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SURFACE AND DEEP LEVEL FAULTLINES AND NETWORK TIES IN MULTICULTURAL TEAMS

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ABSTRACT

This study applies faultline, diversity and network perspectives to understand the functioning of multicultural teams (MCTs). Specifically, this study explores the effects of faultlines on the process and performance of multicultural teams while at the same time taking into account team members' actual network ties. I propose that different types of faultlines influence team process and performance differently. I particularly examine faultlines based on both cultural values and surface-level attributes (e.g., demographics), as well as faultlines based on both cultural values and deep-level attributes (e.g., differences in beliefs and attitudes). I also examine how network ties that span cultural subgroups created by faultlines influence these same process and outcome variables. A cross-sectional and longitudinal investigation of more than 100 research teams at a major research university provides evidence for a complex pattern of the impact of faultlines and network ties. The results demonstrate that faultlines alone do not contribute to team processes or performance. Instead, their effects depend on the social interaction patterns that cut across them. Specifically, team performance improved when friendship ties cut across subgroups formed by cultural faultlines, but relationship conflict increased and team performance decreased when animosity ties cut across these subgroups. Overall, the results highlighted the importance of taking into account team members' actual network patterns while studying the effects of team composition on team process and performance. These results generate many fruitful implications for theory and practice. Directions for future research are suggested.

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Chapter 1

INTRODUCTION

1.1. Overview

Modern organizations require increasingly high levels of interaction among employees from different cultures with diverse backgrounds. This increase in diversity has been expected to generate important benefits for organizations (Jackson, May & Whitney, 1995). For example, team members from different cultures add variety to the experiences of their teams. Those different backgrounds represent broader cognitive resources and a wider range of interpretations and perspectives, which form the bases on which teams solve problems and make decisions (Adler, 1997; Boyacigiller & Adler, 1991; Cox, 1991; Cox & Blake, 1991; Watson, Kumar & Michaelsen, 1993).

On the other hand, working in multicultural teams can be challenging (Von Glinow, Shapiro, & Brett, 2004). Although more perspectives may be beneficial, the diverse cultural backgrounds of team members often make it difficult for members to communicate and coordinate their efforts (Palich & Gomez-Mejia, 1999; Shenkar & Zeira, 1992). Thus, heterogeneous teams have also been found to be less socially integrated and to experience more conflict, less satisfaction and higher turnover than homogenous ones (Bochner & Hesketh, 1994; Li & Hambrick, 2005; Pelled, Eisenhardt, & Xin, 1999; Tsui, Egan, & O'Reilly, 1992; Wagner, Pfeffer & O'Reilly, 1984). For reviews of these contradictory findings see Jackson, Joshi and Erhardt (2003), Milliken

and Martins (1996), van Knippenberg and Schippers, (2007) and Williams and O'Reilly (1998).

How can researchers reconcile the contradictory findings of extant research about the effect of diversity in multicultural teams (MCTs)? One explanation for these conflicting findings may result from an overly simplified approach to conceptualizing diversity. Traditionally, diversity research has focused on the effects of different types of diversity in isolation or in additive models without taking into account the possibility that the effects of one type of diversity may be contingent on variation in other diversity types. Harrison and Klein (2007) suggest that types of diversity may differ in the extent to which they represent different opinions or positions on a continuum (e.g., value separation), different nominal categories of information, knowledge and experience (e.g., functional background variety), and/or different positions that are associated with greater or lesser power or status (e.g., pay disparity). Different types of diversity may therefore mean different things, and may also interact to influence team outcomes (Harrison & Klein, 2007). For instance, a team that is only diverse with respect to team members' knowledge and skills (informational diversity) may function differently than a team with both diverse knowledge and diverse values. For the latter team, members would find it harder to integrate their diverse ideas as they may see themselves separated from one another on fundamental values and beliefs. Consequently, different types of diversity may coexist in a team and interact to influence team outcomes.

Much of the previous research on diversity in multicultural teams has only focused on a single diversity attribute: cultural background or nationality (Earley & Mosakowski,

2000). Although cultural difference can be seen as a salient, if not the most salient aspect in multicultural teams, it is not all that matters. Other attributes of team members such as age, gender, attitudes, beliefs and so on may also play important roles in how teams function. For example, teams with only cultural diversity may operate differently than those with both cultural and age diversity. That is to say, it is important to consider several types of diversity simultaneously.

Such a simultaneous overlap of distinguishing attributes among team members can create team faultlines, which are defined as hypothetical dividing lines that split a team into subgroups based on the compositional dynamics of one or multiple attributes (Lau & Murnighan, 1998). Faultlines engender subgrouping within the team (Gibson & Vermeulen, 2004) and may lead to different team dynamics than single-attribute diversity does (Lau & Murnighan, 1998). Ignoring the various attributes of a team and the possible alignment of those attributes among team members may obscure insights into diversity's effects on other variables such as the team's process or its performance. Thus, current knowledge about cultural diversity and multicultural team performance does not adequately address the complexity of diversity in multicultural teams.

Another major impediment to the advancement of knowledge about diversity's impact is the tendency of extant research to assume rather than assess mediating processes (Lawrence, 1997; van Knippenberg & Schippers, 2007). For instance, diversity dimensions have been used as proxies for network patterns within a team (Reagans & Zuckerman, 2001). That is, diversity research has been based on one important assumption: that the ties within a team or organization are characterized by homophily, the tendency for people to associate with others similar to themselves in terms of

demographic attributes (such as race, gender and age), knowledge and values (Lazarsfeld & Merton, 1954). While Mollica, Gray and Trevino (2003) found that homophily characterized newcomers' networks in organizations despite structural interventions by the organization to build heterophilous ties, Lawrence (1997) has noted that strong homophily does not hold in most organizational settings. Especially when people have past experience interacting with members of other social categories or when the team's norms or organizational cultures encourage interaction across categories, homophily will be attenuated (Blau & Schwartz, 1984; Chatman, Polzer, Barsade & Neale, 1998). However, when negative effects of diversity are observed, the implicit conclusion is often that homophily occurred and was responsible for these negative outcomes even when no empirical evidence for such processes is provided.

Conversely, when positive effects of diversity on team performance are observed, the implicit conclusion is that people with diverse knowledge indeed interact with and learn from each other, without evidence demonstrating that these processes are actually taking place during team interaction. Again, this tendency to rely on outcomes to assume processes is inadequate. That is, focusing solely on team members' attributes while ignoring members' actual network ties and interaction processes runs the risk of generating misleading interpretations of diversity's effects in multicultural teams.

To address these issues, in this dissertation, I conducted an investigation of the effects of faultlines and team members' network ties on multicultural team processes and performance using both cross-sectional and longitudinal analyses. Faultlines are hypothetical dividing lines that split a team into subgroups based on the compositional dynamics (Lau & Murnighan, 1998). A faultline can be drawn based on one or more

attributes of team members enabling the examination of the effects of the alignments of different diversity attributes among team members in multicultural teams. Specifically, I examine in detail how faultlines based on cultural values only, faultlines based on the alignment of cultural values with other surface-level attributes, and faultlines based on the alignment of cultural values with deep-level attributes[1] will influence multicultural team processes and performance.

Social network structure within a team is the pattern of connections among team members (Nadel, 1957). Using a network approach permits a collective representation of team members' relationships at a given point in time. These relationships are argued to be one possible medium through which faultlines may exert effects in teams. In this study, I am particularly interested in team members' friendship and animosity ties that span subgroups within a team as well as team members' external ties that link team members with dissimilar others. Friendship ties across subgroups can serve as bridges and channels for subgroup communication, and thus are defined as *friendship bridging ties*. Negative relationships across subgroups, on the other hand, are argued to inhibit cross-subgroup communication, and therefore are named as *breaching ties*. Finally, I define external ties with dissimilar people as *external bridging ties* and argue that they can serve as psychological bridges between dissimilar team members and subgroups. I investigate whether these *bridging* and *breaching* relationships work together with team faultlines to influence team processes and performance. By applying both faultline and network perspectives to understand the functioning of multi-cultural teams, this study offers several contributions to the diversity, network and multicultural team literatures.

First, by bringing network concepts to the diversity/faultline literature, this study advances our understanding of diversity's effects in teams. Unlike previous diversity research that uses diversity as a proxy for network patterns, this study moves beyond the relatively simple notion of a split in subgroups to measure team members' actual network ties, and to theorize and test how network ties influence the impacts of faultlines on team processes and performance. By emphasizing team members' interaction patterns (as captured by their networks) as the major conditions under which faultlines may matter, this study provides a more fine-grained analysis of team processes as called for by van Knippenberg and Schippers (2007), and represents a step forward to open the "black box" in diversity research (Lawrence, 1997).

Second, by incorporating network perspectives into the diversity literature, this dissertation also extends network research into new territory. Homophily has long been a major construct in network research, and numerous network researchers have examined the patterns of homophily (links to similar others) in work teams and organizations, and how they influence individual, team and organizational outcomes (Ibarra, 1992, 1993; James, 2000; Lincoln & Miller, 1979; McPherson & Smith-Lovin, 1987; Mollica et al., 2003; Mehra, Kilduff & Brass, 1998). In this research, rather than focusing on team members' homophilious ties, I argue that team members also build *bridging* or *breaching* heterophilious ties that span subgroup boundaries and are pivotal in influencing faultlines' effects in teams. By emphasizing *bridging* and *breaching* relationships in team members' networks, this dissertation revealed a more complex role for network ties in teams than previous research and theory have suggested. This dissertation directly tested the leverage of the network approach for studying diversity-related questions by

examining network ties simultaneously with measures of a team's diversity. Consequently, I provide empirical evidence to support the utility of extending network concepts to the diversity literature, and suggest that using a network perspective to study diversity's effects helps reconcile the contradictory findings in the literature about the effects of diversity on team process and performance.

Third, this dissertation also enriches the team literature in general and the multicultural team literature in particular. Using both diversity and network concepts to examine team functioning, and emphasizing the importance of both the distribution of team members' cultural values, and team members' network ties that cut across their cultural sub-groupings, this dissertation provides a more nuanced understanding of factors that impact effective performance of multi-cultural teams.

1.2. Research Questions

This dissertation is guided by the following two research questions:

1) How do the alignments of different types of faultlines influence team processes and performance?
2) What are the effects on team processes and performance of network ties that bridge faultline-generated subgroups?

1.3. A Road Map

This dissertation proceeds as follows. In Chapter two, I review the current literature on diversity and faultlines. This section includes a discussion of the mixed findings of diversity research, empirical attempts to resolve the mixed findings, the development of the concept of faultlines, theoretical explanations and empirical support for faultlines' effects in teams, and a critique of this research. I conclude that the concept of a faultline is important, and it helps researchers to incorporate one or multiple attributes of team members simultaneously rather than assessing just one demographic attribute at a time as most past diversity research has done. I also suggest that, in addition to measuring faultlines, our understanding of diversity will be enhanced by studying team members' actual network patterns rather than just using diversity structure as a proxy for interaction patterns.

In Chapter three, I apply both faultline and network perspectives to multi-cultural team context, and provide the theoretical development of my overall model. I outline my hypotheses and the research motivating each one. Specifically, I distinguish between surface- and deep-level faultlines, and theorize the effects of cultural value faultlines, the alignments of cultural and surface-level faultlines, and the alignments of cultural and deep-level faultlines[2] on team cohesion, conflict and performance. I then bring network ties into the picture, discuss the role of *bridging* and *breaching* ties in multi-cultural teams, and explain how they influence faultlines' effects on team processes and how they contribute to team performance.

In Chapter four, I present the methodology used to test my model. I describe the research setting, and outline the data collection procedure. My hypotheses were tested based on a cross-sectional and longitudinal investigation of more than 100 research teams in a major research university. The background characteristics of my sample are outlined, and the specific measures for my variables are listed.

In Chapter five, I present the results of my analyses, and explain whether each of my hypotheses is supported or not. Overall, my results illustrate the importance of the interaction between faultlines and bridging/breaching ties.

In Chapter six, I discuss the results and the theoretical and practical implications of this study, outline its contributions for diversity, network and team's research, identify several limitations, and suggest possible avenues for future research.

Chapter 2

LITERATURE REVIEW

2.1. Diversity in Teams

Diversity has been conceptualized as the distribution of differences among the members of a unit with respect to a common attribute such as age, job attitude, cultural value, status and so on (Harrison & Klein, 2007). The key question in diversity research is how those differences between team members influence team processes and outcomes, as well as team members' attitudes and performance. To date, research on team diversity has produced mixed results, and diversity has been described as a double-edged sword for organizations (Milliken & Martins, 1996). On one hand, diversity is expected to lead to improved decision making, more innovative problem solving and better performance (e.g., van Knippenberg, De Dreu & Homan, 2004). On the other hand, diversity is also found to reduce team cohesion, inhibit interpersonal communication and increase team conflict (e.g., Tsui, et al., 1992; Pelled, et al., 1999). And recently, a meta-analysis of 24 studies of diversity found no significant relationships of diversity (job related, gender or race) with either team performance or with team cohesiveness (Webber & Donahue, 2001).

To understand the effects of diversity, scholars have begun to distinguish between different types, arguing that various diversity attributes may differentially impact team outcomes (e.g., Harrison, Price & Bell, 1998; Harrison, Price, Gavin & Florey, 2002;

Pelled, et al., 1999; Simons, Pelled, & Smith, 1999). For instance, Pelled et al., (1999) conceptualized diversity in terms of highly job-related and less job-related attributes. They argue that job-related demographic attributes such as education or functional background capture perspectives related to the work being performed, therefore have a stronger influence on the task-relevant team processes, such as task conflict. While race and tenure diversities are more likely to engender relationship conflict, because those aspects are relatively impermeable and tend to form the context of team members' social relationships. Simons et al. (1999) also found that job related diversity interacted with debate to influence top management team performance while less job-related diversity did not. On the other hand, Harrison and colleagues (2002) made a distinction between surface-level (demographic) diversity and deep-level diversity (based on personality traits, beliefs and norms), suggesting that as groups develop, deep-level diversity becomes more important than surface-level diversity (Harrison, et al. 2002; Harrison, et al., 1998).

Distinguishing the effects of different types of diversity helps advance our knowledge in team diversity. However, those distinctions do not capture the interactive effects of different types of diversity attributes. The effect of one diversity type may be contingent on variation in other diversity types. Yet, most diversity research has focused on the effects of different types of diversity in isolation or in additive models without taking into account the possibility that different types of diversity may coexist in a team and interact to influence team outcomes. To study the effects of different types of diversity in combination rather than one at a time, Lau and Murnighan (1998) introduced the concept of faultlines, which have spurred a growing stream of research in this area.

2.2. Team Faultlines

Faultlines are defined as hypothetical dividing lines that split a group into subgroups based on the compositional dynamics of one or multiple attributes (Lau & Murnighan, 1998). As various attributes align and become highly correlated, faultlines become stronger, increasing the likelihood that strong subgroups will develop. For instance, a four person team that consists of two collectivistic women and two individualistic men has a stronger faultline than a four person team consisting of a man and woman from collectivistic cultures and a man and a woman from individualistic cultures. This is because in the second team, there is no overlap of multiple attributes, while in the first team, sex and cultural value differences are aligned.

Thus, "group faultlines increase in strength as more attributes are highly correlated…increasing the homogeneity of the resulting subgroups" (Lau & Murnighan, 1998: 328). According to social categorization theory (Tajfel, 1982; Turner, 1985), members tend to increase social interaction within their own groups, while interacting less with out-groups and perceiving them as less trustworthy. Therefore, when faultlines are strong, team members are more likely to communicate and share information within their own subgroups and decrease their communication with other subgroups, thus reducing cohesion and social integration for the whole group and its associated learning and performance. In support of this reasoning, Molleman (2005) found that demographic faultlines directly impair the functioning of a team, and Thatcher, Jehn and Zanutto (2003) showed that faultlines based on informational category differences (i.e., functional work experience) increased conflict, decreased morale and impaired performance. In a

similar vein, Sawyer, Houlette and Yeagley (2005) reported that "crosscut" diversity (defined as weak faultlines) in terms of racial and functional background enhanced information sharing and improved decision-making. In a study of joint ventures, Li and Hambrick (2005) found that factional faultlines based on parent company affiliations were negatively related to self-rated group performance and that this relationship was mediated by emotional conflict and behavioral disintegration. Lau and Murnighan (2005) also demonstrated disruptive influence, finding that faultlines based jointly on sex and ethnicity explained more variance in team outcomes (e.g., learning, psychological safety, satisfaction and expected performance) than single-attribute diversity did.

However, the evidence on the relationship between faultlines and outcomes is not consistent yet. In a study of 79 student groups, Thatcher et al., (2003) found that demographic faultlines had no effect on conflict, morale or performance. Molleman (2005) reported that the effects of faultlines based on ability and personality were dependent on team autonomy in that these faultlines were only detrimental to team functioning when team autonomy was high. Another related study, by Gibson and Vermeulen (2003), created a measure of subgroup strength (without directly invoking the faultline concept), and observed a significant curvilinear relationship where teams with moderately strong levels of subgrouping experienced the most positive outcomes.

Therefore, although the faultline concept has added value to diversity research, the effects of faultlines are still not clear. The inconclusive results suggest that alternative ways of studying diversity/faultlines in organizations is needed (Williams & O'Reilly, 1998). The concept of faultline is premised on social categorization theory which argues that people prefer to work with similar others. However, assumptions of homophily may

not be born out in teams (Lawrence, 1997) or may be considerably weakened by cross-cutting ties. Therefore, the social linkages that actually exist between members of a team and even with members outside of the team (Jackson, et al., 2003; Reagans & Zuckerman, 2001) may influence the degree to which faultlines affect team behavior and outcomes. Although diversity and faultline research is based on the assumption that diversity and network structures are congruent, few studies have integrated diversity literature with network perspectives. In the Chapter below, I apply both faultline and network perspectives to study multicultural team functioning and develop my theoretical model of how faultlines and network ties jointly influence multi-cultural team processes and outcomes.

Chapter 3

THEORY DEVELOPMENT

I begin my theory development by looking at faultlines' effects in MCTs based on faultline research. Then, I bring team network ties into the picture and theorize how those effects are contingent on team members' social network ties. Figure 1 depicts the hypothesized relationships among faultlines, network ties, team processes and team outcome. In this study, I specifically focus on three types of team processes: cohesion, task conflict and relationship conflict, and one possible team outcome: team performance. First, team cohesion is defined as the degree to which members of the team are attracted to each other (Shaw, 1981). Cohesion has been proposed to play a pivotal role in teams (Evans & Dion, 1991; Gully, Devine, & Whitney, 1995) and has been widely studied in the diversity literature (Harrison, et al., 1998; Smith, et al., 1994). Second, in the theoretical work by Lau and Murnighan (1998), conflict is viewed as a potential outcome of strong faultlines. Task conflict refers to disagreement among team members about decisions, viewpoints, ideas, and opinions while relationship conflict is defined as the perception of interpersonal incompatibility (Simons & Peterson, 2000). These two types of conflict have long been known as important determinants of work group performance [for a review, see De Dreu and Weingart (2003)]. Finally, the relationship between diversity and performance has also been looked at extensively with inconclusive results (Webber & Donahue, 2001). Therefore, by exploring the effects of faultlines and network

ties on cohesion, conflict and performance, I hope to contribute to our understanding of diversity's impacts on teams.

Insert Figure 1 about here

3.1. Faultlines in Multicultural Teams

Multicultural work teams are those that consist of individuals of diverse national backgrounds with different cultural values (Earley & Gibson, 2002). Culture is a socially shared knowledge structure that sanctions certain behaviors and proscribes other behavioral choices of its members (Hofstede, 1984; Poortinga, 1992). Culture specifies how things are to be evaluated and what behaviors are desirable or proscribed for members of the culture (Schwartz, 1992; Probst, Carnevale & Triandis, 1999). Due to cultural conditioning, people from similar cultures tend to respond to stimuli in much the same way. Team members from distinct cultures simply perceive, interpret, and evaluate behaviors differently (Adler, 1997), which creates friction in MCTs.

According to Lau and Murnighan (1998), faultlines can form based on one or more attributes. In MCTs, cultural values can be considered as the most salient attributes affecting team performance. Thus, cultural value difference alone is likely to generate faultlines. Differences in members' cultural values create separation within MCTs, and this separation can produce low cohesion, high conflict, poor performance and high turnover rates (Harrison & Klein, 2007). When this difference is at its maximum

(maximum separation), team members are polarized into opposing subgroups or factions, which consequently engenders strong cultural value faultlines. That is, as MCTs develop, members with the same cultural values can tend to coalesce into subgroups, reinforcing one another and differentiating themselves from other subgroups in a team (Earley & Mozakowski, 2000; Gibson & Vermeulen, 2003). Thus, strong cultural value faultlines are expected to generate more task and relationship conflict and lead to less cohesion in teams. Some research supports this argument, but without looking at cultural value faultlines directly. For instance, Bochner and Hesketh (1994) found that people who were different from others in their teams on Hofstede's dimensions of power distance and collectivism perceived that they were discriminated against more frequently. Also, in a study of geographically dispersed teams, Polzer and colleagues (2006) reported that members' geographic locations activated faultlines and the faultlines' effects were more detrimental when these subgroups were homogeneous with respect to national cultures. Therefore I hypothesize:

> ***Hypotheses 1a-1c:*** *Cultural value faultlines have a negative effect on (1a) cohesion and positive effect on (1b) task conflict and (1c) relationship conflict in MCTs.*

Although cultural differences are understandably the most salient aspect in multicultural teams, they are not all that matters. Faultlines can form around many attributes, including demography, personality, abilities and beliefs which may affect performance simultaneously. To refine the study of diversity and team member attributes, Harrison and colleagues (2002) made a distinction between surface-level diversity and deep-level diversity, demonstrating that as groups develop, deep-level diversity becomes more important than surface-level diversity (Harrison, et al. 2002; Harrison, et al., 1998).

In multicultural teams, cultural values have been considered as the most salient deep-level attributes of team members.[3] However, team members' work beliefs, attitudes and other deep-level attributes also influence their work behaviors and performance. For instance, a recent meta-analysis by Bell (2007) demonstrated the importance of several deep-level composition variables (e.g., work beliefs, personality factors) in predicting team performance. As deep-level attributes are invisible, the disagreements or disputes between members with different deep-level attributes can be quite problematic for teams, resulting in more conflict and less cohesion. And, the alignment of those deep-level attributes (e.g., work beliefs) with cultural values may cause greater polarization between cultural subgroups than that based simply on cultural differences. In this case, disputes or conflict are much more likely to arise between subgroups that are distinguished on the basis of both cultural values and deep-level attributes. Thus, I hypothesize:

> ***Hypotheses 2a-2c:*** *When cultural value and other deep-level faultlines are aligned, the effects on (2a) cohesion, (2b) task conflict and (2c) relationship conflict are stronger than when they are not aligned in MCTs.*

The alignment of cultural value faultlines with surface-level (demographic) faultlines may prove even more complex to sort out and potentially more detrimental to team functioning than the effects of demographic faultlines alone (e.g. Lau & Murnighan, 2005). However, few studies have explored the joint impacts of surface and deep-level faultlines in MCTs (c.f., Phillips & Loyd, 2006).

Based on social categorization theory (Tajfel, 1982; Turner, 1985), team members typically use the salient features of their social identities to categorize one another. Especially at the beginning of a group's existence when surface-level attributes (e.g., race, ethnicity and age) are highly salient and accessible (Harrison et al., 1998, 2002),

categorization on the basis of these surface-level attributes is likely to be automatic (Elsass & Graves, 1997). Categorization can promote the creation of "in-groups" and "out-groups" and evoke biased behaviors and attitudes (Ashforth & Mael, 1989). Research has demonstrated that people tend to exhibit favoritism toward other demographically similar group members while showing bias against dissimilar or out-group members (Tsui & O'Reilly, 1989). Moreover, categorization may also lead to stereotyping (Taylor, Fiske, Etcoff & Ruderman, 1978). For instance, minority groups, such as women and people of color are particularly likely to be stereotyped and those stereotypes are likely to lead to negative expectations for these focal individual and their subgroups (Elsass & Graves, 1997; Joshi, Liao & Jackson, 2006).

According to Harrison et al., (1998, 2002), as a team develops, effects of surface-level diversity give way to deep-level diversity, and conflict arises mainly because of team members' differences in values, attitudes or beliefs. However, when cultural values are aligned with surface-level attributes, the causes of disagreements engendered by team members' cultural value differences may be misattributed. That is, in the face of value diversity, members may not understand why conflict and disputes are occurring. If surface and cultural value differences are aligned, misattributions may be made to surface-level attributes, when cultural value differences are really the culprits. Over time, this inability to distinguish between others' demographic dissimilarity and their value differences is likely to reinforce members' preliminary stereotypes based on demographic attributes and strengthen faultlines. In other words, initial biases rooted in demographics may be reinforced when they are aligned with other deep-level differences. Thus, in MCTs, when cultural value differences are aligned with surface-level

differences, the negative feelings engendered by value conflict confirm members' original negative impressions of demographically dissimilar others, which, accordingly, intensifies conflict and behavioral disintegration within the team.

On the other hand, McGrath and colleagues' expectation model (McGrath, Berdahl, & Arrow, 1995) offers a contrasting explanation for what happens when deep- and surface-level attributes overlap. According to McGrath, et al. (1995), team members infer each others' underlying attributes on the basis of the target member's demographic attributes. These inferences then shape the expectations that other team members have of the target member's behavior, often leading to their differential treatment of this member (McGrath, et al., 1995). Therefore, when surface-level diversity exists in MCTs, team members may expect differences between themselves and those whose surface-level attributes (e.g., ethnicity, age, race, gender etc) are dissimilar from them. Accordingly, when deep-level attributes (cultural values, personality, etc) are aligned with surface-level attributes, team members may be more open minded toward the other subgroups because they expect others to be different from them. That is, the presence of demographic differences triggers expectations that disagreements will occur (Phillips et al., 2006). In that case, disagreements and disputes are less likely to lead to conflict or reduce cohesion because members expect out-groups to behave differently.

Conversely, people expect others from a similar surface-level category to share similar deep-level attributes with them. When this expectation is violated, negative feelings are likely to be generated (Heider, 1958; Phillips & Loyd, 2006). Thus, when cultural value faultlines crosscut demographic faultlines which means that members within the same demographic subgroup hold different cultural values, members may

respond to disagreements caused by value differences more negatively because their expectations of similarity are not met (Phillips & Loyd, 2006). In that case, relationship conflict within the MCT is likely to get intensified. Therefore, based on the arguments above and with little prior evidence in the faultline literature to favor one perspective over the other, I posit two competing hypotheses:

> ***Hypothesis 3a:*** *When cultural value and surface-level faultlines are aligned, the effects on cohesion and conflict are stronger than when they are not aligned in MCTs.*

> ***Hypothesis 3b:*** *When cultural value and surface-level faultlines are aligned, the effects on cohesion and conflict are weaker than when they are not aligned in MCTs.*

I also expect the presence of cultural value faultlines to exert a direct influence on team performance in MCTs. Although faultlines have been considered detrimental to team functioning (e.g., Lau & Murnighan, 1998, 2005; Li & Hambrick, 2005), existence of subgroups may provide support for individual team members' opinions, and encourage members to express the ideas that they share with their similar others (Gibson & Vermeulen, 2003). That is, with the presence of one other team member who shares a similar view point or at least is supportive, minority members will be more encouraged to express their opinions during the team's decision making process because of the psychological support available to them (Asch, 1952; Stasser, Taylor & Hanna, 1989). However, for MCTs to benefit from the divergent views from different subgroups engendered by faultlines, fruitful exchange between subgroups must occur for the diversity of insights to be combined. That is, it is critical for the team to have some members who bridge the structural hole (Burt, 1992) between subgroups and facilitate

fruitful interactions between subgroups, so that the subgroups can become integrated into a fully functioning team (Gibson & Vermeulen, 2003; Moosebrucker, 1988).

On the other hand, when a faultline reaches its maximum[4] where no commonalities exist between subgroups, members are polarized into opposing subgroups and separation within the team reaches its maximum (Harrison & Klein, 2007). In this case, team members lack the conduits for the flow and exchange of information between subgroups, accordingly, integration of the diversity of insights will be less likely to occur. In line with the arguments above, Sawyer and colleagues (2005) found that teams with "crosscut" diversity structure where racial and job-function subgroup boundaries are crossed (with bridges between subgroups) outperformed homogeneous teams and teams with convergent diversity structure where racial and job function subgroups converge (with no commonalities between subgroups).

Insert Figure 2 about here

Figure 2 provides a simple illustration of this. In Figure 2a, there are two subgroups of two team members (subgroup consisting of member A and B; and subgroup consisting of member C and D). The team has an extremely strong faultline as the two subgroups have no commonalities with regard to the four types of cultural values, while within each subgroup the members share all cultural values. This team can be called a convergent team (Sawyer, et al., 2005) as the faultlines of the four types of cultural values converge. That is, the faultline clearly cuts the team into two distinct subgroups. In this case, although the existence of subgroups encourages members to express their opinions and

ideas, the lack of commonality between subgroups inhibits the two subgroups from integrating their differences. Instead, team members are more likely to become biased toward their own subgroups and develop negative feelings toward outside group members (Tajfel & Turner, 1986), which generates more relationship conflict between subgroups and hampers overall team performance (Lau & Murnighan, 1998).

On the other hand, the faultlines shown in Figure 2b are less strong because they do not split the team into distinct subgroups. Instead, the subgroups based on cultural value 1, 2 or 4 crosscut the subgroups based on cultural value 3. Member B belongs to two subgroups—one with member A and another with members C and D because B shares three culture values with A (value 1, 2 and 4) and one cultural value (value 3) with C and D. Therefore, this team is a crosscut team (Sawyer et al., 2005). In this team, member B bridges the two subgroups and serves as a conduit for the information flow between the two subgroups, which may help reduce biased attitudes and behaviors experienced by the team depicted in Figure 1a and facilitate the integration of different ideas represented by different cultural groups. That is, belonging to multiple subgroups provides an opportunity for member B to act as boundary spanners and thus facilitate communication between subgroups.

Finally, Figure 2c shows a homogeneous team with no cultural faultlines. In such a team, although lack of faultlines reduces the obstacles to communication and coordination, it also poses greater obstacles to the generation of creative ideas as members are constrained by their similar cultural perspectives. Thus, based on the above arguments, I suggest that strong faultlines (convergent teams) that are highly divisive can be detrimental, but moderately strong faultlines (cross-cut teams), that

engender some sub-grouping but also leave bridges between subgroups, can enhance performance. I therefore offer the following:

> ***Hypothesis 4:*** *Cultural value faultlines have a curvilinear (inverted U-shaped) relationship with team performance in MCTs, such that moderately strong faultlines will be associated with high team performance.*

3.2. Network Ties and Faultlines

The benefits engendered by moderate faultlines, as discussed above, lie in the potential shared ties across subgroups. Faultline theory relies on diversity as a proxy for network patterns within a team (Reagans, Zuckerman & McEvily, 2004) and assumes that people's interaction patterns are characterized by homophily, the preference to work with similar others (Mollica et al., 2003). Thus, in a MCT with strong cultural faultlines, people who share similar cultural values are assumed to be strongly connected with each other and structural holes are considered to exist between people who do not share the same cultural values. However, homophily may not hold in every team (Lawrence, 1997). Research has identified several conditions that encourage people to interact with dissimilar others and develop strong connections (Blau & Schwartz, 1984; Chatman, et al., 1998; Feld, 1982; Polzer, Milton & Swann, 2002). In MCTs, if team members have favorable past experience (Westphal & Milton, 2000) interacting with members with different cultural values, or have high cultural intelligence (Earley & Ang, 2003), or if the team's norms value cultural diversity (Ely & Thomas, 2001), then homophily will be attenuated and people will be able to build strong or weak ties (Granovetter, 1973; Krackhardt, 1992) with dissimilar others. Those network ties among

dissimilar team members in MCTs are likely to make a difference on the effects of both surface- and deep-level faultlines.

Diversity scholars have also suggested that a high level of team diversity brings more perspectives and ideas to teams and is a source of creativity and innovation (Jehn, Northcraft, & Neale, 1999; Simons, et al., 1999). However, bringing together dissimilar individuals does not automatically lead to more creative decision-making and effective team performance. The critical part is to facilitate members' ability to recognize the diversity of insights and integrate these into innovative solutions. Social interaction ties that bridge dissimilar people could foster cognitive elaboration and information exchange within the whole team, drawing out the different knowledge and skills represented (Oh, Chung & Labianca, 2004; Reagans, et al., 2004). Without the network ties that serve as the channels for information exchange, the diverse insights will probably be left fragmented, and are less likely to be integrated into team performance. Research has demonstrated the importance of incorporating social network concepts into theories about team performance (see Balkundi & Harrison, 2006 for a meta-analytic review) and intergroup relations (Labianca, Brass & Gray, 1998). In the following, I argue that diversity and faultlines' effects on team outcomes will depend on the social network ties that exist between members of the team, the social linkages that exist between subgroups, and even team members' external networks (i.e., social ties with members outside of the team).

3.3. Bridging and Breaching Ties

Network ties that link different network clusters within a team can provide access to diverse ideas, facilitate conflict resolution and enhance team performance (Ancona & Caldwell, 1992; Granovetter, 1973; Gray, Susman & Ren, 2005). In this study, I primarily focus on network ties that link people with different cultural values, and argue that those ties that span cultural subgroups generated by team faultlines are likely to exert influence on faultlines' effects on teams. Social networks convey both positive and negative affect (Labianca & Brass, 2006) and the different types of social ties that people have provide different kinds of support and different types of influence (Labianca, et al., 1998). Therefore, both the positive and negative impacts of network ties on faultlines' effects should be considered. Based on the quality of network ties, I define the ties that link people with different cultural values as either *bridging* or *breaching* ties. Specifically, in the following, I examine *within-team bridging ties* and *breaching ties*, and *external bridging ties*, and explain how they work together with faultlines to influence team processes and performance.

Friendship Bridging Ties. I define friendship bridging ties as team members' friendship ties that cut across cultural value differences in a MCT. For instance, a friendship tie between a collectivistic team member and an individualistic team member is considered a friendship bridging tie. Individuals need friendship networks to provide support and a sense of belonging and identity (Brass, 1984; Ibarra, 1992; Krackhardt, 1992) and research has demonstrated that friendship networks do influence people's attitudes and sense of attachment (Brass, 1995; Morrison, 2002).

Based on faultline theory (Lau & Murnighan, 1998), people with similar cultural values in MCTs should tend to cluster together, leaving structural holes between people who do not share a similar value. This fragmentation within the team would spawn negative biases towards out-groups, engender relationship conflict and reduce team cohesion (Lau & Murnighan, 2005; Tajfel & Turner, 1986). These cultural differences between subgroups also contribute to inevitable misunderstandings and misinterpretations between subgroup members (Ting-Toomey, 1999), which further inhibits communication between subgroups and reduces trust (Kramer, 1999).

However, as discussed earlier, when team members have past experience interacting with members of different cultures (Westphal & Milton, 2000), are culturally intelligent (Earley & Ang, 2003), or the team or organizational culture supports diversity norms (Ely & Thomas, 2001; Chatman, et al., 1998), it is possible for team members to make friends and build networks with people from different cultures. The existence of such friendship bridging ties could establish a link between cultural subgroups, facilitate intercultural communication, change preliminary stereotypes, reduce conflict and promote trust within the whole team (Nelson, 1989; Krackhardt, 1992). For instance, Gray and colleagues (2005) found that brokers who maintain relationships between subgroups help reconcile conflict between subgroups and promote transactive memory development (Wegner, 1986). Nelson (1989) reported that strong relationships across teams in an organization are associated with reduced conflict. Krackhardt (1992) also highlighted the value of friendship ties for developing trust within networks.

Moreover, the positive affect conveyed by the friendship bridging ties can be contagious (Burt & Knez, 1996; Heider, 1958). Team members with friendship bridging

ties might communicate positive information about out-group members to their own cultural subgroups, which will gradually change the whole subgroup's previous prejudice toward the counter-group and furnish a basis for social integration between cultural subgroups. As Labianca and colleagues (1998) demonstrated, friendships are the conduits for lowering perceptions of intergroup conflict when friends have friends in an out-group. Therefore, people tend to perceive less conflict and experience less negative feelings toward their counter-cultural group if some of their in-group members have friends from the other cultural subgroup. Thus, when strong cultural faultlines divide the MCT into subgroups and inhibit communication, the existence of friendship bridging ties tends to *bridge* these subgroups, facilitating intercultural communication and enhancing social integration. I therefore hypothesize:

> ***Hypotheses 5a-5c:*** *Friendship bridging ties will mitigate the effects of cultural value faultlines on (5a) cohesion, (5b) task conflict and (5c) relationship conflict in MCTs.*

The benefits of friendship bridging ties can also translate into better performance. In MCTs, the diverse cultural backgrounds represent a broader array of perspectives and ideas (Cox, 1991; Watson, et al., 1993). However, the diversity of insights does not automatically lead to creativity and innovation. Especially when strong cultural faultlines exist in the MCT, team members are more likely to communicate and share information within rather than across their cultural groups. Although this information exchange within cultural groups may contribute to team performance, the negative perceptions between cultural groups under strong faultline conditions may interfere (Lau & Murnighan, 2005). More importantly, creativity comes from integration of diverse perspectives, rather than information exchange among people with similar views (Bunderson, 2003). Friendship

bridging ties that link dissimilar people may mitigate faultline's interference and foster cognitive elaboration and information exchange between cultural groups, thereby integrating the diverse insights represented by different cultural groups into creative solutions to problems. Therefore, the interpersonal contacts among dissimilar team members may have the potential to enhance the generation of creative thoughts and improve team performance.

Previous network research has shown that the boundary-spanning ties (Tushman, 1977; Tushman & Katz, 1980) that bridge otherwise disconnected network clusters are likely to generate information benefits and facilitate effective knowledge transfer (Burt, 1992; Obstfeld, 2005; Oh, et al., 2004; Reagans, et al., 2004; Tsai, 2001; Westphal & Milton 2000). Diversity research that emphasizes the role of task and goal interdependence in explaining diversity's effects also indirectly supports this position. For instance, Van der Vegt and Janssen (2003) demonstrated that diversity only leads to innovation when there are high levels of task and perceived goal interdependence. Higher levels of task and perceived goal interdependence will result in more facilitative and cooperative interpersonal contacts among dissimilar team members. Those interpersonal contacts that bridge dissimilar people could draw out the different knowledge and skills represented by diversity, and eventually foster team learning and enhance team performance. Therefore, I hypothesize:

Hypothesis 6: *Friendship bridging ties will facilitate team performance in MCTs.*

Breaching Ties. While bridging ties convey positive affect, and serve as bridges to connect members in different cultural subgroups, it is also possible that team members form negative interpersonal relationships with members from other cultural subgroups.

Breaching ties are defined as team members' negative interpersonal relationships that cut across cultural value differences in a MCT. For instance, a negative relationship between a collectivistic team member and an individualistic team member is considered as a breaching tie. Rather than bridging cultural subgroups and serving as channels for cross-subgroup communication, those negative relationships across cultural subgroup boundaries may further enlarge the gap between subgroups and enhance faultlines' negative effects on teams.

Traditional psychology literature has suggested that negative relationships have a greater impact on people's attitudes, cognition and behaviors than positive relationships (Taylor, 1991). More recently, Labianca and Brass (2006) re-examined this "negative asymmetry" in organizational settings and proposed that negative relationships have greater explanatory power than positive relationships to explain workplace outcomes. Empirical evidence also supports this position, revealing that negative interactions have greater effects than positive interactions on life satisfaction, mood and stress (e.g., Hirsch & Rapkin, 1986; Rook, 1984). Therefore, it is important to consider the role of negative relationships in MCTs.

Based on faultline theory, when a faultline is strong, team members tend to generate negative biases toward their counter cultural subgroups even if they do not have any negative interpersonal experience with out-group members (Lau & Murnighan, 1998; Li & Hambrick, 2005). But when such negative interpersonal relationships do exist, the faultline is likely to be strengthened. It has been suggested that negative interactions have significant impacts on team members' perceptions of inter-group conflict (Labianca, et al., 1998). That is, the number of an individual's negative interpersonal relationships with

an out-group's members is strongly related to perceptions of inter-group conflict with that out-group (Labianca et al., 1998).

In addition, like the positive affect conveyed by friendship ties, the negative affect and perception are also likely to be contagious. An individual involved in a negative relationship with an out-group member might communicate negative information about the out-group member to his/her own cultural subgroups to seek social support (Smith, 1989), which will strengthen the whole subgroup's previous prejudice toward the counter-group and produce more intergroup friction. For instance, Labianca and colleagues (1998) reported that when a person's friends have negative relationships with out-group members, he/she is likely to form a negative impression of the out-group too. Therefore, negative interpersonal relationships across cultural subgroups in a MCT may serve as the channels for transferring negative affect across cultural subgroups and enhance faultlines' detrimental effects. In addition, as breaching ties can enlarge the gap and inhibit information exchange between cultural subgroups, they act as obstacles for creative problem solving and innovative decision-making in MCTs. Therefore, I hypothesize the following:

> ***Hypothesis 7a-7c:*** *Breaching ties will enhance the effects of cultural faultlines on (7a) cohesion, (7b) task conflict and (7c) relationship conflict in MCTs.*

> ***Hypothesis 8:*** *Breaching ties will hamper team performance in MCTs.*

External Bridging Ties. Teams' external network ties can also have great impacts on team dynamics (Ancona & Caldwell, 1988, 1992). Teams whose members socialize with outside people from a diverse background tend to have greater access to outside information and resources (Tsai, 2001), which contributes to the set of alternatives from

which decisions are made (Geletkanycz & Hambrick, 1997). Empirical evidence has supported this position, revealing that diverse connections lead to better performance (e.g., Oh, et al., 2004). At the individual level, diverse outside ties are also reported to contribute to individuals' creativity (Perry-Smith, 2006) and influence in decision making (Westphal & Milton, 2000).

I define team members' external ties with dissimilar people as external bridging ties, and argue that they will serve as psychological bridges between dissimilar members within teams, and help mitigate faultlines' effects on teams. Outside connections with dissimilar people can provide opportunities to be exposed to different values and beliefs. The more diverse a person's external connections, the more diverse the types of information they are likely to receive and the broader the sets of values to which they will be exposed. For instance, Erickson (1996) has found that network diversity had an effect on a person's exposure to and knowledge of cultural genres. Therefore, in a MCT, a team member's outside connections with people from different cultures may make him/her more open to the team members from different cultures. At the team level, the more members who are connected with dissimilar people outside the team, the more likely the team will be open to different cultures and the less likely the team will be fragmented into distinct cultural groups. Accordingly, external bridging ties can help reduce the psychological distance between dissimilar team members, and mitigate cultural faultlines' effects on cohesion and conflict. Therefore, I hypothesize the following:

> ***Hypotheses 9a-9c:*** *Team members' external bridging ties will mitigate the effects of cultural faultlines on (9a) cohesion, (9b) task conflict and (9c) relationship conflict in MCTs.*

External bridging ties also contribute to team performance. As discussed earlier, research has demonstrated the benefits of having diverse external networks for teams (e.g., Oh, et al., 2004). However, most studies emphasized the overall diversity of the team's external network without considering the diversity of each team member's external connections (e.g., Ancona & Caldwell, 1988; 1992). For a MCT, the team's external network can still be diverse even if each team member's outside connections are homogeneous. In this case, although a wide range of ideas can be brought to the team from the diverse outside networks, those ideas may be redundant to what the team already has, as those outside ties can be considered as redundant ties (Granovetter, 1973). Moreover, as argued earlier, even if team members have brought more perspectives and ideas to the team, there has to be productive exchange between dissimilar team members for the diversity to be translated into high performance. If team members' external ties are homogenous, it is more likely that their connections within the team are also homogenous, which creates cultural faultlines and inhibits productive exchange between subgroups.

On the other hand, if team members' outside connections are diverse, they are more likely to get unique perspectives and ideas from their outside networks, because they communicate with people who are different from themselves. More importantly, as argued above, external bridging connections can expose people to a broader array of cultural values (Erickson, 1996), which may enhance team members' openness to the other cultural group within the MCT, weaken cultural faultlines and improve cross-subgroup communication. Therefore, the bridging ties not only serve as the conduits for diverse information to the team, but also facilitate within-team cross cultural

communication so that the diverse ideas and perspectives can be translated into better performance. Therefore, I propose:

> ***Hypothesis 10:*** *Team members' external bridging ties will facilitate team performance in MCTs.*

Chapter 4

METHODS

To test my hypotheses, I conducted a cross-sectional (one-wave) and longitudinal (two-wave) investigation of the effects of faultlines and bridging ties on team processes and performance. Methodological details are given below.

4.1. Research Setting and Data Collection

The research was conducted using research teams comprised of graduate students and faculty at a major research university. Those teams came from different departments and colleges across the university, but they were performing comparable cognitive tasks, i.e., working on time-limited research projects. Using university-based research teams provided an ideal research setting for testing my proposed model because it guaranteed a high degree of cultural diversity in the sample since some faculty members and many graduate students in this university came from different cultural backgrounds. Data were collected during a 7-month period using multiple data sources including semi-structured interviews with team leaders, surveys of team members at two points in time and a survey of team leaders.

Interviews. Initially, potential team leaders were identified from the federal grant applicant database obtained from the Office of the Sponsored Program at the university. Initial contacts were made to 768 potential team leaders, randomly selected from the

database, through invitation emails followed by phone calls, requesting an interview about team leaders' experience in leading research teams. Ninety-six leaders who indicated that they were not leading a team at that moment were dropped from the sample, leaving 672 team leaders contacted. Out of the 672 requests, 243 leaders agreed to be interviewed, which generated a 36% response rate. A team of 10 graduate and undergraduate students, including the author, conducted the interviews. During the interviews, besides asking the team leaders about their experience in leading their research teams, the researchers described the research purposes and procedures to all 215 team leaders interviewed (twenty-eight leaders were not interviewed due to time conflict; please refer to Appendix C for the interview protocol). At the end of the interview, team leaders were asked to fill out a short team leader survey containing the questions related to their cultural values and external bridging ties (these measures are described below under *measures*).

Surveys. The main purpose of the interviews was to get access to research teams. As a result of the 215 interviews, 186 research teams' contact information (i.e., team members' names, campus addresses, email addresses and phone numbers) was obtained, which generated a final interview response rate of 29%. It is possible that response bias existed that team leaders who were less happy about their research teams tended not to respond to our interview requests. However, the information obtained from interviews did not reflect an obvious positive skew. Thus, I do not expect response bias to be a serious issue in this study.

The average team size for those 186 teams is 6; they ranged in size from 3 to 20. Paper-and-pencil surveys were then mailed to the 958 team members of the 186 teams

with a return envelope and a cover letter providing instructions. The survey contained questions to measure a) cultural values, b) surface an deep level attributes (used to calculate faultlines within the teams), c) internal and external network ties, and d) team processes (i.e., task and relationship conflict, team cohesion). Reminder emails encouraging participation were sent to all potential respondents two weeks after initial contact and included a copy of an electronic version of the survey.

Approximately two months later, following the first round survey, the same team members were asked to complete a second survey containing questions that measured: a) team processes (i.e., task and relationship conflict, team cohesion), and b) team performance. For this second wave of data collection, the same procedure was used as for the first wave of data collection. Respondents were promised confidentiality for their submitted information although it was not possible to ensure complete anonymity because I need to match the two rounds of data as well as link the respondents to their network data. A 20-dollar Amazon certificate and a chance to win a $100 restaurant certificate for the team were offered as incentives for completing both-wave surveys. That is, for each team member who completed both-round surveys, he/she would get a $20 Amazon certificate. At the same time, he/she would also be entered as a token in a lottery drawing for a $100 restaurant certificate for his/her team. One hundred such restaurant certificates were offered, limit one per team. The more members in a team take part in both-round surveys, the better the chances for his/her team to win.

Sample. Of the 958 team members contacted, 723 returned the first-wave surveys, representing a response rate of 75%, and 672 completed the second-wave surveys, for a response rate of 71% (11 team members left their teams before the second-wave survey

administration). I checked the correlation between the first-wave cultural value data (i.e., individualism/collectivism and power distance cultural values) and an indicator of whether or not the respondents participated in the second wave survey. Neither of the correlations was significant. Thus, I can conclude that there was no consequential response bias between the first and the second wave responses. Because my hypotheses predict team behavior, only those teams with more than 50% within-team response rates were included. Thus, my final sample size was 155 teams for the cross-sectional investigation, and 148 teams for the longitudinal investigation.

For the cross-sectional investigation, team size ranged from 3 to 20 with an average of 6. Median team tenure was 28 months, ranging from 7 months to 8 years. Team members were from 40 different countries, and most of them were Caucasian Americans (64%), Asians (24%), Europeans (5%) and Asian Americans (3%). Team members' range in age was from 19 to 81 (Median=32). Sixty-one percent of the team members are male. In terms of education level, thirty-three percent were doctoral students, and the remaining were full professors (14%), research associates (10%), research technicians/others (9%), master students (8%), associate professors (8%), assistant professors (6%), undergraduates (6%) and post docs (6%). Disciplinary backgrounds represented included Agricultural Sciences (27%), Engineering (17%), Sciences (17%), Earth and Mineral Sciences (15%), Health and Human Development (8%), Liberal Arts (5%), Medicine (5%), Information Science and Technology (4%) and Business Administration (2%).

For the longitudinal investigation, because only 7 teams were removed due to their low within-team response rates (i.e., less than 50%) for the second-wave survey, the

overall background information for the sample did not change much as compared to the 155 teams included in the cross-sectional investigation. Team size ranged from 3 to 10 with an average of 5. Median team tenure was 31 months, ranging from 8 months to 8 years. Most of the team members were Caucasian Americans (64%), Asians (24%), Europeans (5%) and Asian Americans (3%). The median age of the team members was 32 years. Sixty-one percent of the respondents were male. In terms of education level, thirty-four percent were doctoral students, and the remaining were full professors (14%), research associates (10%), research technicians/others (9%), master students (9%), associate professors (7%), assistant professors (6%), undergraduates (6%) and post docs (5%). Disciplinary backgrounds represented included Agricultural Sciences (28%), Sciences (16%), Earth and Mineral Sciences (14%), Health and Human Development (12%), Engineering (11%), Medicine (8%), Liberal Arts (6%), Information Science and Technology (3%) and Business Administration (2%).

4.2. Measures

Cultural values. Hofstede's two cultural dimensions, collectivism/individualism and power distance, were measured to capture cultural values in this study, because these two dimensions have been most widely examined by organizational researchers (Gelfand & Christakopoulou, 1999; Hofstede, 1984; Triandis, 1995) and are relevant in numerous cultural contexts (Aguinis & Henle, 2003; Hofstede, 1980). Values associated with individualism/collectivism reflect deep-seated propensities to construct people as autonomous individuals or as members of embedded groups (Markus & Kitayama, 1991).

Individualism/collectivism was measured using a six-item scale adopted from Wagner III (1995). A sample item is "Only those who depend on themselves get ahead in life". Power distance indicates the degree to which members of a culture accept social inequality (Hofstede, 1980). It was measured using a six-item scale adopted from Earley and Erez (1997). An example of an item is "The team leader's authority should not be questioned". Responses for both scales were made on a five-point format, from 1=strong disagreement to 5=strong agreement. Coefficient alphas were 0.79 for collectivism/individualism and 0.73 for power distance (Please refer to Appendix D for detailed survey items).

Surface level attributes. Team members' *surface level attributes* refer to overt, biological characteristics that are reflected in physical features. Those selected for inclusion in this study are age, gender, ethnicity and status. Team members' status was measured by their occupation. Please refer to Appendix D for the detailed ethnicity and status measure.

Deep level attributes. *Deep level attributes* refer to team members' attitudes and beliefs. Those selected for inclusion in this study were task meaningfulness and goal commitment. Those two attributes were selected since they are particularly relevant to research teams where team members were working intellectually on their project tasks and toward their specified goals. Task meaningfulness measures the extent to which the project task was being valued. It was assessed using a three-item scale by Harrison and colleagues (2002) who adopted it from Rokeach (1973). A sample item is "Doing the project is worthwhile". Responses ranged from 1=strong disagreement to 5=strong agreement ($\alpha = .81$). Goal commitment assesses the extent to which team members were

committed to the team's goals. Five items from Klein, Wesson, Hollenbeck and Wright (2001), modified for research team settings, were used to measure goal commitment. An example of the items is "I think this is a good goal to shoot for". Responses were also on a five-point format, from 1=strong disagreement to 5=strong agreement (α = .77). Please refer to Appendix D for the survey items.

Faultlines. Bezrukova, Jehn and Zanutto's (2002) measure of faultline width was used to compute faultlines. It calculates the distance *D* between the centroids of two sets of averages of attributes, each belonging to one of the potential subgroups (Molleman, 2005).

$$D_g = \sum_{j=1}^{m} \left| \bar{x}_{\bullet j1} - \bar{x}_{\bullet j2} \right|$$

In which $\bar{x}_{\bullet j1}$ denotes the mean of attribute *j* in subgroup *1* and $\bar{x}_{\bullet j2}$ denotes the mean of attribute *j* in subgroup *2* under split *g*. A group with *n* members can potentially be split into two subgroups in $S = (2^{n-1} - 1)$ ways. The distance *D* is the maximum value D_g over all possible splits. Appendix E depicts a graph on how faultline width is calculated.

This computation was adopted from Bezrukova et al. (2002), who borrowed it from the literature on cluster analysis (e.g., Morrison, 1967). Based on this measure, faultline width is a continuous variable with larger values indicating wider faultlines. Faultlines widen when distinctions between team members' attributes increase among subgroups. Therefore, faultline width measure captures the concept of "separation" (Harrison & Klein, 2007), and the widest faultline indicates the utmost separation within the team

when the team is separated into two distinct subgroups and the averages, or central tendencies, of the attributes of the two subgroups differ as widely as possible. The overall faultline width score is the sum total of such differences between the two subgroups.

Besides the faultline width measure, the current literature on team faultlines also suggests another way to calculate faultlines: the faultline strength measure (Thatcher, et al., 2003). It calculates the percent of total variation in overall group characteristics accounted for by the strongest group split (Molleman, 2005). However, this strength measure is largely confounded with team size, and has not adequately considered the extent to which subgroups separate as a result of accumulated differences between them (Thatcher, et al., 2003). Therefore, in this study, I chose to use the faultline width measure to calculate faultlines (Please refer to Appendix F for a detailed explanation on the faultline strength measure and why it was not chosen for this study).

Because faultline width scores were calculated using both continuous and categorical variables, I recoded all major variables before calculating faultlines. Specifically, I standardized all continuous variables (i.e., cultural values and deep-level attributes) and recoded each categorical variable (gender, ethnicity and status) into a series of dummy variables. A categorical variable with c categories were re-coded as c dummy variables (Thatcher, et al., 2003). So, gender was re-expressed as 2 dummy variables, ethnicity as 11 and status as 10 dummy variables. All this ensured that all variables used for faultline calculations were on comparable scales. Several different faultlines were then calculated. First, faultlines based on each of the cultural values (i.e., collectivism/individualism faultlines, and power distance faultlines) were calculated. It is noteworthy that rather than combining collectivism/individualism and power distance

into one cultural value faultline measure, I separated the two cultural values I am interested in and calculated faultline scores based on each of them. In doing so, I can tease out the specific impact of each of the cultural values in teams. Besides cultural value faultlines, faultlines based on each cultural value and the two deep-level attributes, and faultlines based on each cultural value and each of the four surface-level attributes were calculated. In addition, faultlines based only on deep-level attributes were calculated as well (Appendix G outlines the list of faultlines calculated in this study).

Internal bridging/breaching ties. A roster method was used to measure team members' internal network ties. For friendship networks, team members were asked to check one of the following choices for each of the other team members in their team: not very close friend, moderately close friend, very close friend. I constructed the friendship network matrix for each team based on team members' responses, with "not very close friend" coded as 1, "moderately close friend" coded as 2 and "very close friend" coded as 3. Failure to check one of these three choices was treated as 0. A cut-off score of 1 was then used to re-construct the friendship matrix for each team. The i, jth cell of the matrix was coded "1" if i's rating for j was above 1 (e.g., 2 or 3); otherwise, it was coded "0". Thus, only "moderately close friend" and "very close friend" indicate the presence of friendship. I symmetrized the matrix for each team to fill in the missing data (Kilduff & Tsai, 2003).

Team members were also given another choice for each of the other members in their team: prefer to avoid/find awkward to deal with. The animosity (i.e., negative relationship) matrix for each team was constructed based on team members' responses to

it. Failure to check this choice was coded as "0"; otherwise, it was coded as "1". I also symmetrized this matrix to fill in the miss data for each team.

Internal bridging/breaching ties are defined as those positive/negative relations that cut across cultural differences within a team. Thus, to calculate internal bridging ties and breaching ties, I used cultural values (i.e., individualism/collectivism or power distance) to define subgroup memberships. Specifically, the mean of each of the cultural values was used as the cut-off point. So for individualism/collectivism, the cut-off point was 3.7 and for power distance, the cut-off point was 2.6. For each team, internal bridging/breaching ties were then calculated as the cross-subgroup density (Borgatti, Everett & Freeman, 1992), which is the number of existing cross-subgroup ties divided by the total number of all possible cross-subgroup ties. Thus, for each team, two types of bridging ties and two types of breaching ties were calculated: friendship bridging ties based on collectivism/individualism subgroup membership and on power distance subgroup membership respectively; breaching ties based on collectivism/individualism subgroup membership and on power distance subgroup membership respectively.

External bridging ties. External bridging ties measure the extent to which a team member has interactions with members of other cultural groups outside the team. Respondents were asked to what extent the people with whom they socialize or confer outside the team were different from them in terms of: 1) ethnic background and 2) cultural values, with a response format anchored by 1, "very similar" and 5, "very different" ($\alpha = .72$). External bridging ties for a team are equal to the mean of team members' individual-level responses for this measure.

Team cohesion. Team cohesion at both time 1 and time 2 was measured using a four-item scale adopted from Seashore (1979). A sample item is "I feel that I'm really a part of our research team". Responses ranged from "strong disagreement", 1, to "strong agreement", 5. The estimated reliability was $\alpha = .85$ at time 1, and $\alpha = .89$ at time 2. Since team cohesion is a team-level construct, team members' individual responses were aggregated to a team-level score for analysis. The intra-class correlation coefficient (ICC) (James, 1982) and the R_{wg} (James, Demaree, & Wolf, 1984) were calculated to justify the aggregation (Please refer to Table 1 for the results of the ICC analysis and Table 2 for the R_{wg} values for all team-level scales). ICC indicates how much of the individual response variance may be accounted for by the group level variable (Shrout & Fleiss, 1979). It is calculated as the extent of within versus between group variance (Shrout & Fleiss, 1979). A value within the range of .00 to .50 is considered acceptable (James, 1982). The ICC for team cohesion is .22 at time 1, and .21 at time 2. R_{wg} assesses within team inter-rater agreement (James, et al., 1993), or "the extent to which the different judges tend to make exactly the same judgments about the rated subject" (Tinsley & Weiss, 1975: 359). The average R_{wg} across different teams for team cohesion is .83 for time 1, and .85 for time 2, which is above the rule of thumb of .70 acceptable for aggregation; therefore aggregation is justifiable (Cohen, Doveh, & Eick, 2001). The estimated reliabilities for team cohesion were also calculated at the team-level: $\alpha = .92$ for both waves.

Conflict. Four task conflict items (e.g., "how frequently are there conflicts about ideas") and four relationship conflict items (e.g., "how much are personality clashes evident") from Jehn (1995) were used at both time 1 and time 2. Responses were made on a 5-point rating format (1=not at all to 5=to a very large extent). Estimated reliabilities

are .84 for both waves for task conflict (.89 and .90 respectively at the team level), and .93 for both waves for relationship conflict (.97 and .96 respectively at the team level). In addition, for task conflict, ICCs are .17 and .19, and the average R_{wg}s are .87 and .89 for time 1 and time 2 respectively. For relationship conflict, ICCs are .34 and .36, and the average R_{wg}s are .87 and .89. Thus, individual responses were aggregated to a team level score for analysis.

Team performance. Team performance is defined as the extent to which a team accomplishes its goals or mission (Bell, 2007). At time 2, each team member was asked to assess his/her team's effectiveness in meeting the team's goals in ten aspects on a format ranging from "poor", 1, to "outstanding", 5. Since research teams' goals may vary, I also included a response "not applicable" for each of the items. Examples of the items include "meeting the requirements of an external funding agency" and "publishing in a respected journal". The estimated reliabilities are .87 at the individual level and .89 at the team level (reliabilities for all major constructs are listed in Table 3). ICC is .20, and the average R_{wg} is .84 across all teams. Thus, individual responses were aggregated to a team level score for analysis (Please refer to Appendix D for original survey items).

Control variables. Team size, team tenure and team's disciplinary background were controlled for in the analyses. In particular, team tenure was measured as the median length of time team members had been on the team.

Insert Tables 1-3 about here

Chapter 5

RESULTS

5.1. Exploratory Factor Analysis

I employed exploratory factor analysis (EFA) to examine the construct validity of my main constructs. First, I did EFA on cultural values, task meaningfulness, goal commitment and external bridging ties based on the first wave data. In doing the EFA, I used squared multiple correlations (SMCs) as initial communality estimates and extracted factors by principal axis, following oblique rotation which permits correlations among factors. It generated the theoretically expected factor structure. The scree plot of the eigenvalues suggested a six-factor model. I also conducted a parallel analysis using the same communality estimation and extraction techniques (Fabrigar, et al., 1999). The first six eigenvalues expected for random data fell below the observed eigenvalues from the real data. Thus, the parallel analysis also suggested a six-factor solution. Furthermore, deliberate under- and over-factoring led to less simple-structure and ambiguity problems compared to the theoretically expected six-factor solution.

The factor loadings are presented in Table 4. The constructs of individualism/collectivism, power distance, task meaningfulness, goal commitment and external bridging ties could be represented in 6 factors. Please note that the six items of individualism/collectivism loaded on 2 factors: 1) personal independence and 2) beliefs on personal pursuits on group productivity, which is consistent with what Wagner III

(1995) found. Thus, these two dimensions of individualism/collectivism were treated as two factors in my analysis of faultline calculations. In addition, for all the other constructs, all of the items loaded on one and only one factor, except for one cross-loading of .35 for goal commitment (see item 5 on the task meaningfulness factor). The correlation between the "task meaningfulness" factor and the "goal commitment" factor is 0.57. The high correlation suggests that the two deep-level attributes could be combined into one factor. After putting the 8 deep-level attribute items into one construct, the estimated alpha was improved to 0.84 as compared with 0.81 (task meaningfulness) and 0.77 (goal commitment). Therefore, these two deep-level attributes were treated as one factor in my calculations of faultlines. This also ensured that cultural value and deep-level attributes were weighted the same (each for 50%) in the faultline calculation.

The same procedure was used for EFAs on cohesion and conflict based on the first wave data, and on cohesion, conflict and team performance based on the second wave data. The factor loadings are shown in Tables 5 and 6, respectively. All of the items loaded on one and only one factor. Thus, the construct validity of the criterion measures was supported.

Insert Tables 4-6 about here

5.2. Hypotheses Testing

Descriptive statistics and correlations are presented in Table 7 for the cross-sectional investigation and in Table 8a and 8b for the longitudinal investigation. I tested all hypotheses using multiple regression analyses. As mentioned earlier, cultural value faultlines were examined using individualism/collectivism (IC) values and power distance (PD) values separately. Consequently, the results for faultlines calculated using each of these two cultural values are presented separately. See Tables 9a-12a for faultlines based on collectivism/individualism and Tables 9b-12b for those based on power distance.

Insert Tables 7, 8a-12a and 8b-12b about here

Faultlines' effects on teams. The effects of different faultlines on the group process variables, cohesion, task and relationship conflict were tested using both the cross-sectional and the longitudinal data. According to Hypotheses 1a to 1c, cultural value faultlines were expected to have a negative effect on team cohesion and a positive effect on each type of team conflict. To test these hypotheses, I first regressed (separately) team cohesion, task conflict and relationship conflict on cultural value faultlines (i.e., IC faultlines and PD faultlines separately) and the three control variables. As shown in model 1 in Tables 9a-11a, no significant effect was found for IC faultlines, except that in the cross-sectional investigation, IC faultlines positively predicted task conflict ($\hat{\beta} = .18$, $p < .05$). However, this effect did not hold over time in the longitudinal

investigation. For PD faultlines, no significant relationship was detected in either the cross sectional or longitudinal investigations (see model 1 in Tables 9b-11b). Thus, Hypotheses 1a, 1b and 1c were not supported.

Hypotheses 2 predicted that when cultural and deep-level faultlines are aligned, the effects on team cohesion (Hyp. 2a), task (Hyp. 2b) and relationship conflict (Hyp. 2c) are stronger than when they are not aligned. Before testing these hypotheses, I first checked the effects of faultlines based on deep-level attributes (i.e., the construct combining task meaningfulness and goal commitment) only (model 2 in Tables 9a/b-11a/b). To do this, I replaced cultural value faultlines in the previous regressions with deep-level faultlines. As can be seen, significant effects were found on team cohesion at both times (time 1: $\hat{\beta}$ = -.31, $p < .01$; time 2: $\hat{\beta}$ = -.24, $p < .01$). On the other hand, deep-level faultlines only predicted task ($\hat{\beta}$ = .22, $p < .01$) and relationship conflict ($\hat{\beta}$ = .20, $p < .05$) at time 2, but not at time 1.

Then, to test hypotheses 2a-2c, I replaced deep-level faultlines with the faultlines based on the alignment of cultural values with the deep-level attributes. As shown in Tables 9a-11a (model 3), faultlines based on IC and the deep-level attributes did not predict team cohesion or relationship conflict either cross-sectionally or longitudinally. The effect on task conflict was significant at time 1 ($\hat{\beta}$ = .18, $p < .05$), but became less strong and only marginally significant at time 2 ($\hat{\beta}$ = .15, $p < .10$). On the other hand, no significant effects were found for faultlines based on an alignment of PD and the deep-level attributes (see Tables 9b-11b, model 3). Therefore, Hypothesis 2a, 2b and 2c were not supported.

Hypotheses 3a and 3b are competing hypotheses that predict the effects of the alignment of cultural value faultlines with surface-level faultlines. Specifically, Hypothesis 3a predicted that the alignment will enhance faultlines' effects on cohesion and conflict, while Hypothesis 3b argued that the alignment will make the effects of faultlines weaker. To test these hypotheses, I regressed cohesion and conflict (separately) on each of eight types of faultlines based on combining each of the four surface-level attributes with the two types of cultural values (i.e., IC and PD respectively). For IC-based faultlines, see models 4-7 in Tables 9a -11a; for PD–based faultlines see models 4-7 in Tables 9b-11b. No significant effect was detected for the alignment of PD and any of the four surface-level faultlines in either the cross-sectional or the longitudinal investigation. With respect to the effects of the alignment of IC and surface-level attributes, faultlines based on IC and gender were negatively related to team cohesion ($\hat{\beta}$ = -.17, $p < .05$) at time 2, but not at time 1. Faultlines based on IC and ethnicity ($\hat{\beta}$ = .20, $p < .05$), IC and status ($\hat{\beta}$ = .18, $p < .05$) were significant predictors of task conflict cross-sectionally, but not longitudinally. No significant effects were detected on relationship conflict. Thus, I did not find any consistent effects of the alignment of cultural values with surface-level faultlines across time. Hence, neither Hypothesis 3a nor Hypothesis 3b was supported.

According to Hypothesis 4, cultural value faultlines have a curvilinear relationship with team performance. This Hypothesis was tested using team performance data from time 2. I first regressed team performance on the two types of cultural value faultlines (model 1 in Table 12a/b), and then added the quadratic term of cultural value faultliness

in the regression equation (model 2 in Tables 12a/b). The results showed that neither IC faultlines nor PD faultlines had a direct or a curvilinear relationship with team performance. Thus, Hypothesis 4 was not supported.

Faultlines and bridging/breaching ties. Bridging/breaching ties were hypothesized to interact with cultural faultlines to influence team cohesion and conflict. Specifically, friendship bridging ties and external bridging ties were hypothesized to mitigate the effects of cultural faultlines on cohesion (Hyp. 5a and 9a respectively), task conflict (Hyp. 5b and 9b respectively) and relationship conflict (Hyp. 5c and 9c respectively), while breaching ties were proposed to enhance cultural faultlines' effects on cohesion (Hyp. 7a), task (Hyp.7b) and relationship conflict (Hyp. 7c). I tested these hypotheses for each type of cultural faultlines separately. After including the respective cultural value faultline, the corresponding bridging ties and the three control variables as main effects in the regression equations, I added three interaction terms, formed by multiplying cultural value faultlines by each type of the bridging ties (models 8 and 9 in Tables 9a/b-11a/b). As demonstrated in Tables 9a/b, no significant moderating effects were detected for team cohesion. Thus Hypotheses 5a, 7a and 9a were not supported. For task conflict, the only significant moderating effect found was the interaction between IC faultlines and breaching ties (Table 10a). The interaction was positive and significant cross-sectionally ($\hat{\beta} = .71$, $p < .01$), but unfortunately, became weaker and non-significant longitudinally. Thus, Hypotheses 5b, 7b and 9b were not supported.

On the other hand, for relationship conflict (Table 11a), the interaction of IC faultlines and breaching ties was positive and significant at both time 1 ($\hat{\beta} = .73$, $p < .01$)

and time 2 ($\hat{\beta}$ = .53, p < .05). That is to say, relationship conflict increased when breaching ties and IC faultlines co-existed. I plotted the interaction effects at high and low levels (1.0 and -1.0 *SD*s from the mean) of breaching ties cross-sectionally (Figure 3a) and longitudinally (Figure 3b). Both plots show that IC faultlines only increased relationship conflict when a high level of breaching ties was present across IC subgroups. When the level of breaching ties was low, IC faultlines were more or less unrelated to relationship conflict. This significant interaction did not hold for PD faultlines. Thus, Hypothesis 7c was only partially supported. The interactions of friendship or external bridging ties with cultural faultlines were not significant on relationship conflict either. So, Hypothesis 5c and 9c were not supported.

Insert Figures 3a and 3b about here

Besides the moderating effects, the results (model 8 in Tables 9a/b-11a/b) also showed that in teams with subgroups based on IC, friendship bridging ties were directly related to team cohesion at both time 1 ($\hat{\beta}$ = .17, p < .10) and time 2 ($\hat{\beta}$ = .19, p < .05). In teams with subgroups based on PD, friendship bridging ties predicted cohesion cross-sectionally ($\hat{\beta}$ = .17, p < .05), but not longitudinally, and predicted task conflict longitudinally ($\hat{\beta}$ = -.21, p < .05), but not cross-sectionally. No other direct effects on cohesion and conflict were found for bridging/breaching ties.

Finally, bridging/breaching ties were also hypothesized to be direct predictors of team performance. Specifically, friendship (Hyp. 6) and external (Hyp. 10) bridging ties

were proposed to increase team performance, while breaching ties (Hyp. 8) were hypothesized to hamper performance. Performance data from time 2 was used to test these hypotheses. As presented in model 3 in Tables 12a/b, no direct relationship was found between any of the bridging/breaching ties and team performance. Thus, Hypotheses 6, 8 and 10 were not supported.

Post-hoc analyses. Although the relationships between cohesion and conflict with team performance were not hypothesized in my study, post hoc analysis was done to see whether team processes mediated the relationship between faultlines or bridging ties and performance. Cohesion and conflict data from time 1 and performance data from time 2 were used to test this idea. Specifically, in model 4 of Tables 12a/b, I added cohesion and conflict in the previous regression model on team performance. Cohesion was found to be a unique predictor of performance ($\hat{\beta}$ = .36, $p < .01$ for the model with IC faultlines; $\hat{\beta}$ = .35, $p < .01$ for the model with PD faultlines). No significant effects were detected for task or relationship conflict.

Although I took a longitudinal approach and used cohesion/conflict data and performance data with a two-month time lag, the significant relationship between cohesion and performance may still be affected by common method bias since both data came from a single source (Harrison, McLaughlin & Coalter, 1996). To address this issue, I took the approach recommended by Ostroff, Kinicki and Clark (2002). Specifically, I randomly split each of the 148 teams into two and for each team, I aggregated the first-wave responses of half of the team members (sub-sample A) on cohesion and conflict to generate team level scores for the team, and aggregated the second-wave responses of the other half of the team members (sub-sample B) on

performance to get the performance score for the team. I regressed team performance reported by sub-sample B on cohesion and conflict reported by sub-sample A together with cultural faultlines, bridging/breaching ties and the control variables. As shown in model 5 (Tables 12a/b), cohesion was still a significant predictor of team performance ($\hat{\beta}$ = .57, $p < .01$ for the model with IC faultlines; $\hat{\beta}$ = .56, $p < .01$ for the model with PD faultlines). Thus, since cohesion and performance were reported by different sets of team members within the same teams, the significant relationship could not be the result of common method variance.

Finally, I did not hypothesize the interactive effects of faultlines and bridging/breaching ties on performance. However, since the hypothesized direct effects of faultlines and bridging/breaching ties on performance were not found, and faultlines and breaching ties were found to interactively influence team processes (i.e., relationship conflict), I tested the effect of these interactions on performance. In model 6 of Tables 12a/b, after including cultural faultlines, bridging/breaching ties, and the three control variables as main effects in the regression equation, I added three interaction terms, formed by multiplying cultural faultlines with each of the three types of network ties. No significant effect was found in the model related to PD faultlines. However, the moderating effect of IC faultlines × friendship bridging ties was positive and significant ($\hat{\beta}$ = .76, $p < .05$), and the moderating effect of IC faultlines × breaching ties was negative and significant ($\hat{\beta}$ = -.55, $p < .05$). These two significant interaction effects are depicted in Figures 4 and 5, respectively. As shown by Figure 4, IC faultlines were positively related to team performance when friendship bridging ties were at a high level,

but had no effect on performance when friendship bridging ties were at a low level. Similarly, as shown by Figure 5, IC faultlines were negatively associated with team performance only when high levels of breaching ties were present in the team. When breaching ties were at a low level, IC faultlines were more or less unrelated to performance. These interactive effects remained significant after I added cohesion and conflict into the model. Specifically, in model 7 where I did not split the sample, the two moderating effects predicted performance beyond cohesion with $\hat{\beta} = .61$ ($p < .05$) and $\hat{\beta} = -.46$ ($p < .06$), respectively. In model 8 where I used split samples to predict performance, the two interactive effects remained significant with $\hat{\beta} = .62$ ($p < .05$) and $\hat{\beta} = -.41$ ($p < .06$), respectively. Team cohesion was also a unique predictor of performance ($\hat{\beta} = .55$, $p < .01$). The overall adjusted R^2 for this final model was 0.37.

Insert Figures 4 and 5 about here

Chapter 6

DISCUSSION

In this study, I apply both faultline and network perspectives to understand the functioning of multicultural teams. Specifically, I examine the effects of faultlines and network ties on the process and performance of MCTs. I distinguished between surface- and deep-level faultlines as possible determinants of team processes and outcomes, and between bridging ties and breaching ties as possible moderators. Using evidence from a cross-sectional and longitudinal investigation of more than 100 research teams in a world-class academic institution, I found a complex pattern of effects for faultlines and bridging/breaching ties on team process and performance. Specifically, friendship bridging ties themselves had no direct effect on members' evaluations of team performance. They were only helpful when they bridged strong cultural subgroups in the team. Similarly, cultural faultlines and breaching ties themselves were not detrimental. Cultural faultlines only increased relationship conflict and hampered team performance when negative relationships were present across cultural subgroups; and breaching ties were only disruptive when they bridged strong cultural subgroups in the team. Overall, my results highlighted the importance of taking into account team members' actual network patterns while studying team composition's effects (i.e., faultlines' effects) on team functioning. I discuss the nature and implications of these findings in more detail below.

6.1. Implications for Theory: Team Faultlines

My first research question was: How do the alignments of different types of faultlines influence team cohesion, conflict and performance? To answer this question I looked at the effects of cultural faultlines, and surface- and deep-level faultlines.

Faultlines offer one approach to examining diversity in teams. The expectation that faultlines based on a variety of factors (e.g., race, gender, age, values) would impair team functioning was established in theoretical work by Lau and Murnighan (1998). Other diversity researchers, however, have conceptualized diversity in terms of two different types (surface- and deep-level) and have shown that they have differential effects on teams (e.g., Harrison et al., 2002). Based on the distinctive effects of surface- and deep-level diversity found by Harrison and colleagues (2002), I predicted that surface- and deep-level faultlines would also play different roles in the multicultural teams I studied. Using the faultline width measure developed by Bezrukova and colleagues (2002), I operationalized faultlines as the largest distance between the centroids of two sets of averages of attributes (cultural values, surface or deep-level attributes), each belonging to one of the potential subgroups. I expected a disruptive effect of cultural faultlines on team processes, and proposed that the disruptive effect would be strengthened if cultural value faultlines were aligned with other deep-level faultlines. For surface-level faultlines I made competing hypotheses with regard to their alignments with faultlines based on cultural values and argued that there were reasons to expect that the alignments could either enhance or reduce the faultlines' effects.

Unfortunately, none of my predictions regarding faultlines' direct effects on team process was supported. Cultural value faultlines themselves did not reduce cohesion. Nor did they increase conflict in teams. The alignments of cultural values with surface-level or deep-level attributes did not generate detrimental effects either. This lack of direct association between faultlines and team functioning may be explained by several reasons.

First, to the extent that research teams are driven by the goal of extending their research field, the cultural background of team members may fade in importance. Also, for research teams, researchers' individual achievements are likely to be highly dependent on team productivity (e.g., paper publications). So, team members might have been focusing on building on each others' knowledge and expertise to achieve their common goals, rather than being bothered by each other's different cultural backgrounds. In this case, team members' working attitudes may be more important than cultural values. In my sample, faultlines based on deep-level attributes (team members' commitment to tasks and goals) did influence cohesion and conflict although the alignments of cultural values with those deep-level attributes were still not significant predictors of team process. This further suggests that in research teams where members are joined by a common interest in their research topic, team members' working attitudes may override differences in their cultural values.

Another possible reason for the lack of direct relationship between cultural value faultlines and team processes might be the impact of the team or the organizational context on members' attitudes about diversity, as highlighted in the diversity literature (e.g., Chatman & Spataro, 2005; Cohen & Bailey, 1997; Homan, van Knippenberg, Van Kleef & De Dreu, 2007). Homan and colleagues (2007) proposed that diversity beliefs

may help bridge faultlines and reduce faultlines' disruptive effects on teams. Thus, research teams' cultures, and at the university level, the university's climate, may promote the valuing of diversity, which will mitigate the effects of cultural value faultlines. The academic institution where my sample research teams came from held a high commitment to promote multicultural understanding and to value diversity, as reflected in the university's Mission Statement. Therefore, the diversity-valuing climate may be one of the reasons for the lack of support for my predictions on the effects of cultural value faultlines.

With regard to the lack of consistent support for surface-level faultlines, these research teams had relatively long tenure. The average team longevity in my sample was about 3 years, and the newest team was about 7-month. Consequently, team members may have enjoyed sufficient time to get to know each other, reducing the effects of demographic attributes. As Harrison and colleagues (2002) demonstrated, over time, surface-level diversity becomes less important because people get to know each other better and will be less likely to use surface-level demographics as information proxies. Although I took a longitudinal approach, unfortunately, I did not catch most of the research teams during their formation stage. It is likely that most of the research teams in my sample had passed the period when team members only relied on thought patterns characteristic of particular genders, ethnic backgrounds or age-cohorts as information proxies. Surface-level faultlines may have mattered when those research teams were forming, but this could not be detected by my data. Future research that traces team dynamics and membership change over the course of teams' lifetimes is needed to test this conjecture.

The lack of support for the direct association between faultlines and team process is disappointing, yet thought-provoking. Most faultline studies were conducted using experimental designs (e.g., Sawyer, et al., 2005) or on student teams working on course projects (e.g., Lau & Murnighan, 2005; Thatcher, et al., 2003). In this dissertation, I conducted a cross-sectional and longitudinal field study using about 150 real research teams working in their natural contexts. However, in spite of the meaningful context, the large number of teams, and the statistical power I had, I still did not detect significant direct impacts of faultlines on team functioning. All this suggests that maybe the effects of faultlines on team processes and performance have been overstated. Faultlines may not be empirically very important on their own. This lack of direct relationship between faultlines and the team process variables is also in line with van Knippenberg, et al., (2004) who suggested that salient subgroup categorizations in diverse teams are not detrimental in and of themselves. The negative effects arise only when intergroup bias is engendered by such subgroup categorizations. Therefore, focusing solely on team members' attributes while ignoring the underlying processes that elicit inter-group biases runs the risk of generating misleading interpretations of faultlines' effects in teams.

To address this issue, in this study, besides focusing on team composition (i.e., faultlines), I also emphasized the importance of team members' actual network ties as the major conditions under which faultlines may matter. The network approach helps to paint a realistic and comprehensive picture of team members' relationships. My results underscore the importance of team members' interaction patterns (captured as network ties) and show that it is the interplay of team composition and team members' network

links that drives team performance. The specific findings related to network ties and their implications for diversity and team research are discussed in the section below.

6.2. Implications for Theory: Network Ties

My second research question was: What are the roles of network ties in multicultural teams? Previous diversity research has been using diversity as the proxy for network patterns in a team (Reagans & Zuckerman, 2001). However, as Lawrence (1997) argued, diversity structure and network structure may not always be congruent. It is possible for team members to build heterophilous ties with dissimilar team members. Appendix H depicts a couple of examples of the network patterns of research teams in my study. As can be seen, team members did develop positive and negative relationships with dissimilar others. I proposed that those relationships that span subgroup boundaries are likely to determine the effects of faultlines on team processes and performance.

Specifically, I distinguished between internal and external, bridging and breaching ties, and made different predictions about their effects. Friendship bridging ties within a team bridge people with different cultural values, and were expected to serve as conduits for positive information exchange between cultural subgroups, weaken the effects of cultural faultlines and contribute to performance. Breaching ties, on the other hand, transfer negative affect between subgroups, and were proposed to elicit inter-sub-group biases and were hypothesized as detrimental. Finally, I also argued that because external bridging connections expose people to a broader array of cultural values (Erickson,

1996), they would weaken the effects of cultural faultlines and thereby improve performance.

Unfortunately, the notions of friendship or external bridging ties as buffers of the effects of cultural faultlines on cohesion and conflict were not supported. On the other hand, the interaction of cultural faultlines based on individualism/collectivism and breaching ties did affect relationship conflict. That is, IC faultlines only contributed to relationship conflict when negative interpersonal relationships were present across IC cultural subgroups. This is an important finding that underscores the importance of network ties on faultlines' effects. It also corroborated the point raised by van Knippenbert and colleagues (2004) that what is disruptive for diverse teams is the inter-subgroup bias rather than the salient subgroup categorizations themselves. Consequently, the results of the present study indicate that team composition by itself is not important, but becomes important when cultural faultlines coexist with negative relationships among team members from different cultural subgroups. This combination produced detrimental processes by accentuating the impact of faultlines on relationship conflict.

It is noteworthy that the significant interaction effect was not found for cultural faultlines based on power distance and breaching ties between PD subgroups. So, it seems that compared with IC values, PD cultural values were not as important for those research teams, and accordingly, it made no difference whether there were animosity ties spanning different PD subgroups.

The fact that breaching ties, rather than bridging ties were found to be a significant moderator might be explained by "negative asymmetry" (Labianca & Brass, 2006) that

negative relationships have a greater impact on human attitudes than positive relationships. As Labianca and colleagues (1998) demonstrated, perceptions of conflict were associated with negative interpersonal relationships with out-group members, but not decreased by the presence of friendship ties. Thus, breaching ties may be more important than friendship bridging ties in influencing faultlines' effects on relationship conflict perceptions. On the other hand, for task conflict perceptions, the interactive effect of breaching ties and cultural faultlines was found significant at time 1. Although it became weaker and non-significant at time 2, the interaction was in the predicted direction. So, it is possible that the non-significant effect was a result of the low statistical power in my longitudinal investigation. Besides, no moderating effect was found significant for team cohesion. Therefore, it seems that the interaction of breaching ties and cultural faultlines was more influential on conflict than on team cohesion perceptions.

In addition, it is also noteworthy that different from Labianca et al., (1998), negative relationships themselves were not found to be *directly* related to perceptions of relationship conflict in my sample. They only increased conflict when they cut across *opposing* cultural subgroups. However, it is also important to note that Labianca et al.'s study (1998) was on *intergroup* conflict. Group memberships were clearly defined in their sample and each work unit was a group. In contrast, my focus was *intra-team* dynamics. For each of my research teams, no clear sub-group boundary was defined priori. My finding suggests that only when opposing cultural subgroups are present in a team, will negative relationships linking the two cultural subgroups elicit inter-sub-group biases and foster relationship conflict. To the extent that the existence of strong cultural

faultlines coincide with in-and out-group boundaries, my findings are consistent with what Labianca et al., (1998) found, and the direct association between negative relationships with out-group members and perceptions of intergroup conflict in Labianca et al.'s study (1998) might reflect the relationship under strong inter-group boundaries (i.e., strong faultlines).

The interaction effect between bridging/breaching ties and cultural faultlines also affected team performance. This was the most striking finding in this study. I predicted a direct relationship between bridging/breaching ties and performance. When the results did not support my predictions, I did a supplemental analysis. The results of the post-hoc analysis demonstrated that cultural value faultlines and bridging/breaching ties individually did not impact team performance. Yet the interactions of cultural value faultlines and internal bridging/breaching ties exerted strong influence on team members' evaluations of team performance. Specifically, under conditions of strong IC faultlines combined with high levels of friendship ties across IC cultural subgroups, team performance was improved. By contrast, under conditions of strong IC cultural faultlines combined with high levels of negative relationships across IC cultural subgroups, team performance was lowered. These interactive effects on performance occurred regardless of the level of cohesion or conflict on a team. They also remained significant after I split my sample in half and used multi-source data to predict performance over time. Both the longitudinal design and use of multi-source data contribute to my confidence in the findings. In addition, because common method bias is a type of correlated error, it cannot provide an additional explanation for the moderating effects presented here (Harrison, et al., 1996).

It is interesting to note that the interaction between faultlines and bridging/breaching ties only predicted team performance, but not team cohesion or conflict (except that IC faultlines and breaching ties also interactively influenced relationship conflict). This suggests that the interplays between faultlines and bridging/breaching ties did not exert their influences on performance through enhancing/reducing cohesion or lessening/increasing conflict. Instead, these interactive effects occurred through some other mechanism. One such mechanism is knowledge transfer (Hansen, 1999; Hansen, Mors & Lovas, 2005; Miller, Fern, Cardinal, 2007; Tsai, 1999). Networks have the potential to facilitate or constrain the flow of information and knowledge that are relevant to achieve collective goals within teams (Brass, 1984; Coleman, 1988). Specifically, network scholars have demonstrated that relationships within teams and organization subunits (e.g., Levin & Cross, 2004), teams' and individuals' external relations (e.g., Ancona & Caldwell, 1992), and inter-unit relations (e.g., Hansen, 1999; Tsai, 2001) can facilitate or impede the sharing of knowledge. In research teams, friendship ties that bridge opposing cultural subgroups can serve as channels through which useful knowledge and information flow between subgroups. Through these bridging relationships, team members may better recognize opportunities for knowledge use and integrate the diverse information and knowledge represented by different subgroups into innovative solutions (Miller, et al., 2007).

On the other hand, if negative relationships are present across subgroups, the negative affect transferred may elicit inter-subgroup biases, limit the extent to which valuable information and tacit knowledge is shared, used, and attended to by subgroup members, and prevent the integration of diverse ideas, which accordingly hampers team

performance. Therefore, whether network ties interact with faultlines to influence team performance is dependent on whether team members' relationships facilitate or inhibit knowledge sharing between subgroups. This process is irrelevant for team cohesion or conflict. To better understand the interaction between network ties and faultlines, future studies are needed to measure the actual knowledge and information that flow through network ties (e.g., Hansen, 1999).

Finally, external bridging ties were not found to be a significant moderator. This lack of support for external bridging ties suggested that my prediction that the internal network of a team would be reflected by its members' external interaction patterns did not hold for my research teams. Being friends with dissimilar people outside the team does not necessarily mean team members will also build friendship bridging ties within the team. This study suggests that without internal bridging ties, external ties alone will not be influential on team faultlines.

6.3. Contributions

Altogether, my findings underscore a central and potentially powerful role for the interplay between team faultlines and internal bridging/breaching ties in multi-cultural teams. On one hand, team faultlines themselves were not disruptive. Their impacts depended on the existence of network ties between the subgroups engendered by the faultlines. On the other hand, friendship bridging ties alone were not sufficient to boost team performance, and breaching ties alone were not sufficient to hamper goal achievement, but instead, their effects became apparent only when they cut across strong

subgroups. By highlighting the interaction between team faultlines and bridging/breaching ties, this study makes several contributions to the diversity/faultline, network and multi-cultural team literatures.

First, this study enriches the literature on diversity in general and on faultlines in particular by incorporating network concepts. Diversity research has long been criticized as having a "black box" problem (Lawrence, 1997); that is, faultlines and diversity are expected to have a direct effect on team outcomes but the intervening psychological and social constructs remain unexplained and unmeasured. In my study, the pattern of bridging/breaching ties serves as surrogate for the intervening social constructs. Rather than treating diversity and network structures as congruent and using diversity as a proxy for interaction patterns, this study investigated the effects of network ties on faultlines' impacts. In this regard, this study represents an empirical test of the proposition raised by Lawrence (1997) that the direct relationship between diversity and outcomes might be overemphasized. My results from cross-sectional and longitudinal analyses of about 150 real research teams working in their natural contexts supported this proposition. Faultlines themselves do not influence team functioning; instead, their impacts on team process and performance depend on the social interaction patterns among team members. When positive relationships are present across subgroups, members who occupy the bridging positions may facilitate fruitful interactions and knowledge sharing between subgroups (Gibson & Vermeulen, 2003; Moosebrucker, 1988). Under this circumstance, faultlines will less likely to be activated, and teams would be less vulnerable to the disruptive effects of faultlines. In fact, faultlines can become beneficial if the diversity of insights represented by different subgroups can be drawn out by the bridging ties, and the

subgroups are able to be integrated into a fully functioning team. On the other hand, when teams are characterized by negative relationships cutting across subgroups, the teams' faultlines are more likely to be activated. The negative inter-group relationships may contribute to detrimental processes and trigger the latent impacts of faultlines.

Therefore, bringing together diverse people does not automatically activate team faultlines. The network ties existing between subgroups engendered by the faultlines appear be the critical factors that determine whether faultlines' effects are felt. To date, diversity research has largely remained agnostic with respect to team members' actual network patterns, and there has been a lack of synthesis between diversity or attribute-based approaches and network or relation-based approaches to team outcomes (Balkundi & Harrison, 2006). In a study of identity confirmation networks, Milton and Westphal (2005) made an initial effort to integrate the organizational demography literature with the network perspective by suggesting team members' identity confirmation patterns mediate the relationship between race-based diversity (i.e., race dissimilarity with other team members) and individual performance. Going beyond Milton and Westphal (2005), this dissertation examined team members' actual positive and negative social relationship networks, and investigated how they work together with team's overall diversity structure to influence team performance. To date, no study has looked at the effect of the interaction between network variables and diversity variables on team level outcomes. By emphasizing the importance of the interplay between team faultlines and network ties, this study contributes to theory that simultaneously accounts for diversity and structural influences on team effectiveness. Meanwhile, by highlighting network patterns as one possible medium through which cultural faultlines may take

effects, this study represents a step forward to open the black box in diversity research (Lawrence, 1997). In doing so, this study also offers a possible explanation for the mixed findings in previous diversity research about the effects of diversity on team process and performance. That is, ignoring team members' internal relationship patterns may have produced spurious results.

Second, applying network concepts to diversity research, this study also contributes to the network literature. Network research has been guided by the concept of homophily, the tendency for people to associate with similar others (Lazarsfeld & Merton, 1954). Many network researchers have examined the patterns of homophily in teams and organizations, and how they influence individual, team and organizational outcomes (e.g., Ibarra, 1992, 1993; Mollica et al., 2003; Mehra, et al., 1998). In Milton and Westphal's study (2005), they also emphasized the homophilic tendency in team members' identity confirmation networks. On one hand, people tend to be more comfortable interacting with similar others because "interpersonal similarity increases ease of communication, improves predictability of behavior, and fosters relationships of trust and reciprocity" (Ibarra, 1993: 61). On the other hand, in organizations people do not get to choose whom they work with; instead, organizations constrain members' choices concerning with whom to associate. Therefore, homophily may not hold in most organizational settings (Lawrence, 1997).

Thus, rather than focusing on team members' homophilous ties as most network research does, this dissertation emphasizes *bridging* and *breaching* ties that link people with different diversity attributes. By looking at positive and negative relationships that cut across subgroup boundaries, this study enriches the network literature in a way that is

vital to current understanding of the role of network ties in teams. The results of this study demonstrated that network ties are important, but their roles are more complex than previous network research and theory suggest. Positive-affect ties within teams may no longer be generally helpful, and negative relationships may not be uniformly detrimental. What really drives performance is whether those relationships bridge opposing subgroups rather than just bridging random individuals. The existence of subgroups may provide support for individual team members' opinions, and encourage members to express the ideas that they share with their similar others (Gibson & Vermeulen, 2003). On the other hand, when friendship ties cut across subgroup boundaries, they may serve as the conduits for the flow and exchange of information between subgroups, rather than just between two individuals. Accordingly, these bridging ties may facilitate members' ability to recognize the diversity of insights and knowledge represented by different subgroups and integrate these into innovative solutions (Oh, et al., 2004; Reagans, et al., 2004). Without bridging ties, subgroups may not be able to draw out all potential diverse knowledge and skills available in the teams.

In a similar vein, when breaching ties exist between two cultural subgroups, these interpersonal negative relationships may elicit inter-group biases, which accordingly can prevent knowledge sharing within teams, thereby hampering performance. The existence of cultural subgroups, then, amplifies the negative affect conveyed by the interpersonal animosity which otherwise might remain between individuals and not spill over to the whole team.

As the interest in network effects on teams grows, it is important to understand when the pattern of social ties is most influential. By highlighting the interactive effects

of bridging/breaching ties and team faultlines on team performance, this dissertation reveals a distinctive role of network ties that can not be detected by the homophily approach. In the meantime, it also represents an empirical test of the leverage of using the network approach to study diversity-related questions. My results demonstrated the fruitfulness of incorporating network perspectives into diversity research: It not only helps explain diversity's effects on teams, but also uncovers a more complex role of network ties in teams. So, by integrating network approach with diversity literature, this study extends network research into new territory and pinpoints a promising avenue for future network research. Future studies on network patterns and team performance should incorporate team composition, and particularly take into account the specific members' attributes that are represented by the network ties. Do those ties link people with the same attributes, or people with dissimilar attributes thereby bridging different subgroups? The answers to these questions are likely to determine whether network ties will exert influence on team dynamics and outcomes.

Finally, I also offer a theoretical contribution regarding multi-cultural teams, demonstrating how relationships across cultural subgroups within a team influence cultural faultlines' effects on team performance. By considering the distribution of the attributes that are related to team members' cultural backgrounds, and which, if any, social relationships among team members cut across their cultural differences, it is possible to develop a more thorough understanding of factors that impact effective performance of multi-cultural teams than permitted by previous research.

6.4. Limitations and Implications for Future Research

Some limitations of this research need to be addressed. These limitations also raise a number of questions for future research.

First, complete data were not available from all team members. Teams were included in the analysis if data existed for more than 50% of the team members. This could affect the results. However, I did run analysis on teams with over 80% within-team responses, and on teams with no missing data. This reduced my overall sample size and my power to detect the significant moderating effects. Still, the overall pattern of results is consistent with those I reported here. Specifically, for the sample of teams with over 80% within-team responses (n=96 for the cross-sectional analysis; n=80 for the longitudinal analysis), all the results for my hypotheses testing were in the same direction as what I reported here. Due to the lower statistical power, 14 out of the 23 significant results in the > 50% sample (including the interactive effects of bridging/breaching ties and IC faultlines on team performance) became only marginally significant or non-significant, but they were still in the same direction as for those teams with over 50% within-team responses. For the sample of teams with full responses (n=64 for the cross-sectional analysis; n=56 for the longitudinal analysis), 16 out of the 23 results (including the interactive effects of bridging/breaching ties and IC faultlines on team performance) became only marginally significant or non-significant; but again, they were in the same direction as for those teams with over 50% within-team responses. It is also noteworthy that the interaction between IC faultlines and breaching ties remained a

significant predictor of relationship conflict for both "over 80%" teams, and "full-response" teams.

Secondly, the particular characteristics of research teams in my sample may raise concerns about the extent to which my results will generalize to working teams in business organizations. As I mentioned earlier, to the extent that research teams are driven by the goal of extending their research field, team members might set aside cultural differences and work to communicate with people who are engaged in similar or related research topics regardless their respective cultural values. Under this circumstance, perceptions of team members' expertness or research interests may be more important than cultural values. So dedication to the tasks of the research team may not activate cultural value faultlines, or, the effects of cultural faultlines might be minimized in my sample. Therefore, future studies are warranted to replicate my findings in other types of teams in business organizations. Experimental studies that investigate cultural faultlines' effects under maximal faultline experimental conditions are also valuable. On the other hand, future studies on research teams could also investigate other types of faultlines, such as faultlines based on geographic locations (Polzer, et al., 2006), expertiseness (Van der Vegt, Bunderson & Oosterhof, 2006) or functional backgrounds (Randel & Jaussi, 2003). In addition, the two deep-level attributes selected in the study were goal commitment and task meaningfulness. There are many other important work-related attitudes and beliefs that I did not include. For instance, Bell's recent meta-analysis (2007) found several deep-level composition variables as important predictors of team performance, including the big five personality factors. So an

important question for researchers would be which types of deep-level attributes would have significant impacts on which types of teams.

In addition, I was not able to catch most of my research teams at their beginning stages. The newest team in my sample was about 7-month old. This could influence my findings, particularly regarding the effects of surface-level faultlines. Also, according to Gersick (1989), teams are more performance-oriented in the second half of their life cycles. Thus, it is possible that performance might be inflated in my sample if most of my teams were in the second half of their life cycles. Finally, my longitudinal design speaks to the direction of causality that the interaction of faultlines and bridging ties precedes relationship conflict and performance. Still, this conclusion might only be a snapshot of my research teams over their whole life cycles. It is possible that relationship conflict between team members at the team's forming stages leads to the development of animosity ties, which subsequently interact with faultlines and generate more conflict. It would be valuable if future research would take a more fine-grained longitudinal approach and trace the interplay of team composition, team interaction patterns and team outcomes over the lifetime of the team. I recognize the challenges of finding such research opportunities, especially given the research focuses are in such sensitive topics as diversity and conflict. Still, this would be an important next step and a fine-grained longitudinal approach will add new knowledge to both diversity and team research.

Thirdly, there are also some limitations regarding the faultline measure I used in this study. As mentioned earlier in the method section, in the current faultline literature, there are two ways to measure team faultlines: faultline strength and faultline width (Bezrukova et al., 2002; Molleman, 2005; Thatcher, et al., 2003). Faultline strength

measures similarity within subgroups, while faultline width emphasizes dissimilarities between subgroups within a team. Thefaultline width measure was chosen over the strength measure in this study due to the fact that my research samples varied a lot in size (ranging from 3 to 20), and faultline strength was significantly confounded with team size. Also, the strength measure does not adequately address the extent of "separation" within teams (Thatcher, et al., 2003). On the other hand, it is also advisory for future studies to replicate my study using teams with comparable sizes and examine whether faultline strength and width have different patterns of influence in teams. More importantly, it would be valuable if future research could develop a faultline measure that combines both the strength and the width aspects of faultlines that is less sensitive to fluctuations in team size.

In a related matter, the faultline width measure calculated faultlines that split teams into two subgroups. In my sample of research teams, although the average team size was 6, the biggest team comprised of 20 members. It is very likely that for teams with over 10 members, more than 2 subgroups could be present in the team, which accordingly might lead to other team dynamics, such as coalition formation among subgroups. Future research should examine the possibility of faultlines that split teams into more than two sub-groups. The multivariate statistical cluster analysis literature (e.g., Jobson, 1992; Sharma 1996) may be used to address this problem.

Fourthly, although the average R_{wg} measures for my process variables were quite strong, indicating within-team inter-rater agreement, in about 10% of my samples team members did not agree with each other (see Table 2). Although cohesion and conflict are team-level constructs, we can not assume that all members within a team are

homogeneous in their perceptions of team-level phenomenon. Especially in culturally diverse teams, team members with different cultural values are likely to interpret and acknowledge conflict differently (Brew & Cairns, 2004; Lee & Rogan, 1991; Ting-Toomey, 1999; Ting-Toomey & Oetzel, 2002; Tinsley, 2001; Weldon & Jehn, 1995). In addition, each team member's social network within the team may also influence his/her perceptions regarding team phenomenon (Labianca, et al., 1998). Therefore, the aggregation of team members' individual perceptions may not always be the appropriate way to capture team level conflict and cohesion. Future studies are encouraged to investigate the asymmetric conflict perceptions (Jehn, Rispens & Thatcher, 2008) or the possible effects of the dispersion in the degree of team cohesion, and find a way to properly evaluate team process that accounts for asymmetric perceptions.

To better understand team process, it is also important for future studies to recognize team process is an evolving construct. Members' interactions with other members may well shift over time. Marks, Mathieu and Zaccaro (2001) noticed in their review of team process that the differentiation between team process and resulting states of these processes were often blurred. In this dissertation, in order to uncover the process that underlies the effects of faultiness, I used members' network ties as surrogates of members' interaction patterns. However, network ties still only represent a snapshot of members' interacting with each other. What is more important is members' interdependent behavioral activities that convert inputs to outcomes to achieve team goals (Marks, et al., 2001). Network ties that span subgroup boundaries have the potential to serve as conduits for fruitful information exchange and knowledge sharing between subgroups. However, whether network ties indeed provide information benefits for teams

will depend on how the team members who occupy the network positions behave. Only when members who are in brokerage roles (Gray, et al., 2005) are able to communicate efficiently with both subgroups, can they help the subgroups to transcend between-group biases and enable productive exchange between subgroups. Thus, the specific behaviors of individuals who occupy particular structural positions can play a pivotal role in team outcomes. Future studies are not only needed to examine team members' interaction patterns longitudinally (Brass, Galaskiewicz, Greve, & Tsai, 2004), but also to explore team members' specific behaviors that contribute to team performance.

Fifthly, team performance in this study was measured with self-report instruments. The use of other sources or other types of measurement, such as experts' ratings, or some objective metrics (e.g., publications, grants, etc) would have strengthened the validity of the study. However, my performance model was tested using split samples where the responses of half of the sample at time 1were used to obtain aggregate measures of team processes and the responses of the remaining half were used to measure performance at time 2. This longitudinal design and multisource data eliminates concerns of common method bias and enhanced confidence in my research conclusions regarding research team performance. Besides, consideration of other team process and outcome variables, such as information use (Dahlin, Weingart & Hinds, 2005), communication processes (Gersick, 1989) and team viability, would make useful extensions of my proposed model.

Still another consideration is that, in this study, I focused on the effects of network ties, but did not explain or examine the origins of those interaction patterns. On one hand, it enables me to avoid assuming that diversity structure leads to network structure. On the other hand, it is worthwhile to examine how changes in team composition may impact its

network patterns. The presence or absence of strong faultlines may create team structures that influence team members' social interaction patterns. Taking the faultlines based on geographic locations as an example, for research teams, it is very possible that members of the same team are located in different research labs. Spatial proximity engenders familiarity and is likely to be one of the reasons for relationship building as it offers the opportunity for face-to-face communication. Thus, relations among geographically-dispersed members are likely to differ from those who are co-located (e.g., in the same lab). Also, as demonstrated earlier, team members' negative experience with out-group members (breaching ties) could strengthen faultlines' effects over time. On the other hand, the existence of subgroups created by faultlines may also promote members' negative feelings toward out-group members, thereby engendering breaching ties. Thus, the reciprocal relationships between diversity and network ties, and their interactive effects on team functioning pose intriguing questions for future empirical research.

Also, this study examined the effects of faultlines based on team members' attributes. However, as argued earlier, actual faultlines may not always be activated. Thus, future research could measure team members' faultline perceptions: perceptions about subgroup existence within their teams. It is possible that at the beginning, actual surface-level differences might be the driver for perceived faultlines, but as time goes by, team members' network patterns may be more influential on perceived faultlines. The relationship between actual and perceived faultlines, network ties, and their direct and joint effects on team processes and outcomes deserves more investigation.

It is also noteworthy that by measuring friendship and animosity ties, I focused on the expressive features of relationships within teams in this study. Future diversity and network research may consider advice relations and their interactions with team composition on performance-related outcomes. Also, as the benefits of bridging ties lie in their bridging effects, more studies are needed to examine possible interventions such as leadership and team member development that assist teams in developing productive heterogeneous ties and in understanding and utilizing the different knowledge and skills represented by different cultural groups in MCTs. It would also be useful to see if differences would occur if cultural bridging ties span vertical boundaries vs. horizontal boundaries (e.g., Oh, et al., 2004).

Shifting down a level of analysis, I recommend further investigation of the antecedents of team members' network positions. How did team members take the bridging roles in the first place? Klein and colleagues (2004), for instance, investigated those individual characteristics that influence team members' network positions. Future research could examine unique characteristics of individuals in those bridging roles in diverse teams, and how these bridging positions distinguish those team members from others in terms of attitude, sub-group identity, creativity and performance.

Finally, taking a multi-level perspective, both structure and the characteristics of individual nodes can be important for individual, team or organization outcomes (e.g., Ibarra, 1993; Kilduff & Krackhardt, 1994; Mehra, Kilduff & Brass, 2001). For instance, Obstfeld (2005) demonstrated that both network density and people's strategic orientation toward connecting people in one's social network (tertius iungens orientation) are significant predictors of innovation. In a similar vein, for MCTs, both network structure

and team members' orientation to form social network ties with dissimilar others should influence team outcomes. Thus, future studies are warranted to investigate how team member characteristics, as well as network structures influence faultlines' effects on MCTs.

6.5. Implications for Practice

The findings of this study also provide some important insights for managers. Although sometimes, team leaders do not have control over team composition, team leaders should not feel threatened by diverse team composition that has the potential to split teams into subgroups. My work suggests that composition alone can not contribute to performance. Instead, developing and maintaining high levels of positive relationships among dissimilar team members may help draw out the positive aspect of diverse composition. Thus, team leaders should try to assist teams in developing productive heterogeneous ties. This involves building friendship ties while avoiding animosity ties between members from different subgroups. This could take the form of social activities that provide opportunities for team members to socialize with dissimilar others, which might help promote friendship building; or through proactive training to help members appreciate each other's cultural values, which may help reduce misunderstanding and the associated negative feelings. Also, rather than sweeping the negative feelings under the table, it is important for team leaders to take a proactive role to resolve the negative relationships among team members, especially among those from different subgroups.

Those negative relationships between subgroups are the underlying mechanisms that trigger the latent impacts of faultlines.

6.6. Conclusion

Diversity research has yielded a number of inconclusive results and suggests that alternative ways to study team diversity are needed (Williams & O'Reilly, 1998). In this dissertation, I integrate diversity literature with network perspectives and emphasize the importance of taking into account team members' network ties while studying team composition's effects on team processes and outcomes. Using evidence from cross-sectional and longitudinal investigations of more than 100 research teams in a major research university, I demonstrated the importance of the interplay of team composition and networks. By showing team members' internal bridging ties as important mediums through which faultlines take effects, this study offers one possible explanation for the mixed findings of diversity research, advances our understanding of diversity's effects in teams, and extends network research into new territory. Using both faultline and network approaches to study multi-cultural team dynamics, this study also enriches team literature and adds knowledge to our understanding of multi-cultural team effectiveness.

As the impact of diversity and faultlines continues to be a growing area of research, albeit one with contradictory findings, it is important to uncover the black box to understand how and why such effects occur. Bringing network theories to diversity research provides a compelling stage for finding the answer. This dissertation presents a

first step to apply network concepts to diversity research, and hopefully will spur more research in this direction.

FOOTNOTES

[1] According to Lau and Murnighan (1998), faultlines can form based on one or more attributes. I recognize that within one team, there can be multiple faultlines formed around different types of attributes. My interest in the study is faultlines based on cultural values only, faultlines based on surface-level attributes, and faultlines based on deep-level attributes. In the rest of the dissertation, I refer to faultlines based on cultural values as *cultural value faultlines*, faultlines based on surface-level attributes as *surface-level faultlines*, and faultlines based on deep-level attributes as *deep-level faultlines*.

[2] Here, when I talk about the alignments of cultural value faultlines with surface-level (or deep-level) faultlines, I refer to the situation when the faultline based only on cultural values within the team overlaps with the faultline based on surface-level (or deep-level) attributes. Under these circumstances, cultural value differences are also aligned with surface-level (or deep-level) differences. I recognize that when the faultlines are aligned, there is actually one faultline within the team that is based on both cultural values and surface-level (or deep-level) attributes. Accordingly, when I operationalize the alignments of faultlines in the later part of the dissertation, I calculate faultlines based on both cultural values and surface-level (or deep-level) attributes simultaneously.

[3] I acknowledge that cultural values may overlap with race which is part of surface-level diversity. In a team of White Americans and Chinese, for example, both race and values are intertwined. I examine the overlap between surface-level diversity and cultural value faultlines in the next section.

[4] Bezrukova and colleagues (2002) created a measure of faultline width to help study the effects of faultline on teams. Based on their measure, faultline width is a continuous variable with larger values indicating wider faultlines. Here, by using the term "moderate" faultlines, I follow Bezrukova et al., (2002) and consider faultline width as a continuous variable.

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APPENDIX A

FIGURES

Figure 1

Hypothesized Relationships

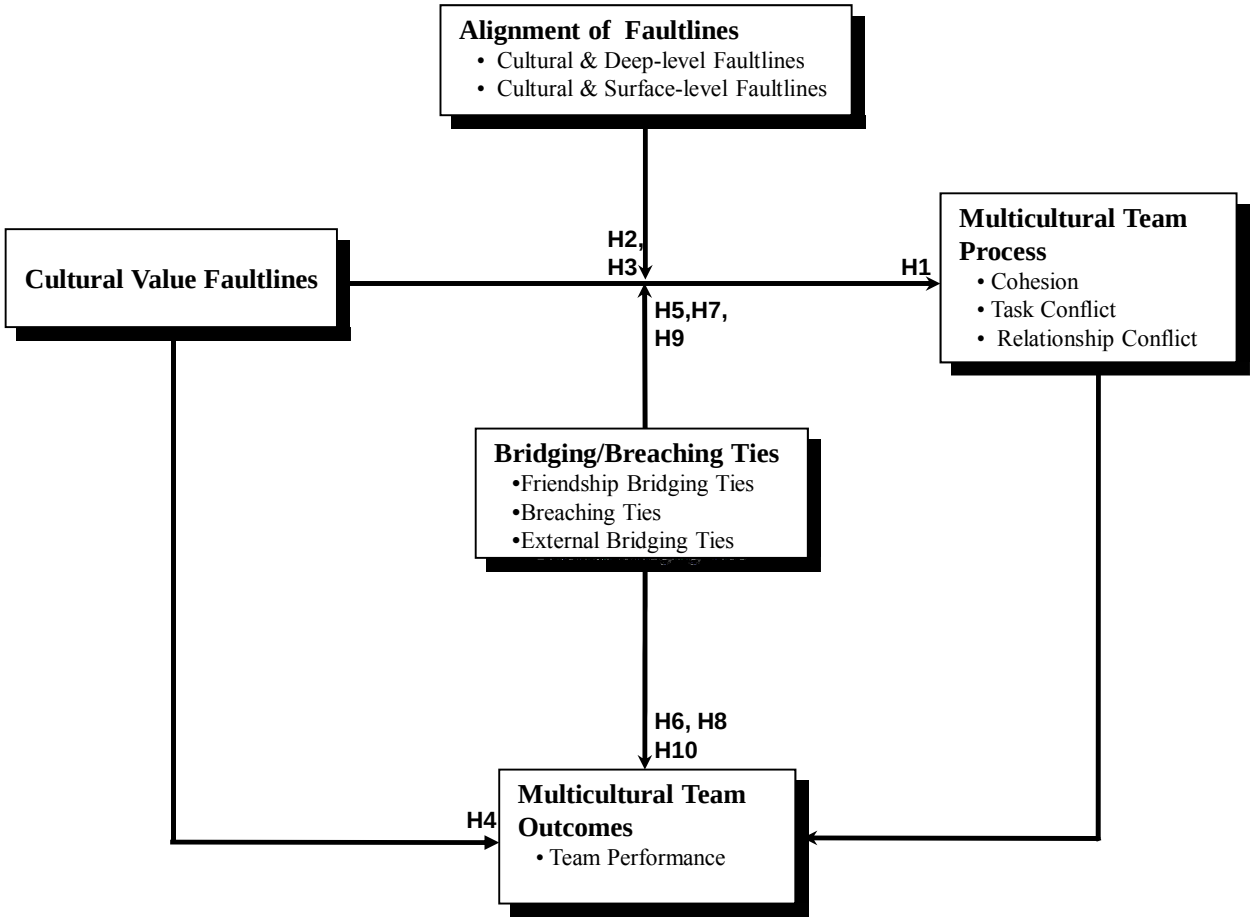


Figure 2

Examples of Team Faultlines

a: Extremely strong faultline splitting the team into two distinctive subgroups

Convergent Team):

	Cultural Value	**Cultural Value**	**Cultural Value**	**Cultural Value**	
Member A	High	High	Low	Low	
Member B	High	High	Low	Low	
Member C	Low	Low	High	High	**Faultline1**
Member D	Low	Low	High	High	

Note: The faultlines based on cultural value 1, or 2, or 3 or 4 converge (faultline1).

b: Faultline that leaves a bridge between subgroups (Cross-cut Team):

	Cultural Value	**Cultural Value**	**Cultural Value**	**Cultural Value**	
Member A	High	High	Low	Low	**Faultline2** ↓
Member B	High	High	High	Low	
Member C	Low	Low	High	High	↑ **Faultline1**
Member D	Low	Low	High	High	

Note: Faultline 1 is based on cultural value 1, 2 and 4. Faultline 2 is based on cultural value 3. The subgroups engendered by faultline 1 crosscut the subgroups engendered by faultline 2.

c: Homogeneous team with no faultline (Homogeneous Team):

	Cultural Value	**Cultural Value**	**Cultural Value**	**Cultural Value**
Member A	High	High	High	High
Member B	High	High	High	High
Member C	High	High	High	High
Member D	High	High	High	High

Figure 3a

Interaction of IC Faultlines and Breaching Ties with Relationship Conflict as Dependent Variable (Time 1)

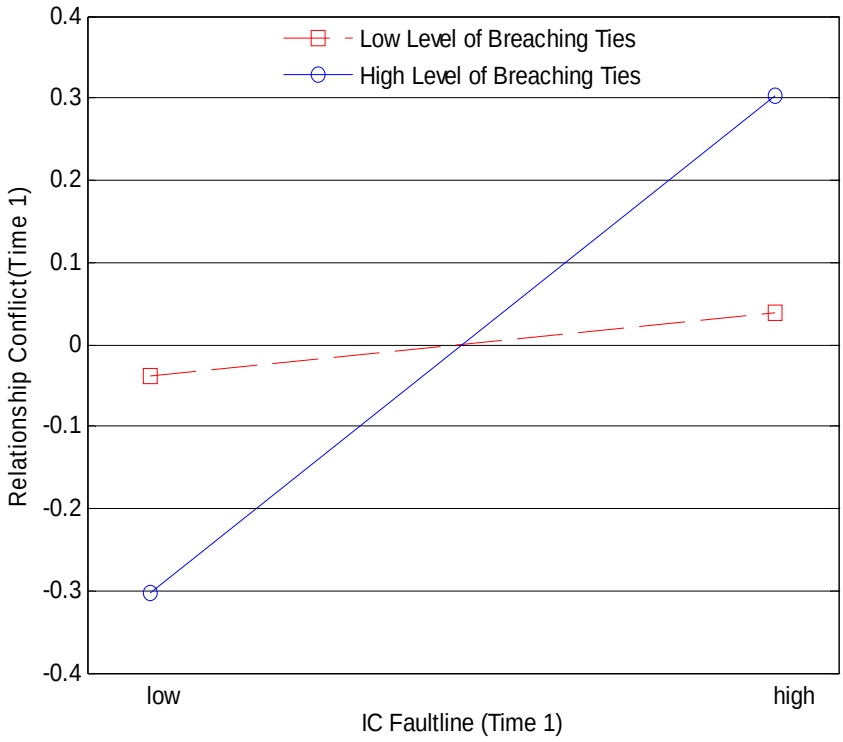


Figure 3b

Interaction of IC Faultlines and Breaching Ties with Relationship Conflict as Dependent Variable (Time 2)

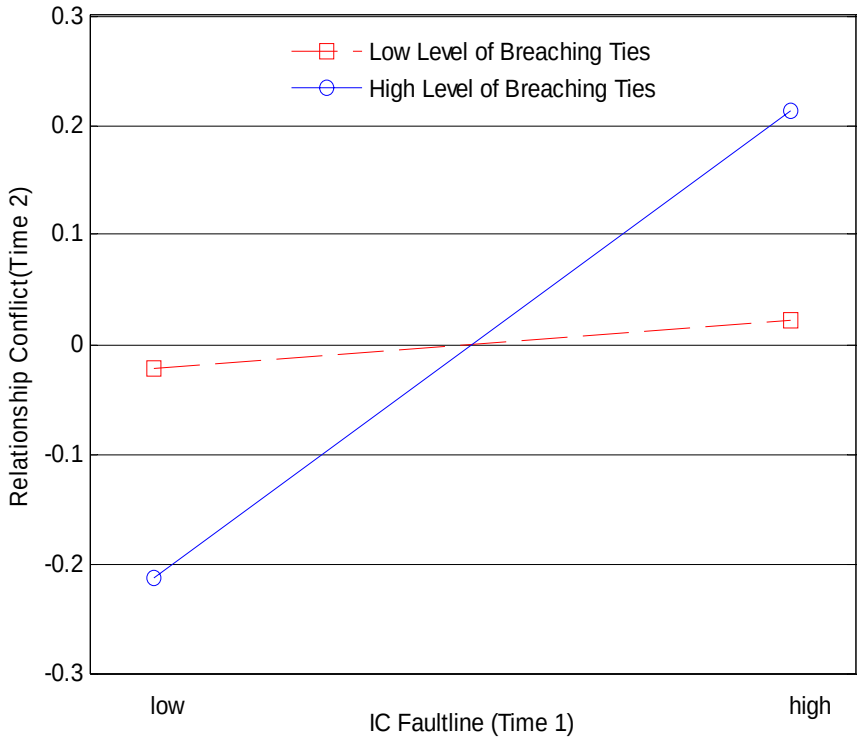


Figure 4

Interaction of IC Faultlines and Friendship Bridging Ties with Team Performance as Dependent Variable (Time 2)

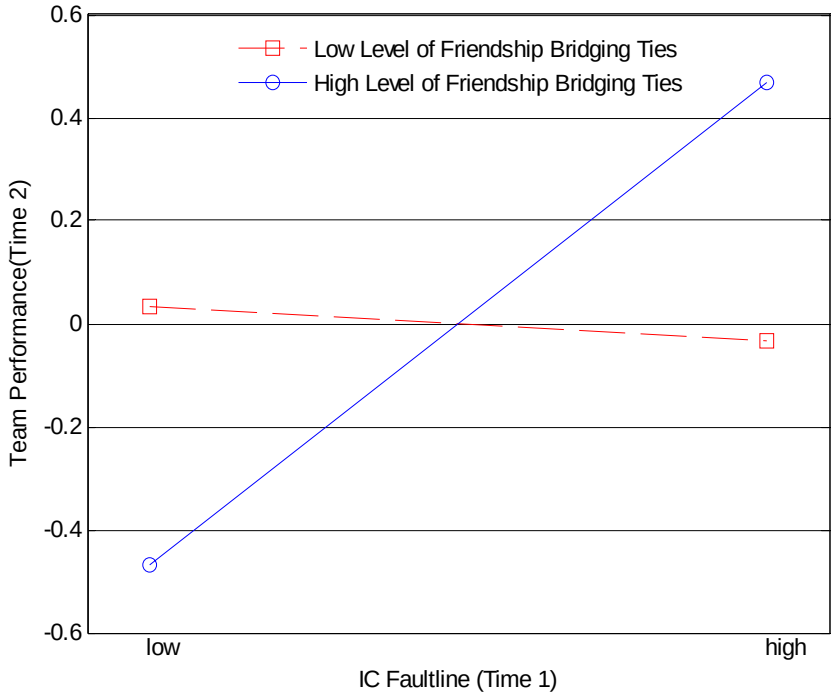
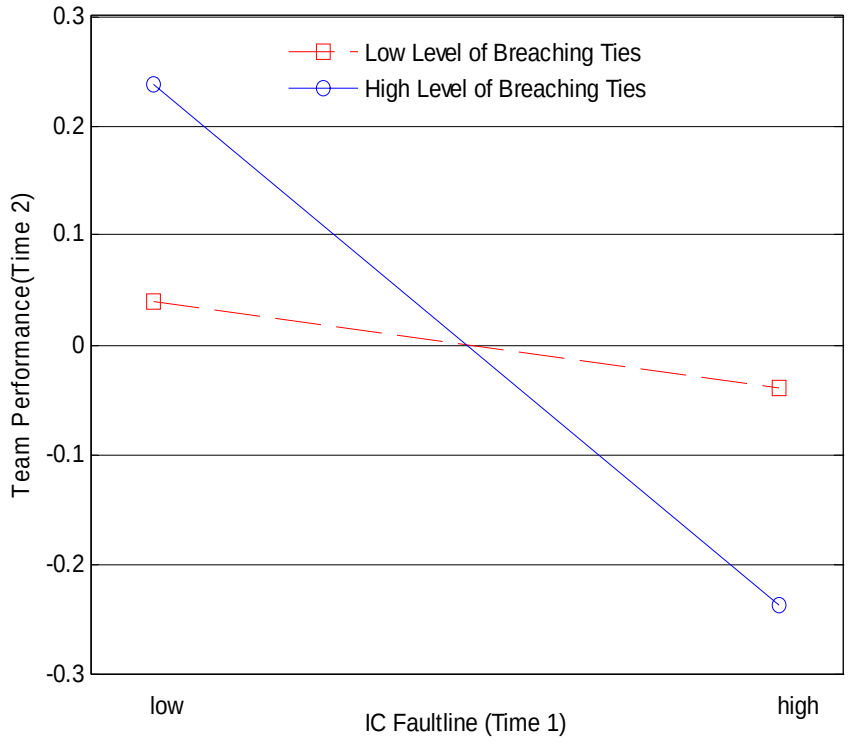


Figure 5

Interaction of IC Faultlines and Breaching Ties with Team Performance as Dependent Variable (Time 2)



APPENDIX B

TABLES

Table 1
ICC Results

Variable	ICC (wave 1)	ICC (wave 2)
Team Cohesion	0.22	0.21
Task Conflict	0.17	0.19
Relationship Conflict	0.34	0.36
Team Performance		0.20

Table 2
R_{wg} Measures

Scale	Wave 1: >=70%	Mean (Wave 1)	Median (Wave 1)	Wave 2: >=70%	Mean (Wave 2)	Median (Wave 2)
Team Cohesion	88% (137)	0.86	0.93	90% (135)	0.85	0.92
Task Conflict	94% (145)	0.87	0.92	93% (140)	0.89	0.93
Relationship Conflict	90% (139)	0.87	0.94	92% (139)	0.89	0.94
Team Performance				84% (126)	0.84	0.91

Table 3
Estimated Reliability

Scales	Alpha （wave 1）	Alpha (team level, wave 1)	Alpha （wave 2）	Alpha (team level, wave 2)
Collectivism	0.79			
Power Distance	0.73			
Task Meaningfulness	0.81			
Goal Commitment	0.77			
Task Conflict	0.84	0.89	0.84	0.90
Relationship Conflict	0.93	0.97	0.93	0.96
Team Cohesion	0.85	0.92	0.89	0.92
External Tie	0.76		0.74	
Team Performance			0.87	0.89

Table 4
Six-Factor Solution on Team Individualism/Collectivism, Power Distance, Task Meaningfulness, Goal Commitment and External Bridging Ties Constructs: Exploratory Factor Analysis

Item	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Alpha
Power Distance							.73
In work-related matters, team leaders have a right to expect obedience from their subordinates.	0.67	-0.06	0.01	0.07	-0.03	-0.04	
The team leader's authority should not be questioned.	0.67	0.04	-0.01	0.06	0.04	0.00	
Team members who often question authority sometimes keep their leaders from being effective.	0.62	-0.05	-0.01	-0.02	-0.07	0.06	
In most situations, team leaders should make decisions without consulting their team members.	0.47	0.13	0.00	-0.09	0.02	0.00	
Team memberss should not express disagreements with their team leaders.	0.45	-0.01	-0.01	-0.11	0.03	0.03	
Authority structures in teams are useful for ensuring that each person knows who has power over him or her.	0.44	-0.04	0.02	-0.01	0.06	-0.04	
Beliefs on Personal Pursuits on Group Productivity (Individualism/Collectivism dimension 1)							.84
A group is more productive when its members do what they want to do rather than what the group wants them to do.	0.01	0.85	0.01	0.01	-0.02	0.00	
A group is most efficient when its members do what they think is best rather than doing what the group wants them to do.	-0.01	0.83	-0.03	0.04	0.03	0.01	
A group is more productive when its members follow their own interest and concerns.	-0.02	0.67	0.00	-0.07	0.00	-0.02	
Task Meaningfulness							.81
Doing the research project is worthwhile.	0.00	0.00	0.81	0.02	-0.03	0.00	
Doing the research project is more than busy work.	-0.04	-0.04	0.71	-0.05	0.02	-0.02	
I can learn a lot from this research project.	0.02	0.00	0.65	0.12	0.00	0.01	
Goal Commitment							.77
Quite frankly, I don't care if I achieve the research team's goals or not. (R)	-0.03	-0.10	-0.02	0.64	-0.01	0.01	
It's hard to take this research team's goals seriously. (R)	-0.03	0.05	0.02	0.62	-0.05	-0.02	
It wouldn't take much to make me abandon the research team's goals. (R)	-0.05	-0.07	-0.03	0.60	0.00	-0.02	
I am strongly committed to pursuing the research team's goals.	0.05	0.07	0.16	0.53	0.05	0.03	
I think our goals are good ones to shoot for.	0.04	0.04	0.35	0.42	0.02	0.02	

Table 4 (Cont'd)
Six-Factor Solution on Team Individualism/Collectivism, Power Distance, Task Meaningfulness, Goal Commitment and External Bridging Ties Constructs: Exploratory Factor Analysis

Item	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Alpha
Personal Independence (Individualism/Collectivism Dimension 2)							.81
Only those who depend on themselves get ahead in life.	0.02	-0.01	0.00	0.05	0.79	0.00	
In the long run the only person you can count on is yourself.	-0.01	-0.02	-0.02	-0.02	0.74	0.04	
To be superior a person must stand alone.	0.02	0.06	0.02	-0.05	0.67	-0.05	
External Bridging Ties							.72
Ethnic background	-0.04	0.02	0.04	0.02	0.00	0.70	
Cultural values	0.03	-0.02	-0.04	-0.02	0.00	0.70	

Table 5
Three-Factor Solution on Team Cohesion, Task Conflict and Relationship Conflict Constructs:
Exploratory Factor Analysis at Wave 1

Item	Factor1	Factor2	Factor3	Alpha*
Relationship Conflict				.93
How much tension is there among members in your team?	0.94	-0.01	-0.04	
How much are personality clashes evident in your team?	0.85	0.05	0.05	
How much emotional conflict is there among members?	0.81	-0.05	0.02	
How much personal friction is there among members in our team?	0.80	-0.02	0.09	
Cohesion				.85
Our team really sticks together.	-0.02	0.84	0.00	
Our team gets along together well.	-0.14	0.77	-0.03	
Team members are willing to help each other on the job.	0.04	0.72	-0.06	
I feel that I'm really a part of our research team.	0.05	0.69	0.09	
Task Conflict				.84
How often do your teammates disagree about ways the work should be done?	0.02	0.04	0.76	
How frequently are there conflicts about ideas in your team?	-0.02	-0.06	0.76	
How much conflict about the work you do is there in your team?	0.05	0.08	0.72	
To what extent are there differences of opinions on tasks in your team?	0.07	-0.05	0.67	

Notes:
*Estimated Reliabilities based on individual-level responses are reported.

Table 6
Four-Factor Solution on Team Cohesion, Task Conflict, Relationship Conflict and Team Performance Constructs:
Exploratory Factor Analysis at Wave 2

Item	Factor1	Factor2	Factor3	Factor4	Alpha
Team Performance					.87
Producing publishable work in a respected journal.	0.79	-0.11	-0.19	0.05	
Getting a paper accepted for presentation at a respected conference.	0.77	-0.14	-0.14	0.08	
Solving a practical problem that the field is currently confronting.	0.69	-0.12	0.02	0.09	
Getting a grant to support further research.	0.66	0.04	0.03	-0.03	
Meeting the requirements of an external funding agency.	0.64	0.08	0.11	-0.03	
Extending your research field.	0.61	0.05	0.15	0.02	
Meeting intermediate deadlines.	0.57	0.03	0.16	-0.07	
Developing new methodologies.	0.55	0.06	0.14	-0.06	
Forming collaborations with different researchers.	0.53	0.05	0.16	-0.05	
Creating new software/hardware.	0.41	0.17	0.01	-0.19	
Relationship Conflict					.93
How much tension is there among members in your team?	0.02	0.90	-0.04	0.02	
How much personal friction is there among members in your team?	0.03	0.84	-0.02	0.09	
How much emotional conflict is there among members?	-0.02	0.81	-0.06	0.00	
How much are personality clashes evident in your team?	0.03	0.76	-0.04	0.12	
Cohesion					.89
Our team gets along together well.	0.00	-0.14	0.80	0.00	
Our team really sticks together.	0.06	-0.08	0.79	0.02	
Team members are willing to help each other on the job.	0.04	-0.02	0.79	0.00	
I feel that I'm really a part of our research team.	0.07	0.04	0.72	0.06	
Task Conflict					.84
How frequently are there conflicts about ideas in your team?	0.01	0.03	-0.03	0.77	
How often do your teammates disagree about ways the work should be done?	-0.01	0.00	0.03	0.73	
To what extent are there differences of opinions on tasks in your team?	-0.03	0.09	0.02	0.67	
How much conflict about the work you do is there in your team	-0.06	0.11	0.06	0.66	

Notes:
*Estimated Reliabilities based on individual-level responses are reported.

Table 7
Descriptive Statistics for Wave 1 Data

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. FW (IC)*																								
2. FW (PD)*	.14																							
3. FW (IC+deep*)	.80**	.08																						
4. FW (PD+deep)	.13	.56**	.26**																					
5. FW (deep)	.05	-.06	.26**	.40**																				
6. FW (IC+age)	.79**	.20*	.76**	.21*	.05																			
7. FW (IC+gender)	.90**	.11	.71**	.08	.04	.73**																		
8. FW (IC+ethnicity)	.88**	.13	.65**	.10	.02	.68**	.79**																	
9. FW (IC+status)	.95**	.15	.80**	.15	.04	.79**	.87**	.82**																
10. FW (PD+age)	.05	.64**	.09	.54**	.03	.44**	.07	.03	.08															
11. FW (PD+gender)	.15	.80**	.07	.43**	-.02	.19*	.32**	.13	.16	.54**														
12. FW (PD+ethnicity)	.11	.74**	.00	.39**	-.07	.13	.08	.36**	.09	.45**	.58**													
13. FW (PD+status)	.11	.90**	.08	.55**	-.06	.20*	.09	.09	.18*	.66**	.72**	.65**												
14. Friendship bridging ties (based on IC)	.27**	.11	.14	.05	-.02	.18*	.15	.30**	.22**	.07	-.02	.17*	.04											
15. Breaching ties (based on IC)	.15	-.03	.18*	.01	.02	.10	.16	.15	.15	-.05	.01	-.02	.02	-.01										
16. Friendship bridging ties (based on PD)	-.09	.27**	-.14	.05	-.10	-.05	-.11	-.02	-.10	.19*	.13	.29**	.18*	.40**	-.09									
17. Breaching ties (based on PD)	-.08	-.05	-.07	-.11	-.22**	-.01	-.03	-.03	-.04	-.03	-.03	.02	-.08	-.14	.52**	-.08								
18. External bridging ties	.06	-.01	.09	.14	.11	.03	.03	.19*	.06	-.03	.01	.26**	-.01	.22**	.00	.11	-.02							
19. Team cohesion	.00	.08	.00	-.07	-.31**	.07	-.05	-.04	.02	.07	-.05	.03	.11	.15	-.12	.18*	-.13	-.01						
20. Task conflict	.19*	.08	.17*	.11	.13	.16*	.11	.21**	.17*	.12	.04	.15	.06	.02	.03	.01	.06	.04	-.37**					
21. Relationship conflict	.12	.04	.07	.11	.18*	.05	.15	.15	.09	.02	.19*	.14	.04	-.03	.12	-.08	.04	.09	-.50**	.59**				
22. Team size	.07	.29**	-.05	.02	.08	.06	.12	.08	.04	.19*	.32**	.28**	.19*	.00	.03	.03	.03	-.06	-.08	.16*	.16*			
23. Department	.10	.04	.08	-.08	-.09	.14	.10	.12	.11	.07	.09	.04	.07	-.13	.07	-.14	.04	-.11	.06	.04	-.01	-.06		
24. Team Tenure	-.11	.03	-.08	.09	.16	-.13	-.10	-.07	-.17*	-.01	.02	.11	-.01	.05	.08	.15	.01	.09	.02	.04	.07	-.05	.02	
Mean	2.83	1.60	4.35	3.25	2.31	3.88	3.48	3.51	4.01	2.73	2.28	2.31	2.76	0.41	0.07	0.44	0.07	2.75	4.14	2.22	1.80	5.43	4.45	36.79
s.d.	0.98	0.65	1.06	0.66	0.31	1.07	1.03	1.12	0.96	0.88	0.75	0.81	0.65	0.33	0.18	0.34	0.15	0.50	0.50	0.44	0.62	2.35	2.96	28.25

*Notes:
*p<.05; **p <.01;
FW=faultline width; IC=individualism/collectivism; PD= power distance; deep=deep-level attributes combining task meaningfulness and goal commitment;
N=155

Table 8a
Descriptive Statistics for Wave 1 and Wave 2 Data (IC Faultlines)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. FW (IC*) (T1*)																								
2. FW (IC+deep*) (T1*)	.79**																							
3. FW (deep) (T1*)	.02	.23**																						
4. FW (IC+age) (T1*)	.77**	.75**	.03																					
5. FW (IC+gender) (T1*)	.90**	.70**	.01	.71**																				
6. FW (IC+ethnicity) (T1*)	.87**	.64**	.00	.66**	.79**																			
7. FW (IC+status) (T1*)	.95**	.80**	.02	.78**	.87**	.81**																		
8. Friendship bridging ties (based on IC) (T1*)	.24**	.12	.00	.14	.11	.29**	.18*																	
9. Breaching ties (based on IC) (T1*)	.13	.18*	.01	.10	.14	.13	.14	-.02																
10. External bridging ties (T1*)	.07	.08	.10	.04	.04	.20*	.07	.27**	-.01															
11. Team cohesion (T1*)	.00	.01	-.30**	.08	-.02	-.06	.02	.15	-.10	.01														
12. Task conflict (T1*)	.18*	.17*	.14	.15	.10	.20*	.17*	.02	.03	.05	-.40**													
13. Relationship conflict (T1*)	.09	.06	.18*	.02	.12	.14	.07	-.06	.11	.10	-.53**	.58**												
14. Team cohesion (sub-sample A) (T1*)	.03	-.02	-.19*	.11	.04	-.04	.08	.10	-.08	.00	.57**	-.23**	-.30**											
15. Task conflict (sub-sample A) (T1*)	.16*	.17*	.18*	.17*	.10	.16*	.13	.03	.19*	-.04	-.30**	.59**	.35**	.20*										
16. Relationship conflict (sub-sample A) (T1*)	.09	.07	.22**	.05	.11	.07	.05	.01	.09	.08	-.42**	.44**	.76**	-.04	.59**									
17. Team cohesion (T2*)	-.11	.00	-.25**	.00	-.17*	-.13	-.08	.12	-.09	-.06	.73**	-.37**	-.52**	.43**	-.22*	-.38**								
18. Task conflict (T2*)	.12	.15	.22**	.14	.05	.14	.13	-.02	-.01	.12	-.23**	.59**	.36**	-.11	.33**	.27**	-.30**							
19. Relationship conflict (T2*)	.07	.02	.21**	.00	.09	.10	.04	-.06	.06	.03	-.56**	.55**	.81**	-.34**	.34	.64**	-.61**	.48**						
20. Team Performance (T2*)	-.09	-.10	-.23**	-.02	-.10	-.11	-.08	.06	-.01	-.11	.43**	-.28**	-.30**	.23**	-.22*	-.22*	.58**	-.24**	-.37**					
21. Team Performance (sub-sample B) (T2*)	-.03	-.04	-.16	.03	-.02	-.10	-.01	.04	.04	-.17*	.30**	-.21*	-.26**	.58**	.22*	.05	.41**	-.13	-.23*	.63**				
22. Team size	.03	-.08	.07	.01	.08	.06	.00	-.01	.03	-.06	-.09	.15	.15	.08	.24**	.13	-.08	.06	.16	.08	.11			
23. Department	.09	.06	-.12	.12	.10	.10	.09	-.13	.07	-.12	.06	.03	-.02	.04	.00	-.07	.03	-.05	-.07	.08	.06	-.07		
24. Team Tenure	-.10	-.08	.15	-.12	-.09	-.08	-.16	.07	.07	.10	.00	.03	.07	-.03	-.05	.04	-.05	-.02	.01	.13	.04	-.03	.00	
Mean	2.86	4.37	2.31	3.93	3.52	3.54	4.05	0.42	0.07	2.76	4.14	2.23	1.80	4.03	2.19	1.80	4.16	2.20	1.73	3.63	3.58	5.49	4.52	36.31
s.d.	0.95	1.04	0.31	1.05	1.00	1.10	0.95	0.33	0.18	0.50	0.49	0.44	0.63	0.88	0.65	0.86	0.51	0.42	0.57	0.59	0.87	2.35	2.97	28.20

*Notes:
*p<.05; **p <.01;
FW=faultline width; IC=individualism/collectivism; deep=deep-level attributes combining task meaningfulness and goal commitment; T1=time1; T2= time2;
N=148;

Table 8b
Descriptive Statistics for Wave 1 and Wave 2 Data (PD Faultlines)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. FW (PD*) (T1*)																								
2. FW (PD+deep*) (T1*)	.56**																							
3. FW (deep) (T1*)	-.05	.39**																						
4. FW (PD+age) (T1*)	.64**	.54**	.03																					
5. FW (PD+gender) (T1*)	.80**	.42**	-.03	.53**																				
6. FW (PD+ethnicity) (T1*)	.74**	.39**	-.07	.45**	.59**																			
7. FW (PD+status) (T1*)	.90**	.56**	-.05	.65**	.72**	.64**																		
8. Friendship bridging ties (based on PD) (T1*)	.27**	.07	-.10	.18*	.16*	.30**	.19*																	
9. Breaching ties (based on PD) (T1*)	-.07	-.11	-.23**	-.04	-.05	.01	-.09	-.09																
10. External bridging ties (T1*)	.00	.14	.10	-.01	.01	.27**	-.01	.14	-.02															
11. Team cohesion (T1*)	.08	-.05	-.30**	.07	-.01	.00	.12	.14	-.14	.01														
12. Task conflict (T1*)	.07	.10	.14	.10	.03	.15	.05	.00	.06	.05	-.40**													
13. Relationship conflict (T1*)	.03	.09	.18*	.00	.18*	.13	.03	-.10	.04	.10	-.53**	.58**												
14. Team cohesion (sub-sample A) (T1*)	.22*	-.06	-.19*	.25**	.17*	.06	.25**	.19*	-.04	.00	.57**	-.23**	-.30**											
15. Task conflict (sub-sample A) (T1*)	.13	.11	.18*	.18*	.10	.12	.11	.08	.11	-.04	-.30**	.59**	.35**	.20*										
16. Relationship conflict (sub-sample A) (T1*)	.02	.15	.22**	.08	.15	.04	.01	-.07	-.02	.08	-.42**	.44**	.76**	-.04	.59**									
17. Team cohesion (T2*)	.08	-.04	-.25**	.04	-.11	.00	.08	.11	-.12	-.06	.73**	-.37**	-.52**	.43**	-.22*	-.38**								
18. Task conflict (T2*)	-.05	.06	.22**	.03	-.07	.05	-.02	-.18*	.04	.12	-.23**	.59**	.36**	-.11	.33**	.27**	-.30**							
19. Relationship conflict (T2*)	-.10	-.01	.21**	-.06	.05	.03	-.10	-.14	.07	.03	-.56**	.55**	.81**	-.34**	.34**	.64**	-.61**	.48**						
20. Team Performance (T2*)	.18*	.01	-.23**	.14	.05	.07	.15	.05	-.05	-.11	.43**	-.28**	-.30**	.23**	-.22*	-.22*	.58**	-.24**	-.37**					
21. Team Performance (sub-sample B) (T2*)	.18*	.04	-.16	.17*	.07	.00	.18*	.09	.04	-.17*	.30**	-.21*	-.26**	.58**	.22*	.05	.41**	-.13	-.23**	.63**				
22. Team size	.27**	.00	.07	.16*	.29**	.27**	.17*	.04	.02	-.06	-.09	.15	.15	.08	.24**	.13	-.08	.06	.16*	.08	.11			
23. Department	.05	-.08	-.12	.06	.10	.04	.07	-.18*	.03	-.12	.06	.03	-.02	.04	.00	-.07	.03	-.05	-.07	.08	.06	-.07		
24. Team Tenure	.07	.11	.15	.00	.06	.12	.02	.14	.02	.10	.00	.03	.07	-.03	-.05	.04	-.05	-.02	.01	.13	.04	-.03	.00	
Mean	1.63	3.25	2.31	2.76	2.31	2.33	2.79	0.44	0.07	2.76	4.14	2.23	1.80	4.03	2.19	1.80	4.16	2.20	1.73	3.63	3.58	5.49	4.52	36.31
s.d.	0.65	0.67	0.31	0.88	0.74	0.82	0.65	0.33	0.15	0.50	0.49	0.44	0.63	0.88	0.65	0.86	0.51	0.42	0.57	0.59	0.87	2.35	2.97	28.20

*Notes:
*p<.05; **p <.01;
FW=faultline width; PD= power distance; deep= deep-level attributes combining task meaningfulness and goal commitment; T1=time1; T2= time2;
N=148;

Table 9a
OLS Regression Results for Direct and Moderating Effects of Faultlines and Bridging/Breaching Ties on Team Cohesion (IC Faultlines)

Predictors	Team Cohesion																		
	Time 1: N=155 (cross-sectional result)									Time 2: N=148 (longitudinal result)									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Control Variables																		
Team Size	-0.07	0.05	-0.08	-0.08	-0.07	-0.07	-0.08	-0.07	-0.06	-0.07	-0.06	-0.08	-0.08	-0.06	-0.07	-0.08	-0.07	-0.05
Department	0.05	0.03	0.05	0.04	0.06	0.06	0.05	0.08	0.09	0.03	-0.01	0.02	0.02	0.04	0.03	0.03	0.05	0.05
Team Tenure	0.01	0.06	0.01	0.02	0.01	0.01	0.02	0.02	0.02	-0.07	-0.02	-0.06	-0.05	-0.07	-0.06	-0.07	-0.07	-0.06
Faultlines																		
IC	0.00							-0.03	0.10	-0.11							-0.15^{+}	-0.06
Deep		-0.31**									-0.24**							
IC + Deep			-0.01									-0.01						
IC + Age				0.07									-0.01					
IC + Gender					-0.04									-0.17*				
IC + Ethnicity						-0.04									-0.14			
IC + Status							0.02									-0.09		
Network Ties																		
FBTIC*								0.17^{+}	-0.10								0.19*	-0.22
BTIC*								-0.12	-0.04								-0.07	-0.21
EBT*								-0.05	0.07								-0.09	0.06
Interactions																		
IC*FBTIC									0.33									0.50
IC*BTIC									-0.08									0.16
IC*EBT									-0.25									-0.33
Adjusted R^2	0.00	0.08**	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04*	0.00	0.00	0.01	0.00	0.00	0.01	0.02

Notes: FBTIC: friendship bridging ties based on membership in subgroups based on Individualism/collectivism;
BTIC: breaching ties based on membership in subgroups based on Individualism/collectivism;
EBT: external bridging ties;
$^{+}$p<0.10; *p<.05; **p <.01; Standardized coefficients are reported;

Table 9b
OLS Regression Results for Direct and Moderating Effects of Faultlines and Bridging/Breaching Ties on Team Cohesion (PD Faultlines)

Predictors	Team Cohesion																		
	Time 1: N=155 (cross-sectional result)									Time 2: N=148 (longitudinal result)									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Control Variables																		
Team Size	-0.11	-0.05	-0.07	-0.09	-0.06	-0.09	-0.10	-0.09	-0.10	-0.11	-0.06	-0.08	-0.09	-0.05	-0.08	-0.09	-0.10	-0.09
Department	0.05	0.03	0.05	0.05	0.06	0.05	0.04	0.08	0.06	0.01	-0.01	0.02	0.02	0.03	0.02	0.01	0.03	0.01
Team Tenure	0.01	0.06	0.02	0.01	0.02	0.01	0.01	-0.01	0.00	-0.06	-0.02	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.06
Faultlines																		
PD	0.11							0.06	0.55	0.11							0.07	-0.02
Deep		-0.31**									-0.24**							
PD + Deep			-0.07									-0.04						
PD + Age				0.08									0.06					
PD + Gender					-0.03									-0.09				
PD + Ethnicity						0.05									0.03			
PD + Status							0.13									0.09		
Network Ties																		
FBTPD*								0.17*	0.32^{+}								0.11	0.20
BTPD*								-0.11	0.02								-0.10	0.17
EBT*								-0.03	0.15								-0.07	-0.16
Interactions																		
PD*FBTPD									-0.20									-0.14
PD*BTPD									-0.15									-0.28
PD*EBT									-0.43									0.20
Adjusted R^2	0.00	0.08**	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.04*	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: FBTPD: friendship bridging ties based on membership in subgroups based on power distance;
BTPD: breaching ties based on membership in subgroups based on power distance;
EBT: external bridging ties;
$^{+}$p<0.10; *p<.05; **p <.01; Standardized coefficients are reported;

Table 10a
OLS Regression Results for Direct and Moderating Effects of Faultlines and Bridging/Breaching Ties on Task Conflict (IC Faultlines)

Predictors	Task Conflict																	
	Time 1: N=155 (cross-sectional result)									Time 2: N=148 (longitudinal result)								
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Control Variables																		
Team Size	0.15^{+}	0.16^{+}	0.18*	0.16^{+}	0.16^{+}	0.15^{+}	0.16*	0.16^{+}	0.19*	0.05	0.04	0.07	0.05	0.05	0.05	0.06	0.06	0.06
Department	0.03	0.06	0.03	0.02	0.04	0.02	0.03	0.03	0.01	-0.05	-0.02	-0.05	-0.06	-0.05	-0.06	-0.06	-0.05	-0.06
Team Tenure	0.06	0.02	0.06	0.06	0.05	0.05	0.07	0.06	0.07	-0.01	-0.05	-0.01	-0.01	-0.02	-0.01	0.00	-0.01	-0.01
Faultlines																		
IC	0.18*							0.19*	-0.20	0.13							0.14	-0.29
Deep		0.12									0.22**							
IC + Deep			0.18*									0.15^{+}						
IC + Age				0.15^{+}									0.14^{+}					
IC + Gender					0.09									0.05				
IC + Ethnicity						0.20*									0.14+			
IC + Status							0.18*									0.14		
Network Ties																		
FBTIC*								-0.04	0.10								-0.10	0.26
BTIC*								-0.01	-0.66**								-0.02	-0.30
EBT*								0.04	-0.14								0.14	-0.16
Interactions																		
IC*FBTIC									-0.16									-0.43
IC*BTIC									0.71**									0.30
IC*EBT									0.39									0.62
Adjusted R^2	0.04*	0.02	0.04*	0.03^{+}	0.01	0.04*	0.03^{+}	0.02	0.06*	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: FBTIC: friendship bridging ties based on membership in subgroups based on Individualism/collectivism;
BTIC: breaching ties based on membership in subgroups based on Individualism/collectivism;
EBT: external bridging ties;
$^{+}$p<0.10; *p<.05; **p <.01; Standardized coefficients are reported;

Table 10b
OLS Regression Results for Direct and Moderating Effects of Faultlines and Bridging/Breaching Ties on Task Conflict (PD Faultlines)

Predictors	Task Conflict																		
	Time 1: N=155 (cross-sectional result)									Time 2: N=148 (longitudinal result)									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Control Variables																		
Team Size	0.16^{+}	0.16^{+}	0.16*	0.15^{+}	0.17*	0.13	0.16^{+}	0.16^{+}	0.16^{+}	0.07	0.04	0.06	0.05	0.08	0.04	0.06	0.07	0.07
Department	0.04	0.06	0.05	0.04	0.05	0.04	0.04	0.05	0.03	-0.04	-0.02	-0.04	-0.04	-0.03	-0.05	-0.04	-0.06	-0.07
Team Tenure	0.04	0.02	0.03	0.04	0.04	0.03	0.04	0.04	0.04	-0.02	-0.05	-0.03	-0.02	-0.02	-0.03	-0.02	-0.01	-0.01
Faultlines																		
PD	0.03							0.03	-0.25	-0.07							-0.01	-0.88^{+}
Deep		0.12									0.22**							
PD + Deep			0.11									0.06						
PD + Age				0.09									0.02					
PD + Gender					-0.02									-0.08				
PD + Ethnicity						0.11									0.05			
PD + Status							0.03									-0.03		
Network Ties																		
FBTPD*								-0.01	0.11								-0.21*	-0.07
BTPD*								0.06	0.20								0.03	0.09
EBT*								0.05	-0.12								0.15^{+}	-0.29
Interactions																		
PD*FBTPD									-0.17									-0.23
PD*BTPD									-0.15									-0.06
PD*EBT									0.43									1.09^{+}
Adjusted R^2	0.01	0.02	0.02	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.02	0.02

Notes: FBTPD: friendship bridging ties based on membership in subgroups based on power distance;
BTPD: breaching ties based on membership in subgroups based on power distance;
EBT: external bridging ties; $^{+}$p<0.10; *p<.05; **p <.01; Standardized coefficients are reported;

Table 11a
OLS Regression Results for Direct and Moderating Effects of Faultlines and Bridging/Breaching Ties on Relationship Conflict (IC Faultlines)

Predictors	Relationship Conflict																		
	Time 1: N=155 (cross-sectional result)									Time 2: N=148 (longitudinal result)									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Control Variables																		
Team Size	0.16^{+}	0.15^{+}	0.17*	0.16*	0.15^{+}	0.15^{+}	0.16*	0.16^{+}	0.18*	0.08	0.14^{+}	0.16^{+}	0.15^{+}	0.15^{+}	0.15^{+}	0.15^{+}	0.15^{+}	0.17*
Department	-0.02	0.01	-0.01	-0.01	-0.02	-0.02	-0.02	-0.03	-0.04	-0.07	-0.04	-0.06	-0.06	-0.07	-0.07	-0.07	-0.08	-0.09
Team Tenure	0.09	0.05	0.08	0.08	0.09	0.08	0.09	0.08	0.09	0.03	-0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.04
Faultlines																		
IC	0.12							0.12	-0.29	0.08							0.09	-0.32
Deep		0.16^{+}									0.20*							
IC + Deep			0.08									0.04						
IC + Age				0.05									0.00					
IC + Gender					0.14^{+}									0.09				
IC + Ethnicity						0.15^{+}									0.10			
IC + Status							0.10									0.06		
Network Ties																		
FBTIC*								-0.09	0.32								-0.10	0.05
BTIC*								0.09	-0.58*								0.04	-0.44^{+}
EBT*								0.10	-0.14								0.04	-0.18
Interactions																		
IC*FBTIC									-0.48									-0.17
IC*BTIC									0.73**									0.53*
IC*EBT									0.52									0.46
Adjusted R^2	0.02	0.03^{+}	0.01	0.01	0.03^{+}	0.03^{+}	0.02	0.02	0.07*	0.01	0.04*	0.01	0.01	0.01	0.01	0.01	0.00	0.01

Notes: FBTIC: friendship bridging ties based on membership in subgroups based on Individualism/collectivism;
BTIC: breaching ties based on membership in subgroups based on Individualism/collectivism;
EBT: external bridging ties;
$^{+}$p<0.10; *p<.05; **p <.01; Standardized coefficients are reported;

Table 11b
OLS Regression Results for Direct and Moderating Effects of Faultlines and Bridging/Breaching Ties on Relationship Conflict (PD Faultlines)

Predictors	Relationship Conflict																	
	Time 1: N=155 (cross-sectional result)									Time 2: N=148 (longitudinal result)								
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Control Variables																		
Team Size	0.17^{+}	0.15^{+}	0.16*	0.17*	0.11	0.14	0.16*	0.16^{+}	0.15^{+}	0.20*	0.14^{+}	0.15^{+}	0.17*	0.15^{+}	0.16^{+}	0.18*	0.19*	0.18*
Department	0.00	0.01	0.00	0.00	-0.02	-0.01	-0.01	-0.01	-0.01	-0.05	-0.04	-0.06	-0.05	-0.06	-0.05	-0.05	-0.07	-0.06
Team Tenure	0.07	0.05	0.07	0.07	0.07	0.06	0.07	0.08	0.07	0.03	-0.01	0.02	0.02	0.02	0.02	0.02	0.04	0.03
Faultlines																		
PD	-0.01							0.03	-0.36	-0.15^{+}							-0.11	-0.60
Deep		0.16^{+}									0.20*							
PD + Deep			0.10									-0.01						
PD + Age				-0.01									-0.09					
PD + Gender					0.16^{+}									0.00				
PD + Ethnicity						0.09									-0.02			
PD + Status							0.01									-0.12		
Network Ties																		
FBTPD*								-0. 12	-0.07								-0.14	-0.19
BTPD*								0.03	-0.15								0.05	-0.28
EBT*								0.10	-0.07								0.04	-0.15
Interactions																		
PD*FBTPD									-0.08									0.05
PD*BTPD									0.20									0.35
PD*EBT									0.45									0.48
Adjusted R^2	0.01	0.03^{+}	0.01	0.01	0.03^{+}	0.01	0.01	0.01	0.00	0.02	0.04*	0.00	0.01	0.01	0.00	0.02	0.03	0.02

Notes: FBTPD: friendship bridging ties based on membership in subgroups based on power distance;
BTPD: breaching ties based on membership in subgroups based on power distance;
EBT: external bridging ties; $^{+}$p<0.10; *p<.05; **p <.01; Standardized coefficients are reported;

Table 12a
OLS Regression Results for Direct and Moderating Effects of Faultlines and Bridging/Breaching Ties on Team Performance
(IC Faultlines)

Predictors	Team Performance							
	Time 2: N=148 (longitudinal result)							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Control Variables								
Team Size	0.09	0.10	0.09	0.14^{+}	0.03	0.08	0.12	0.03
Department	0.09	0.09	0.09	0.07	0.03	0.11	0.08	0.04
Team Tenure	0.13	0.13	0.13	0.14^{+}	0.06	0.12	0.13^{+}	0.05
Faultlines								
IC	-0.09	-0.28	-0.10	-0.07	-0.06	0.59	0.50	0.06
IC*IC		0.20						
Bridging/Breaching Ties								
FBTIC*			0.12	0.05	0.05	-0.51^{+}	-0.45^{+}	-0.48*
BTIC*			-0.01	0.03	0.07	0.50*	0.45^{+}	0.44*
EBT*			-0.14	-0.11	-0.19**	0.35	0.28	-0.06
Interactions								
IC*FBTIC						0.76*	0.61*	0.62*
IC*BTIC						-0.55*	-0.46^{+}	-0.41^{+}
IC*EBT						-1.02^{+}	-0.84^{+}	-0.30
Team Process								
Cohesion				0.36**			0.38**	
Task Conflict				-0.11			-0.09	
Relationship Conflict				-0.05			0.00	
Cohesion (sub-sample A)					0.57**			0.55**
Task Conflict (sub-sample A)					0.06			0.09
Relationship Conflict (sub-sample A)					0.05			0.07
Overall Adjusted R^2	0.01	0.01	0.02	0.21**	0.34**	0.08*	0.24**	0.37**

Notes:
FBTIC: friendship bridging ties based on membership in subgroups based on Individualism/collectivism;
BTIC: breaching ties based on membership in subgroups based on Individualism/collectivism;
EBT: external bridging ties;
$^{+}$p<0.10; *p<.05; **p <.01; Standardized coefficients are reported;
In models 5 and 8, team performance was measured based on sub-sample B.

Table 12b
OLS Regression Results for Direct and Moderating Effects of Faultlines and Bridging/Breaching Ties on Team Performance
(PD Faultlines)

Predictors	Team Performance							
	Time 2: N=148 (longitudinal result)							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Control Variables								
Team Size	0.05	0.04	0.04	0.11	0.02	0.04	0.11	0.03
Department	0.08	0.08	0.06	0.04	0.02	0.05	0.03	0.01
Team Tenure	0.13	0.13	0.14	0.15*	0.07	0.13	0.14^{+}	0.06
Faultlines								
PD	0.15^{+}	0.30	0.15^{+}	0.13	0.05	-0.49	-0.77	-0.38
PD*PD		-0.15						
Bridging/Breaching Ties								
FBTPD*			0.01	-0.05	-0.01	0.06	-0.01	-0.10
BTPD*			-0.05	0.00	0.05	0.00	0.01	0.14
EBT*			-0.12	-0.10	-0.18*	-0.43^{+}	-0.53*	-0.36^{+}
Interactions								
PD*FBTPD						-0.10	-0.09	0.11
PD*BTPD						-0.04	0.01	-0.10
PD*EBT						0.76	1.05^{+}	0.43
Team Process								
Cohesion				0.35**			0.36**	
Task Conflict				-0.12			-0.13	
Relationship Conflict				-0.06			-0.06	
Cohesion (sub-sample A)					0.56**			0.56**
Task Conflict (sub-sample A)					0.06			0.06
Relationship Conflict (sub-sample A)					0.05			0.04
Overall Adjusted R^2	0.03^{+}	0.02	0.02	0.22**	0.34**	0.01	0.22**	0.33**

Notes:
FBTPD: friendship bridging ties based on membership in subgroups based on power distance;
BTPD: breaching ties based on membership in subgroups based on power distance;
EBT: external bridging ties;
$^{+}$p<0.10; *p<.05; **p <.01; Standardized coefficients are reported;
In models 5 and 8, team performance was measured based on sub-sample B.

APPENDIX C

INTERVIEW PROTOCOL

We selected your team for our study because you are undoubtedly doing very intriguing and important research. Rather than focusing on the content of your research, we are interested in your *experiences in leading a research team* and *working with your team members*.

1. When and how did this team come together? What are the most important (overall or final) goals of your team?

2. How is the work coordinated and how are decisions made in your team?

3. Are there any subgroups within your team? How are they split?

4. We would like to contact your other team members and ask them to participate in two surveys about their experience of working in research teams. Do you feel comfortable with this? Can you give us a list of your team members' names so that we can contact them? Their participation will be voluntary as well. Can you please provide their contact information using the attached form?

5. When you need task related information, which team members do you usually go to?

   Which team members, if any, do you spend time with during your free time?

   Are there topics that you avoid talking about with team members? Would you like to talk about those issues with some members rather than others (why those members)?

   Which team members, if any, do you find yourself avoiding at times?

Thank you again for your time and willingness to participate in our research!

APPENDIX D

MEASURES

Ethnicity

Country of Origin_____

If you are from the US, how would you describe your ethnic background?

_____ African America (Black)

_____ Caucasian (White)

_____Asian American

_____Latino or Hispanic American

_____ Native America (Indian)

_____Multi-racial (please specify) _____

Status Code

1: Masters student
2: Doctoral student
3: Undergraduate
4: Clinical professor
5: Assistant professor
6: Associate professor
7: Full professor
8: Research associate
9: Post doc
10: Others (research technician, visiting scholar, staff, etc)

Individualism/Collectivism (Wagner III, 1995)

Five point Likert scale: strong disagreement to strong agreement

1. Only those who depend on themselves get ahead in life.
2. In the long run the only person you can count on is yourself.
3. To be superior a person must stand alone.
4. A group is more productive when its members do what they want to do rather than what the group wants them to do.
5. A group is most efficient when its members do what they think is best rather than doing what the group wants them to do.
6. A group is more productive when its members follow their own interest and concerns.

Power Distance (Earley & Erez, 1997; Tinsley, 2001)

Five point Likert scale: strong disagreement to strong agreement

1. Authority structures in teams are useful for ensuring that each person knows who has power over him or her.
2. The team leader's authority should not be questioned.
3. In most situations, team leaders should make decisions without consulting their team members.
4. In work-related matters, team leaders have a right to expect obedience from their subordinates.
5. Team members who often question authority sometimes keep their leaders from being effective.
6. Team memberss should not express disagreements with their team leaders.

Task Meaningfulness [Harrison et al., 2002 adopt from Rokeach (1973)]

Five point Likert scale: strong disagreement to strong agreement

1. I can learn a lot from this research project.
2. Doing the research project is more than busy work.
3. Doing the research project is worthwhile.

Goal Commitment (Hollenbeck, Williams & Klein, 1989; Klein, Wesson, Hollenbeck & Wright, 2001)

Five point Likert scale: strong disagreement to strong agreement

1. It's hard to take this research team's goals seriously. (R)
2. Quite frankly, I don't care if I achieve the research team's goals or not. (R)
3. I am strongly committed to pursuing the research team's goals.
4. It wouldn't take much to make me abandon the research team's goals. (R)
5. I think our goals are good ones to shoot for.

External Bridging Ties:

Five point Likert scale: very similar to very different

To what extent are the people with whom you socialize or confer outside the team different from you in terms of:

1. Ethnic background
2. Cultural values

Team Cohesion (Seashore, 1979)

Five point Likert scale: strong disagreement to strong agreement

1. I feel that I'm really a part of our research team.
2. Our team gets along together well.
3. Our team really sticks together.
4. Team members are willing to help each other on the job.

Task Conflict (Jehn, 1995)

Five point Likert scale: Not at all to a very great deal

1. How often do your teammates disagree about ways the work should be done?
2. How frequently are there conflicts about ideas in your team?
3. How much conflict about the work you do is there in your team?
4. To what extent are there differences of opinions on tasks in your team?

Relationship Conflict (Jehn, 1995)

Five point Likert scale: Not at all to a very great deal

1. How much personal friction is there among members in your team?
2. How much are personality clashes evident in your team?
3. How much tension is there among members in your team?
4. How much emotional conflict is there among members?

Team Goal Achievement

Six point scale: Poor, average, above average, excellent, outstanding, does not apply

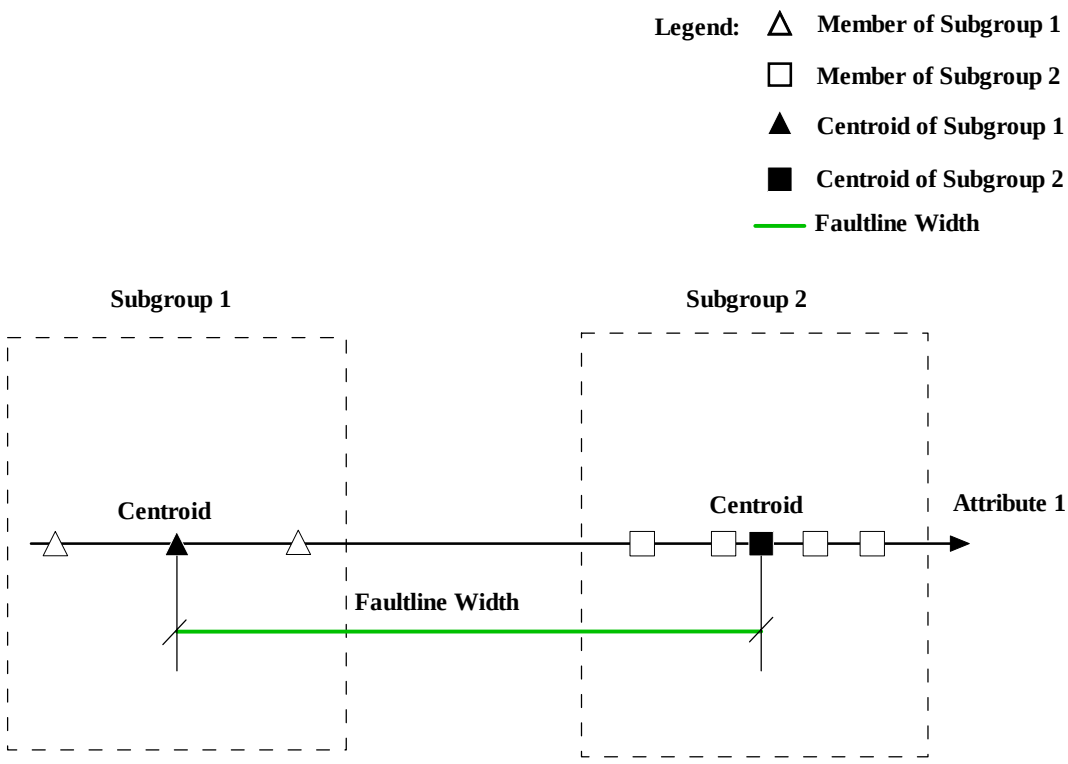
How effective has your team been in...

1. Extending your research field.
2. Meeting the requirements of an external funding agency.
3. Producing publishable work in a respected journal.
4. Getting a paper accepted for presentation at a respected conference.
5. Solving a practical problem that the field is currently confronting.
6. Getting a grant to support further research.
7. Developing new methodologies.
8. Creating new software/hardware.
9. Forming collaborations with different researchers.
10. Meeting intermediate deadlines.

APPENDIX E

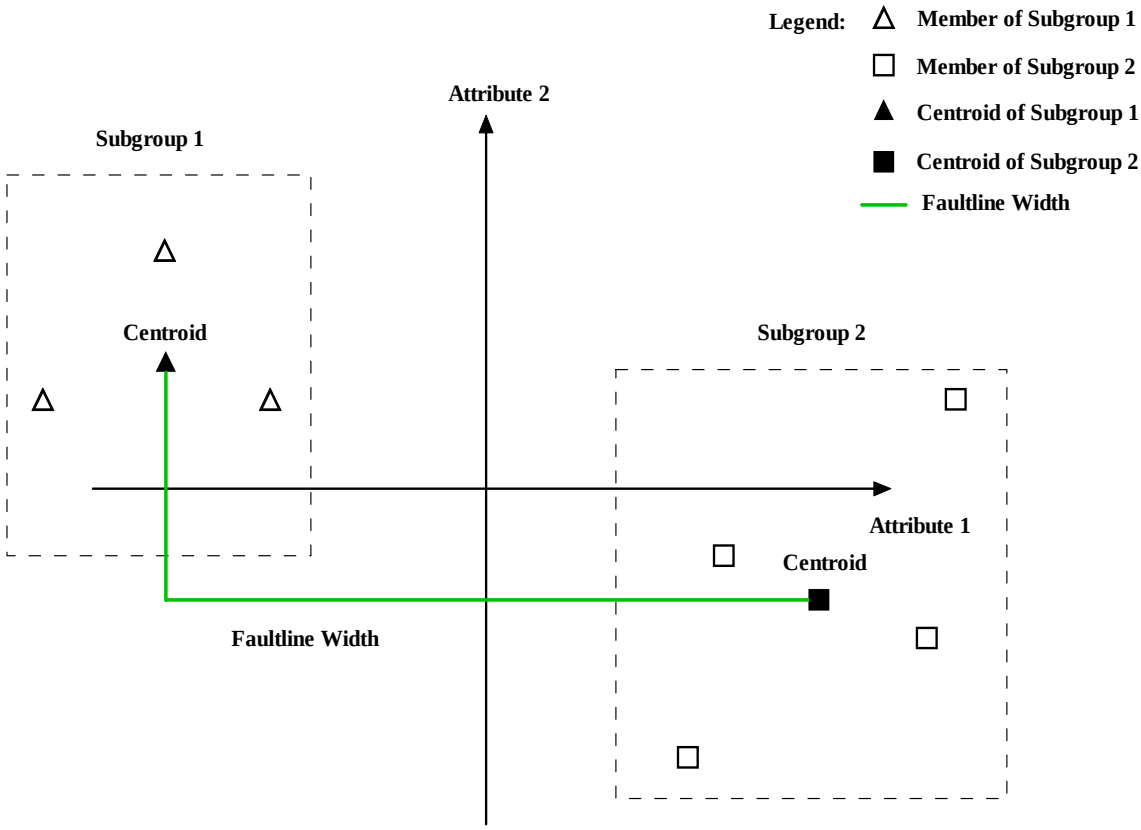
GRAPHS OF FAULTLINE WIDTH CALCULATION

Faultline Width Calculation Based on One Attribute:



Note: Faultline width is the largest distance between the centroids of the two subgroups over all possible splits. The above graph depicts the split of this 6-person team that generates the largest distance between the centroids of the two subgroups with regard to attribute 1. This distance is considered as the faultline width for this team based on attribute 1. Faultline width is a continuous variable with larger score indicating wider separation within the team.

Faultline Width Calculation Based on Two Attributes:



Notes: The above graph depicts the split of this 6-person team that generates the largest distance between the two subgroups based on both attributes 1 and 2. The overall faultline width score is the sum total of attribute 1 difference and attribute 2 difference between the centroids of the two subgroups.

Using faultline width to operationalize "alignment of different attributes" does not necessarily mean that perfect alignment will inevitably exist in every team. However, as faultline widens and grows larger, the two subgroups within the team become more different in every dimension of their attributes. That is, members in subgroup 1 differ with members in subgroup 2 in both attributes 1 and 2. When faultline width reaches its maximum, the two subgroups in the above graph will fall into two extremes for both attributes. Therefore, faultline width captures the "extent of alignment of different attributes" with larger faultline width score indicates larger extent of alignment.

Faultlines can form around one or more attributes (Lau & Murnighan, 1998). In this study, the faultlines calculated are either based on one attribute or two attributes. Please refer to Appendix G for the list of the faultlines calculated in this study.

APPENDIX F

FAULTLINE STRENGTH

Calculation of Faultline Strength (from Molleman, 2005; Thatcher, et al., 2003)

A group with *n* members can potentially be split into two subgroups in $S = (2^{n-1} - 1)$ ways. The ratio of the sum of squares between the subgroups and the total sum of squares will be computed for each possible split:

$$Fau_g = \left(\frac{\sum_{j=1}^{5} \sum_{k=1}^{2} n_k^g (\bar{x}_{\bullet jk} - \bar{x}_{\bullet j\bullet})^2}{\sum_{j=1}^{5} \sum_{k=1}^{2} \sum_{i=1}^{n_k^g} (x_{ijk} - \bar{x}_{\bullet j\bullet})^2} \right) \quad g = 1,2...,S$$

Where

x_{ijk} : the score of the *i*th member of subgroup *k* on the *j*th attribute,

$\bar{x}_{\bullet j\bullet}$: denotes the overall group mean of attribute *j*,

$\bar{x}_{\bullet jk}$: denotes the mean of attribute *j* in subgroup *k*,

n_k^g : denotes the number of members of the *k*th subgroup under split *g*.

The strength of the faultline Fau is the maximum value of Fau_g *over all possible splits g=1, 2,…, S.*

Reasons for Not Choosing the Faultline Strength Measure in This Study:

1. The faultline strength measure is confounded with team size. Large teams have more potential for heterogeneity (Bantel & Jackson, 1989), and are therefore less likely than small teams to have homogeneous subgroups. As the faultline strength measure emphasizes the similarity within subgroups, and is positively related to within-subgroup homogeneity (Molleman, 2005), larger teams tend to get smaller faultline strength scores as compared to smaller teams. In my sample as discussed later in the method section, team sizes ranged from 3 to 20. This large range of team sizes will have a confounding effect on faultline strength scores. I checked the

correlations between faultline strength scores and team size in my sample, and the correlation between Individualism/Collectivism faultline strength and team size is as high as -0.60, and between power distance faultline strength and team size is as high as -0.56.

2. The faultline strength measure has not adequately considered the extent to which subgroups separate as a result of accumulated differences between subgroups (Thatcher, et al., 2003). For instance, the faultline strength scores for a team with 3 members who are 25 years old each and 3 members who are 60 years old each, and for a team with 3 members who are 25 years old each and 3 members who are 30 years old each are both 1. Because both teams can split into two homogenous subgroups, they both have the strongest faultlines. However, the two subgroups in the first team are far apart than the two subgroups in the second team. Thus, the faultline strength measure does not capture the concept of "separation" within teams.

APPENDIX G

FAULTLINES CALCULATED IN THIS STUDY

- Faultlines (F) related to individualism/collectivism (I/C) cultural value:
    - F based on I/C only
    - F based on I/C and deep-level attributes (task meaningfulness and goal commitment)*
    - F based on I/C and age
    - F based on I/C and gender
    - F based on I/C and ethnicity
    - F based on I/C and status
- Faultlines (F) related to power distance (PD) cultural value:
    - F based on PD
    - F based on PD and deep-level attributes (task meaningfulness and goal commitment)*
    - F based on PD and age
    - F based on PD and gender
    - F based on PD and ethnicity
    - F based on PD and status
- Faultlines (F) based on deep-level attributes only (task meaningfulness and goal commitment)*

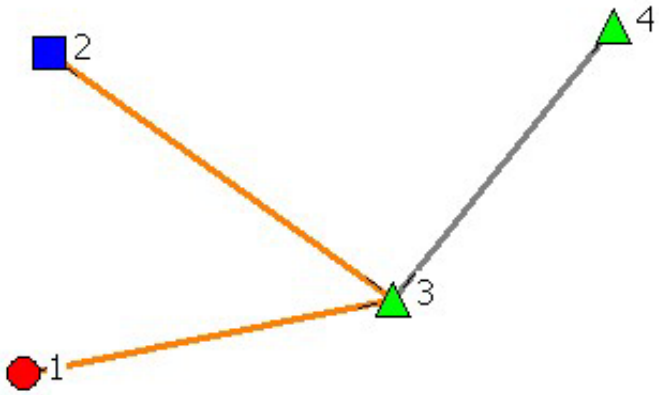
***Note:**

Based on the factor analysis result discussed later in the dissertation, I combined task meaningfulness and goal commitment into one factor when calculating faultlines related to deep-level attributes.

APPENDIX H

EXAMPLES OF RESEARCH TEAMS' NETWORK GRAPHS

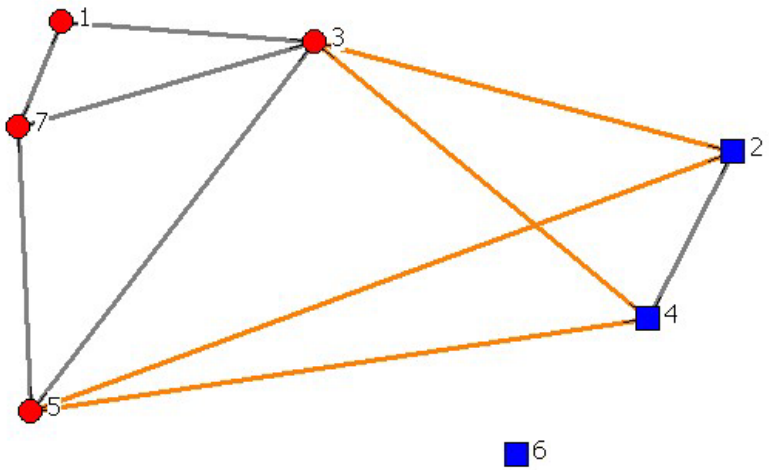
Status Diversity and Friendship Network for Team E035 (Team size: n=4)



Notes:

- Postdoctoral
- Assistant professor
- Doctoral student
- Friendship bridging ties across status subgroups
- Friendship ties within status subgroups

Deep-level Diversity and Friendship Network for Team C032
(Team size: n=7)



Notes:

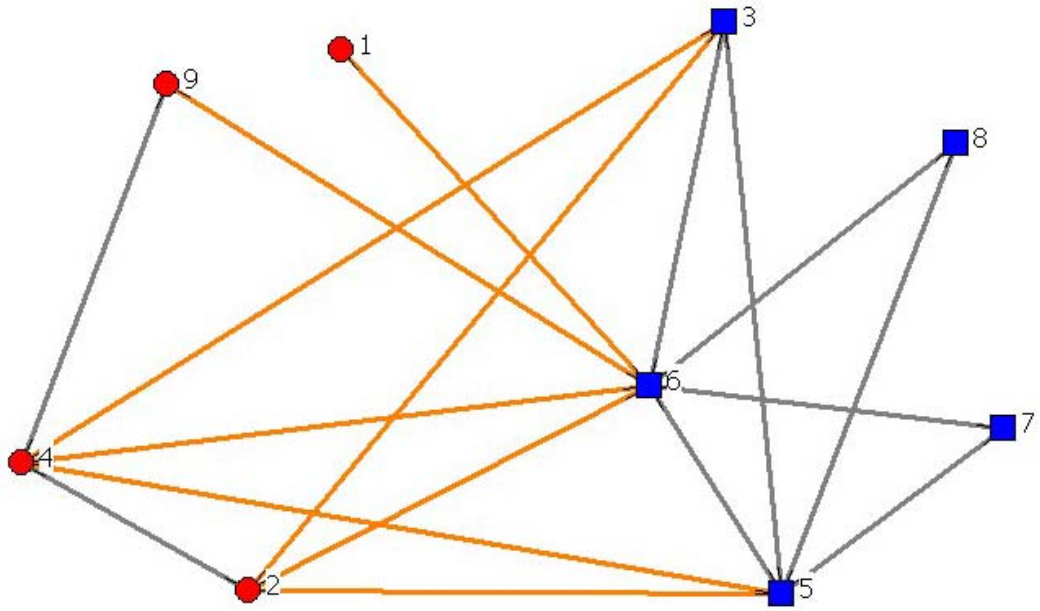
Member with low task meaningfulness and goal commitment

Member with high task meaningfulness and goal commitment

Friendship bridging ties across deep-level subgroups

Friendship ties within deep-level subgroups

Power Distance Diversity and Friendship Network for Team C006
(Team size: n=9)



Notes:

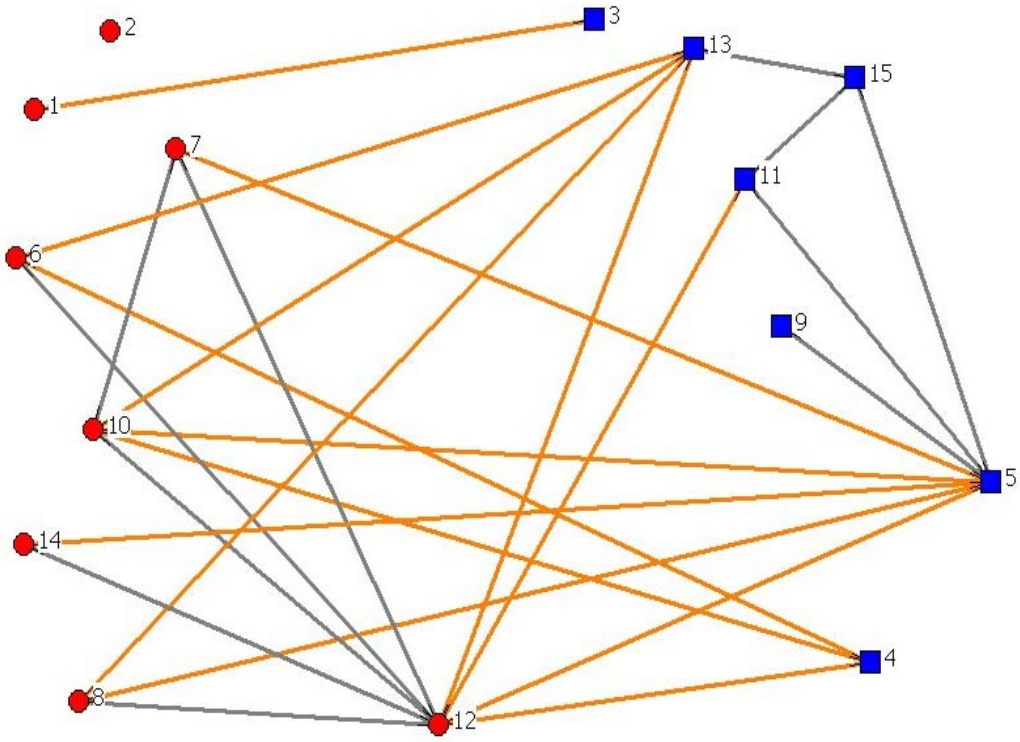
Member with low power distance cultural value

Member with high power distance cultural value

Friendship bridging ties across cultural value subgroups

Friendship ties within cultural value subgroups

Gender Diversity and Friendship Network for Team A005 (Team size: n=15)



Notes:

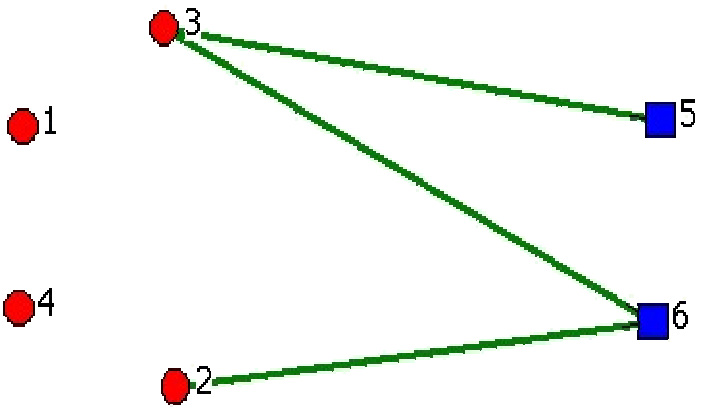
Female

Male

Friendship bridging ties across gender subgroups

Friendship ties within gender subgroups

Ethnicity Diversity and Animosity Network for Team A028 (Team size: n=6)



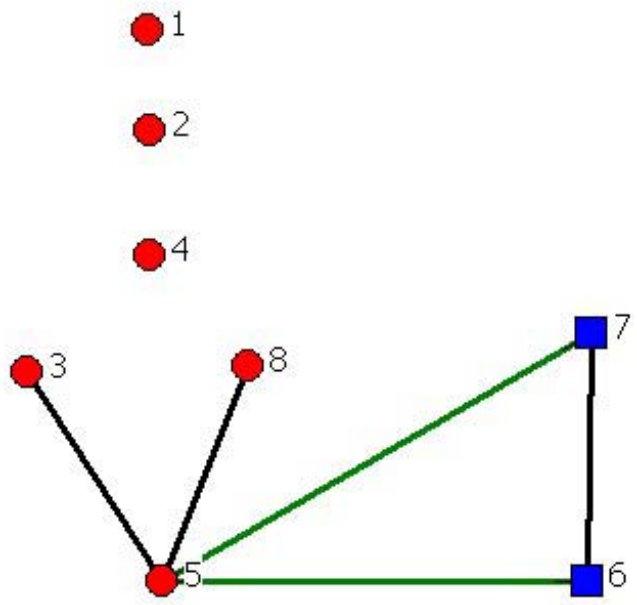
Notes:

Chinese

Caucasian

Breaching Ties

Individualism/Collectivism Diversity and Animosity Network for Team B004 (Team size: n=8)



Notes:

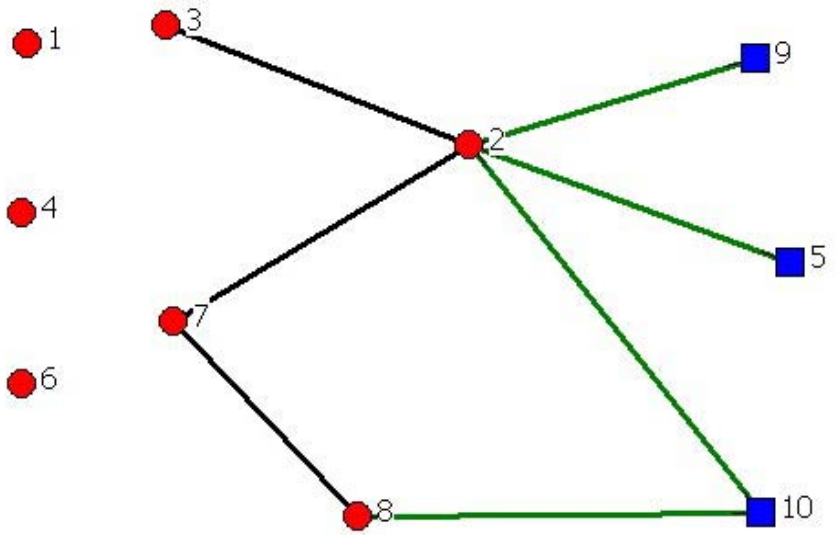
Individualist

Collectivist

Breaching ties across cultural value subgroups

Animosity ties within cultural value subgroups

Gender Diversity and Animosity Network for Team B011 (Team size: n=10)



Notes:

Female

Male

Breaching ties across gender subgroups

Animosity ties within gender subgroups

VITA

Hong Ren

Hong Ren received her Ph.D. in Business Administration, with a concentration in organizational behavior from Pennsylvania State University's Smeal College of Business. She received her Master's degree in Management from Nottingham Business School in UK in 2002, and her Bachelor's degree in English and International Business from Beijing Foreign Studies University in China in 2001. In August 2008, Hong will take up a position as an assistant professor in Management in the Sheldon B. Lubar School of Business at University of Wisconsin-Milwaukee.

Hong's research interests focus on understanding the complexities of cross-cultural organizational behavior and human resource management issues at multiple levels. Her specific research foci include cross-cultural conflict management, cross cultural adjustment for those individuals on international assignments, cultural diversity and networks within teams and international joint venture performance.