether conflict values influence these different types of evaluations, it would be informative to distinguish who had conflict with whom in the group (i.e., accounting for dyadic conflict in addition to individual-level and group-level conflict; see Korsgaard et al., 2008).

A particularly worthwhile avenue for future conflict research along individual-, dyadic-, and group-based lines is the Social Relations Model (SRM; Kenny, 1994). SRM represents one of the most relevant approaches to studying similarities/differences in interpersonal perception in small group settings. SRM uses “round-robin” data collection methods, in which each perceiver in a group rates multiple targets (e.g., the conflict experienced with each respective group member), with the result being that each target is also rated by multiple perceivers. This type of data structure allows variance to be examined within perceivers (e.g., whether perceivers experience different levels of conflict with different “targets”) as well as between perceivers (e.g., general differences in how much conflict is perceived by perceiver A as compared to perceiver B). It also permits an examination of variance between targets (e.g., general differences in how much conflict all perceivers tend to experience in relation to target A versus target B). This “round robin” type of data structure is also useful for examinations using social network theory and methods.
(Borgatti, Mehra, Brass, & Labianca, 2009), through which the conflict-related characteristics of individuals (e.g., conflict centrality), ties (e.g., directed vs. mutual), or overall group conflict structure (e.g., conflict density) could provide areas for further theory development and research.

Of course, given the additional challenges required to collect dyadic conflict data (e.g., a team member of a 5-person group will be required to fill out four times as many survey questions compared to traditional conflict research), the use of these alternative methods for studying conflict must be guided by strong theory. Part of the reason for focusing on conflict at the individual and group levels in this dissertation is to reconcile differences that exist in prior intragroup conflict research, particularly concerning the ways conflict is conceptually defined versus how it has been measured. In fact, the multi-level methodological approach taken here is one that can be employed straightforwardly using the data that is commonly gathered as part of intragroup conflict research (e.g., individual members’ reports and the group averages of these reports). In view of the current study’s contributions, it appears that a multi-level approach adds greatly to existent conflict theory. Therefore, these results should not only encourage further research along the current lines, but also prompt future theorizing as to how conflict manifests itself differently at the individual-, dyadic-, and group-levels.

Lastly, consistent with the overarching goal of this thesis, future research should bring even greater specificity to theoretical models of conflict by identifying further refinements concerning its conceptualization and measurement. Two dominant types of conflict were examined in the current model. However, as previously mentioned, process conflict (Jehn, 1997) has also received some prior attention as an additional substantive form
of conflict in groups. Similar to task conflict, initial theory regarding process conflict suggested it plays a positive role in team process management (i.e., through efficient resource allocation; Jehn & Mannix, 2001) but empirical results suggest its effects are typically negative (Greer & Jehn, 2007). The current hypotheses regarding conflict value composition as a moderator of task-to-relationship conflict spillover should be investigated in relation to process-to-relationship conflict spillover.

In addition to process conflict, some researchers have recently proposed even further delineations of task-related conflict (Bendersky, Behfar, Weingart, Todorova, Bear, & Jehn, 2010), distinguishing between conflict that is experienced during initial, divergent stages of member interactions (e.g., idea generation), and those occurring later in the process as collective decisions are required (e.g., idea implementation). It is possible that people’s conflict values may vary in relation to the timing of conflicts in this sequence of divergent and convergent team processes. In addition, Edmondson and Smith (2006) suggested that the topics of task-related conflicts can be differentiated in relation to a number of features, including whether objective data exists to enable the quality of different views to be tested, and whether the task-based disagreements pertain to facts or deeply held assumptions. These distinctions concerning the nature of task-based disagreements that occur in teams should be incorporated into further multi-level research on conflict spillover.

5.3 Managerial implications

This dissertation draws attention to the potentially dysfunctional nature of task-based disagreements in team work settings, and identifies a potential source of this effect. The implications of these findings are of practical significance. First, by demonstrating how
conflict involves the simultaneous operation of more subjective experiences at the individual level and more manifest expressions at the group level, this research should remind managers and team members that an absence of overt disagreement does not denote an absence of conflict. This research found that much of the variance in conflict stems from the unique ways in which the more objective features of the environment are perceived by different team members. Therefore, people who manage (or work in) groups should corroborate their personal views of the situation by engaging in discussions with other team members (all together or one-on-one) in order to ascertain how much conflict might truly exist beyond the more obvious observable signs.

Particularly in teams in which members’ perceptions of conflict are divergent, conflict will be particularly unlikely to be addressed if people are not sensitive to its possible presence. Results of this research suggest that, if overlooked, significant differences in the amount of conflict perceived will reduce certain team members’ willingness to work with others, which can obviously interfere with team functioning. As a means of overcoming these challenges, teams (and those that lead them) can check for signs of perceptual conflict variation more formally, by building in pre-arranged breaks in the work process that are geared toward “touching base” about how the process is unfolding, identifying points of disagreement that have arisen to date, and ensuring no other points of disagreement are being overlooked.

As part of such structured breaks, groups and group leaders should attempt to separate the substantive disagreements from other more interpersonal points of friction that may have arisen; and to reiterate the importance of engaging in thorough discussion of differences that are work-relevant. Out of this process, the aim should be to establish norms that foster more
direct confrontation of substantive disagreements, and separate these from interpersonal differences.

This last suggestion also corresponds to the major implication of the current research: that negative reactions to the expression of task-related disagreements in work groups are particularly likely when team members possess diverse conflict values. Given this is the first investigation of conflict values and their composition in groups, not enough is known regarding the stability of these beliefs. However, it is reasonable to assume that the composition of the conflict values in these groups had implications for the way conflict norms were negotiated/elaborated. Indeed, research has shown that norms can form quite swiftly based on the similarity of members’ beliefs during initial interactions (for e.g., Bettenhausen & Murnighan, 1985).

The dysfunctional effects of task conflict on team process and outcomes appear to be driven by normative ambiguity concerning the role of disagreements. Therefore, these results compel managers to concern themselves with the manners through which norms regarding conflict are established. Although no evidence exists in the current study to the contrary, it is contended that future research is required to determine whether a team composed primarily of members who hold negative conflict values will truly be effective in the long run. Therefore, the recommendation being made here, in this respect, is for managers to take deliberate steps to foster shared views among team members concerning the positive value of task-based disagreements in complex forms of work. Managers might arrange opportunities for team members to engage in initial orientation meetings through which the value of conflict is discussed and exemplified. Part of this orientation could involve particular interpersonal skills training sessions, through which members would
practice ways to preface their disagreements with other team members (e.g., with mention of how addressing this issue could improve performance; with proper attention to matters of politeness, respect, phrasing, and tone). In addition, as discussed above in the section for future research, teams could be given the opportunity to outline broad goals regarding how members will work together (e.g., team charters), with particular attention to the role played by disagreements.

5.4 Conclusion

This dissertation has taken an integrative approach toward conceptualizing diversity, conflict and team effectiveness that provides new insight into how problem-solving groups respond to internal task-based disagreements. Prior to this dissertation, intragroup conflict research was particularly focused on distinguishing task conflict from relationship conflict, toward demonstrating the performance-enhancing function of task conflict in complex work environments. In this dissertation’s review of the literature, it has been noted that empirical support for the positive effects of task conflict is lacking outside of laboratory or quasi-experimental field studies, which challenges the fundamental theoretical notion that task conflict can have any positive effects in groups.

It has been argued in this dissertation that the evidence of task conflict’s wide-ranging negative effects in work groups demands attention. However, it has also been argued here that these recent conclusions must be scrutinized fully, given that intragroup conflict research, to date, has been focused on the independent effects of task and relationship conflict, rather than their tendency to co-occur. In addition, conflict research has remained
largely single-level in terms of its theoretical and operational specification, with the majority of studies focusing on conflict as a group-level construct alone.

This dissertation has outlined the importance of employing multi-level theory and methods in order to better understand how task conflict potentially leads to relationship conflict. The result of this investigation finds that task conflict spills over through distinct perceptual and behavioural mechanisms, which have distinct effects on teams and team members. However, the diversity of conflict values was shown to moderate the tendency for task conflict to predict relationship conflict at the group level, which ultimately determined whether the overt expression of task conflict had any negative impact on the effectiveness of teams.

Emerging from this dissertation is the contention that the negative effects of task conflict in groups may stem from the normative confusion that arises when team members’ views concerning the inherent value of disagreement are diverse during their initial interactions. Future research should take stock of the contributions made by this dissertation and continue to explore this and other important features of group composition. By better accounting for the way that diversity and conflict are interrelated, we can come closer to understanding how to benefit from the underlying differences that are fundamental to teams.
References


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Appendix 1A: The Complete Set of Relationships Examined in the Model

![Diagram showing the relationships between Diversity of Problem-Relevant Assumptions, Composition of Conflict Values, Demographic Diversity, Task Conflict, Relationship Conflict, Performance, and Team Viability. The diagram includes arrows indicating direct, indirect, and moderator effects.]

- **Moderator effects**
- **Indirect effects (transmitted by relationship conflict)**
Appendix 1B: Individual-level Relationships Examined in the Model

- Indirect effects (transmitted by relationship conflict)
- Moderator effects
Appendix 2: Summary of the Hypotheses

Hypothesis 1: The demographic diversity of the team positively predicts deep-level diversity.

Hypothesis 1a: The demographic diversity of the team positively predicts the diversity of problem-relevant assumptions.

Hypothesis 1b: The demographic diversity of the team positively predicts the diversity of conflict values.

Hypothesis 2: Manifest relationship conflict mediates the relationship between team demographic diversity and team viability. Teams that are more demographically diverse have more manifest relationship conflict, which in turn negatively predicts team viability.

Hypothesis 3: The diversity of problem-relevant assumptions positively predicts manifest task conflict.

Hypothesis 4: The positive relationship between the diversity of problem-relevant assumptions and manifest task conflict (H3) is moderated by both the diversity and average of conflict values (i.e., a 3-way interaction). The positive relationship between the diversity of problem-relevant assumptions and manifest task conflict is stronger among teams in which members hold less diverse and more functional (i.e., more positive) conflict values.

Hypothesis 5: Task conflict positively predicts relationship conflict at both the individual and group levels.
Hypothesis 5a: At the individual level, perceived task conflict positively predicts perceived relationship conflict.

Hypothesis 5b: At the group level, manifest task conflict positively predicts manifest relationship conflict.

Hypothesis 6: Conflict values moderate the positive relationship between task conflict and relationship conflict at both the individual and group levels.

Hypothesis 6a: At the individual level, team members’ conflict values moderate the relationship between perceived task conflict and perceived relationship conflict (H5a). The positive relationship between perceived task conflict and relationship conflict is smaller among individuals who have more positive conflict values than it is among those who have more negative conflict values.

Hypothesis 6b: At the group level, the positive relationship between manifest task conflict and manifest relationship conflict (H5b) is moderated by both the diversity and average of conflict values (i.e., a 3-way interaction). The positive relationship between manifest task conflict and relationship conflict is smaller among teams in which members hold less diverse and more functional (i.e., more positive) conflict values.

Hypothesis 7: Relationship conflict mediates the relationship between task conflict and team viability at both the individual and group levels.
Hypothesis 7a: At the individual level, perceived relationship conflict mediates the effect of perceived task conflict on individual willingness to work with team members in the future. Members who perceive more task conflict tend to perceive more relationship conflict (H5a), which in turn negatively predicts personal willingness to work with team members in the future.

Hypothesis 7b: At the group level, manifest relationship conflict mediates the effect of manifest task conflict on team viability. Teams with more manifest task conflict tend to have more manifest relationship conflict (H5b), which in turn negatively predicts team viability.

Hypothesis 8: Conflict values moderate the mediated effect of task conflict on team viability at both the individual and group levels.

Hypothesis 8a: At the individual level, team members’ conflict values moderate the mediated negative relationship between perceived task conflict and individual willingness to work with team members in the future (H7a). As a result of the moderation of the positive relationship between perceived task and relationship conflict by team members’ conflict values (H6a), the mediated effect of perceived task conflict on individual willingness to work with team members is smaller among individuals who have more positive conflict values than among those who have more negative conflict values.
Hypothesis 8b: At the group level, the mediated negative effect of manifest task conflict on team viability (H7b) is moderated by both the diversity and average of conflict values (i.e., a 3-way interaction). As a result of the moderation of the positive relationship between manifest task and relationship conflict at the team level (H6b), the mediated effect of manifest task conflict on team viability is smaller among teams in which members hold less diverse and more functional (i.e., more positive) conflict values.

Hypothesis 9: Manifest relationship conflict is a suppressor of the relationship between manifest task conflict and performance.

Hypothesis 9a: After controlling for manifest relationship conflict, manifest task conflict has a direct positive effect on team performance.

Hypothesis 9b: Manifest task conflict has an indirect negative effect on team performance, which is transmitted by way of manifest relationship conflict. Teams with more manifest task conflict tend to have more manifest relationship conflict (H5b), which in turn negatively predicts team viability.

Hypothesis 10: At the group level, the indirect negative effect of manifest task conflict on team performance is moderated by both the diversity and average of conflict values (i.e., a 3-way interaction). As a result of the moderation of the positive relationship between manifest task and relationship conflict at the team level (H6b), the indirect negative effect of manifest task conflict on team performance is smaller among teams in which members hold less diverse and more functional (i.e., more positive) conflict values.
Appendix 3A: Invitation Letter

[NOTE: THIS LETTER WAS PRINTED ON UNIVERSITY LETTERHEAD]

Hello,

My name is Kevin Hill and I am completing my PhD in Organizational Behaviour & Human Resource Management at the University of Toronto. I would like to thank you for reading this letter, which gives me the opportunity to share some information with you on the nature of my research and to invite you to participate in a study that will help me to complete my dissertation.

I’m interested in teamwork. More specifically, I conduct research on how people experience working in teams and I’m especially interested in the processes by which team members come to collective understandings regarding certain issues, particularly, organizationally-relevant issues like those you are studying in this class.

This is where your help would be greatly appreciated.

I would like to ask you to agree to answer some survey questions and consent to allow your assignments and tests in this class to be submitted to evaluation by trained raters. Your participation in this study is entirely voluntary. The analysis of this data would only be used for the purposes of my research and will not influence the grade you receive in this class.

In exchange for your participation, I would like to offer you the following:

1. A detailed, written summary of the study’s main results, and
2. A chance to win one of 10 $20 gift certificates to Amazon.Ca, Chapters.Indigo.Ca, or iTunes (your choice).

If you choose to participate, you can complete the first survey right away (which will take between 5 and 10 minutes of your time). I will deliver you two more surveys (each of which will take roughly 5 minutes to complete) over the next six weeks.

In short, complete participation in this study would require approximately 15-20 minutes (no more than 30 minutes) of your time in total. The results of this research will have implications for the ways in which teams are staffed and managed in work settings. In addition, you would be helping me to complete my dissertation so that I can graduate, something I’m sure you can appreciate.

If you would like to participate, please complete the consent form (both copies) on the following two pages. Don’t forget to keep a copy for your own record.

Thank you,

[my signature]

Kevin Hill
Ph.D. Candidate in Organizational Behaviour & Human Resource Management
Joseph L. Rotman School of Management
University of Toronto

Tel: (416) 978-6372
Email: Kevin.Hill03@Rotman.Utoronto.Ca
Appendix 3B: Consent Form

You are being asked to participate in a study conducted by Kevin Hill, of the Joseph L. Rotman School of Management, University of Toronto. The purpose of this research is to better understand the processes by which teams come to collective understandings when solving organizational problems.

In total, this study involves providing your honest answers to survey questions, which should take no more than 20 minutes to complete (over the next six weeks). In addition, the content of your tests and assignments for this course will be analyzed by trained coders. You have been selected as a potential respondent because you are a commerce student and conducting a group project as part of your course requirements.

Before you make this decision, please make note of the following:

1. There are no foreseeable risks to participating in this study.

2. The data is limited to survey responses and to copies of assignments and tests completed as part of this course. You should understand that your course work remains your property and that the proposed analyses of this work will be limited to assessments of the content and certain characteristics of the work (e.g., grades), and that no explicit portions of this work will be ever be reproduced in any formal written work (published or unpublished) without your knowledge.

3. Should you consent, no personally-identifiable information (e.g., name or student ID number) will be retained in the data after the course completion. Once all data have been compiled for analysis, your data will be assigned a new random number code and all identifying information (e.g., your name and ID number) will be erased permanently. This process will occur on January 30th and will ensure that the remaining database record will maintain your anonymity.

4. All data that you consent to release will be kept strictly confidential.

5. The intention is to publish the results of this research in an academic journal if possible. In the event that a future publication results from this research, none of your individual data will be revealed. You will not be identified in any way. Only Kevin Hill and his research collaborators will have access to the raw data that is gathered, and it will be kept primarily in a password-encrypted format.

6. If you choose to consent to the release of this information, you may request a copy of a detailed scientific summary of the results and be entered into a prize drawing (outlined in the invitation letter) by providing an email address below. The provision of this email address is completely optional and will not be used for any purpose other than to inform you of the study’s results and administer the awarding of prizes. You do not need to provide an email address to participate in this study.

_________________________________________________________

University of Toronto ID#   Student’s Signature   Date

_________________________________________________________

Email address (optional)
Appendix 3C: Initial Cover Page (Additional Consent Form) for Surveys

The following survey is part of a study conducted by Kevin Hill, of the Joseph L. Rotman School of Management, University of Toronto. The purpose of this research is to better understand the processes by which teams come to collective understandings when solving organizational problems. In total, this survey should take no more than 5 minutes to complete. You have been selected as a potential respondent because you are a commerce student and conducting a group project as part of your course requirements.

Before you make this decision, Kevin Hill, the lead researcher of this study, would like to highlight the following for you:

- You should understand that this decision is voluntary and that you may decline to participate or discontinue participation at any point during the survey without any negative consequences whatsoever. You may also decline to answer any survey question that you are not comfortable answering.

- By participating, you agree to allow your responses to be analyzed in order to extend social science research. Your responses will be kept confidential.

If you have any questions, please feel free to direct them to Kevin Hill (Kevin.Hill03@Rotman.Utorto.0.ca). You may also contact the Ethics Review Office of the University of Toronto at ethics.review@utoronto.ca or 416-946-3273 if you have questions about your rights as a participant.

If you would like to participate in this study, please indicate so by signing below:

_________________  __________________  _______________
University of Toronto ID#  Student’s Signature  Date
Appendix 4: Measurement Instruments

i. Demographic Variables:
Please fill in the following demographic information:

Your sex
- Male
- Female

Your Ethnic/Ancestral Origin (you may check more than one):
- Aboriginal
- African (e.g., Cameroon, Ethiopia, Ghana, Kenya, Nigeria, Somalia, Uganda, Zimbabwe)
- American (U.S.A.)
- Arabian (e.g., Algeria, Egypt, Iraq, Lebanon, Morocco, Palestine, Saudi Arabia, Yemen)
- Asian, East (e.g., China, Hong Kong, Japan, Korea)
- Asia, South (e.g., India, Nepal, Sri Lanka)
- Asian, Southeast (e.g., Cambodia, Indonesia, Philippines, Singapore, Thailand, Vietnam)
- Canadian
- Caribbean
- European, Central (e.g., Czech Republic, Hungary)
- European, Eastern (e.g., Poland, Romania, Ukraine)
- European, Northern (e.g., Finland, Norway, Sweden)
- European, Southern (e.g., the Balkans, Greece)
- European, Western (e.g., Britain, France, Germany)
- Israeli
- Latin, Central or South American
- Mexican
- Pacific Islands (e.g., Australia, New Zealand, Samoa, Papua New Guinea)
- Other (please specify) ________________________________
ii. Problem-relevant Assumptions (Employment Inducement Inventory):

**INSTRUCTIONS:**

Organizations are complex systems, which can be evaluated according to many different standards of effectiveness.

People vary in their beliefs concerning what organizations are obligated to provide employees in exchange for their efforts.

Please indicate how important you feel it is, in general, for an organization to provide each of the following to its employees. Please assign a level of importance to each item based on your personal beliefs. There are no "right" or "wrong" answers.

<table>
<thead>
<tr>
<th>No importance: It is not important at all for an organization to provide this to its employees</th>
<th>Moderate importance: It is somewhat important for an organization to provide this to its employees</th>
<th>Extreme importance: It is extremely important for an organization to provide this to its employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slightly above-average wages for the industry</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Job-related training</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Consistent and timely paychecks</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Tasks that closely match the job description</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Effective and supportive supervision when needed</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No importance: It is not important at all for an organization to provide this to its employees</td>
<td>Moderate importance: It is somewhat important for an organization to provide this to its employees</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Opportunity to use existing knowledge and skills</td>
<td>○</td>
<td>①</td>
</tr>
<tr>
<td>Increasing responsibility and autonomy</td>
<td>○</td>
<td>①</td>
</tr>
<tr>
<td>Support to attain the highest level of performance</td>
<td>○</td>
<td>①</td>
</tr>
<tr>
<td>Feedback and recognition for a job well done</td>
<td>○</td>
<td>①</td>
</tr>
<tr>
<td>Opportunity for advancement</td>
<td>○</td>
<td>①</td>
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<tr>
<td>Opportunity to be involved in decisions</td>
<td>○</td>
<td>①</td>
</tr>
<tr>
<td>Flexible work schedule</td>
<td>○</td>
<td>①</td>
</tr>
<tr>
<td>Development of marketable skills</td>
<td>○</td>
<td>①</td>
</tr>
<tr>
<td></td>
<td>No importance: It is not important at all for an organization to provide this to its employees</td>
<td>Moderate importance: It is somewhat important for an organization to provide this to its employees</td>
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<td>--------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
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<tr>
<td>Regular bonuses</td>
<td><img src="image1" alt="Scale Image" /> <img src="image2" alt="Scale Image" /> <img src="image3" alt="Scale Image" /> <img src="image4" alt="Scale Image" /> <img src="image5" alt="Scale Image" /> <img src="image6" alt="Scale Image" /></td>
<td><img src="image7" alt="Scale Image" /> <img src="image8" alt="Scale Image" /> <img src="image9" alt="Scale Image" /> <img src="image10" alt="Scale Image" /> <img src="image11" alt="Scale Image" /> <img src="image12" alt="Scale Image" /></td>
</tr>
<tr>
<td>Opportunity to form professional networks</td>
<td><img src="image19" alt="Scale Image" /> <img src="image20" alt="Scale Image" /> <img src="image21" alt="Scale Image" /> <img src="image22" alt="Scale Image" /> <img src="image23" alt="Scale Image" /> <img src="image24" alt="Scale Image" /></td>
<td><img src="image25" alt="Scale Image" /> <img src="image26" alt="Scale Image" /> <img src="image27" alt="Scale Image" /> <img src="image28" alt="Scale Image" /> <img src="image29" alt="Scale Image" /> <img src="image30" alt="Scale Image" /></td>
</tr>
<tr>
<td>An exciting and challenging work environment</td>
<td><img src="image37" alt="Scale Image" /> <img src="image38" alt="Scale Image" /> <img src="image39" alt="Scale Image" /> <img src="image40" alt="Scale Image" /> <img src="image41" alt="Scale Image" /> <img src="image42" alt="Scale Image" /></td>
<td><img src="image43" alt="Scale Image" /> <img src="image44" alt="Scale Image" /> <img src="image45" alt="Scale Image" /> <img src="image46" alt="Scale Image" /> <img src="image47" alt="Scale Image" /> <img src="image48" alt="Scale Image" /></td>
</tr>
<tr>
<td>Support with personal problems</td>
<td><img src="image55" alt="Scale Image" /> <img src="image56" alt="Scale Image" /> <img src="image57" alt="Scale Image" /> <img src="image58" alt="Scale Image" /> <img src="image59" alt="Scale Image" /> <img src="image60" alt="Scale Image" /></td>
<td><img src="image61" alt="Scale Image" /> <img src="image62" alt="Scale Image" /> <img src="image63" alt="Scale Image" /> <img src="image64" alt="Scale Image" /> <img src="image65" alt="Scale Image" /> <img src="image66" alt="Scale Image" /></td>
</tr>
<tr>
<td>Long-term job security</td>
<td><img src="image73" alt="Scale Image" /> <img src="image74" alt="Scale Image" /> <img src="image75" alt="Scale Image" /> <img src="image76" alt="Scale Image" /> <img src="image77" alt="Scale Image" /> <img src="image78" alt="Scale Image" /></td>
<td><img src="image79" alt="Scale Image" /> <img src="image80" alt="Scale Image" /> <img src="image81" alt="Scale Image" /> <img src="image82" alt="Scale Image" /> <img src="image83" alt="Scale Image" /> <img src="image84" alt="Scale Image" /></td>
</tr>
<tr>
<td>Exposure to new management styles and organizational structures</td>
<td><img src="image91" alt="Scale Image" /> <img src="image92" alt="Scale Image" /> <img src="image93" alt="Scale Image" /> <img src="image94" alt="Scale Image" /> <img src="image95" alt="Scale Image" /> <img src="image96" alt="Scale Image" /></td>
<td><img src="image97" alt="Scale Image" /> <img src="image98" alt="Scale Image" /> <img src="image99" alt="Scale Image" /> <img src="image100" alt="Scale Image" /> <img src="image101" alt="Scale Image" /> <img src="image102" alt="Scale Image" /></td>
</tr>
<tr>
<td>Time off when needed</td>
<td><img src="image109" alt="Scale Image" /> <img src="image110" alt="Scale Image" /> <img src="image111" alt="Scale Image" /> <img src="image112" alt="Scale Image" /> <img src="image113" alt="Scale Image" /> <img src="image114" alt="Scale Image" /></td>
<td><img src="image115" alt="Scale Image" /> <img src="image116" alt="Scale Image" /> <img src="image117" alt="Scale Image" /> <img src="image118" alt="Scale Image" /> <img src="image119" alt="Scale Image" /> <img src="image120" alt="Scale Image" /></td>
</tr>
</tbody>
</table>
### iii. Conflict Values:

**INSTRUCTIONS:**
Teams are often used to accomplish complex tasks in organizations, such as problem solving. Think about how team members tend to behave when facing a complex issue.

Listed below are potential characteristics of teams. How effective do you feel it is for teams to exhibit each of the following potential characteristics in complex problem-solving settings?

There are no right or wrong answers. Please give a rating, using the scale below, for each characteristic based on your personal beliefs.

<table>
<thead>
<tr>
<th>Characteristic of the team</th>
<th>Your score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Group member disagreements about the work being done</td>
<td></td>
</tr>
<tr>
<td>2. Evident personality clashes between members of the group</td>
<td></td>
</tr>
<tr>
<td>3. Tension in the group during decisions</td>
<td></td>
</tr>
<tr>
<td>4. Differences about the content of decisions among the member of the group</td>
<td></td>
</tr>
<tr>
<td>5. Differences of opinion regarding the task among the members of the group</td>
<td></td>
</tr>
<tr>
<td>6. Anger among the members of the group</td>
<td></td>
</tr>
<tr>
<td>7. Group member disagreements over different ideas</td>
<td></td>
</tr>
<tr>
<td>8. Personal friction in the group during decisions</td>
<td></td>
</tr>
</tbody>
</table>
iv. Task and Relationship Conflict:

**INSTRUCTIONS:**

Please use the following scale to indicate the extent to which you agree or disagree with each of the following statements concerning your experience working with your team in this exercise.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neither agree nor disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Your Score

1. The personal relationships were always excellent.

2. Some team members visibly disliked each other.

3. The tension between some team members was sometimes painful.

4. Some team members didn’t get along personally.

5. The atmosphere was always very comfortable.

6. Team members regularly took divergent viewpoints on the issues involved.

7. Team members often had very different ideas on substantive matters.

8. Everyone agreed on the direction to take from the outset.

9. Team members had predominantly identical ideas on the subjects involved.

10. There were regularly different opinions on task-related issues.

11. Diverse perspectives on substantive issues were the rule rather than the exception.

Items 1-5 index relationship conflict (#1 and #5 are reverse-worded). Items 6-11 index task conflict (#8 and #9 are reverse-worded)
### v. Team Viability (Willingness to Work Together):

**INSTRUCTIONS:**
Concerning your team, please use the scale below to indicate the extent to which you agree or disagree with each of the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I would like to work with members of this group on another similar project.</td>
<td>1-7</td>
</tr>
<tr>
<td>Strongly disagree: 1, 2, 3</td>
<td>Neither agree nor disagree: 4, 5, 6</td>
</tr>
<tr>
<td>2. This group is not capable of working together as a unit.*</td>
<td>1-7</td>
</tr>
<tr>
<td>Strongly disagree: 1, 2, 3</td>
<td>Neither agree nor disagree: 4, 5, 6</td>
</tr>
<tr>
<td>3. I would be willing to work with (NAME of fellow team member) on a future class project.</td>
<td>1-7</td>
</tr>
<tr>
<td>Strongly disagree: 1, 2, 3</td>
<td>Neither agree nor disagree: 4, 5, 6</td>
</tr>
<tr>
<td>4. I would be willing to work with (NAME of fellow team member) on a future class project.</td>
<td>1-7</td>
</tr>
<tr>
<td>Strongly disagree: 1, 2, 3</td>
<td>Neither agree nor disagree: 4, 5, 6</td>
</tr>
<tr>
<td>5. I would be willing to work with (NAME of fellow team member) on a future class project.</td>
<td>1-7</td>
</tr>
<tr>
<td>Strongly disagree: 1, 2, 3</td>
<td>Neither agree nor disagree: 4, 5, 6</td>
</tr>
</tbody>
</table>

* Item #2 is reverse worded