

## ABSTRACT

Title of Dissertation: CULTURAL DIVERSITY IN PROJECT TEAMS: UNPACKING HOW AND WHEN CULTURAL DIVERSITY AFFECTS COLLECTIVE PERFORMANCE

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Drawing on impression formation theory (Fiske & Neuberg, 1990), social identity theory (Tajfel & Turner, 1979) and similarity attraction theory (Byrne, 1971, 1997), one can argue that cultural diversity in project teams creates difficulty for free flow of information among team members, which in turn hurts team performance. Yet, it can also be argued that people with different cultural background can provide unique perspectives to an issue, which will benefit teams. In fact, empirical research has found mixed results of cultural diversity on team performance. In this dissertation, I develop a model to reconcile the conflicting results of cultural diversity on team performance. Specifically, I argue that work-related information elaboration is one of the underlying mechanisms that translates the effect of cultural diversity to performance, depending on member information processing motivation and cultural intelligence. Participants were randomly assigned to three types of teams: all American ( $N = 32$  teams), all Chinese ( $N = 34$  teams), and mixed ( $N = 38$  teams), in

which members in each team finished an experimental task (i.e., a business case study). Mediation and moderated mediation analyses were run. Leading results indicate that information sharing uniqueness translated the effect of cultural diversity to team performance, whereas information sharing openness did not mediate the relationship between cultural diversity and team performance after controlling for the mediating effect of information sharing uniqueness. Consistent with one of the major claims in this dissertation, the data show that in culturally diverse teams, high levels of cultural diversity amplified the positive relationship between cultural diversity and information sharing uniqueness, which led to higher team performance. However, social motivation did not change the strength of the relationship between cultural diversity and information elaboration processes. Theoretical and practical implications are provided in the discussion.

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by

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## Chapter 1: Rationale

Ninety-five percent of upper middle managers from various industries agreed that they participated on more than one team at a time (Martin & Bal, 2015). The popularity of cross-functional project teams in organizations has led to much scholarly attention recently: more than forty teams related literature reviews have been published, and many more theoretical and empirical studies have been done (Kozlowski & Bell, 2012). Team-based work structure has been adopted by more and more organizations, with the aims of making the most use of member expertise, minimizing individual work load, and facilitating work efficiency and success (Kozlowski & Ilgen, 2006; Marks, Mathieu, & Zaccaro, 2001). Project teams, which are temporary work teams that are assembled to accomplish time-constrained tasks, are also becoming pervasive in an effort to adapt to the fast-paced business environment (Kozlowski & Bell, 2012; Savelsbergh, Poell, & van der Heijden, 2015). In cross-functional project teams, professionals with different areas of expertise are usually drawn from different departments (e.g., a new product development team may consist of professionals who specialize in technology, design, marketing, operations, customer service, etc.), and each of them is expected to contribute his or her unique expertise. Due to the fact that organizations rely on team-based work structures more often, the complexities of project teams, such as various team characteristics' effects on teams and how teams function, are worth scholarly inquiry.

The rapid growth of multinational companies, globalization of the economy, international immigrants, and international outreach and exchanges in higher education have resulted in many people working in foreign countries. It is expected that the number of foreign-born workers will increase in the years to come around the world, especially in the U. S. (Van Knippenberg, Ginkel, & Homan, 2013). The U.S., which has the largest population of international migrants,

hired 25.7 million foreign-born workers, comprising 16.5 percent of the total labor force in America (U.S. Department of Labor, Bureau of Labor Statistics, 2014). The global economy has created a new reality for organizations: multicultural teams, or people of various cultural backgrounds, working together in the same project team (e.g., Aritz & Walker, 2014; Cox, 1994; Govindarajan & Gupta, 2001; Oetzel, 1998, 2001; Smith, Fischer, Vignoles, & Bond, 2013; Van Knippenberg & Schippers, 2007).

People from different cultures differ in both outward individual characteristics and private personalities, values, or skill sets (Milliken & Martins, 1996). Some of this individual uniqueness is of course due to the natural variability of people in similar situations, but some of it is also due to different cultural experience and expectations. Cultural diversity in teams is not only relations-oriented (i.e., it may influence interpersonal relationships), but also task-oriented (i.e., it may affect team functioning due to culture-related personalities, values, or skill sets; Jackson, May, & Whitney, 1995). These unique characteristics of multicultural teams may foster different team processes in project teams, and various ways of accomplishing work tasks. Thus, multicultural project teams may well have unique team processes compared to culturally homogeneous teams. Because of multicultural project teams' popularity and unique characteristics, it is important to understand *how* and *when* cultural diversity contributes to collective performance in project teams. We should not take for granted that putting dissimilar people together in a team will necessarily have positive effects.

Cultural diversity in teams affects how people interact with each other in teams and leads to variances in team performance (Cox, 1994), and researchers have proposed different theories and provided inconsistent results about whether culturally heterogeneous teams will outperform culturally homogenous teams. One school of researchers (e.g., Cox, Lobel, & McLeod, 1991) has

the “value in diversity” argument, that team members, with their unique cultural backgrounds and various ways of thinking, should complement each other by providing unique information and multiple perspectives (Cox, 1994). One can also argue that people from different cultures, when working in a team with interdependent roles, may have different values and individual goals (e.g., different cultural values frame things differently). The differences may lead to conflicts, such as difficulties in understanding each other, or barriers to exchanging information in depth (Cox, 1994). Those conflicts are detrimental to team task performance (Shore et al., 2011; De Dreu & Weingart, 2003). Regarding cultural diversity’s equivocal influence on team task performance, it has been considered theoretically as a double-edged sword in work teams (Pieterse, Van Knippenberg, & Van Dierendonck, 2013). In fact, previous empirical research exploring the relationship between cultural diversity and team performance showed conflicting results, suggesting the existence of moderators (Cox, 1994; Schippers, Den Hartog, Koopman, & Wienk, 2003; Stahl, Maznevski, Voigt, & Jonsen, 2010). In other words, it is possible that in different circumstances both of the theoretical mechanisms (i.e., cultural diversity brings value or barriers to the teams) could exist in multicultural teams, but there is no integrative theory to guide predictions. For example, under what conditions will cultural diversity bring unique value to project teams?

The seemingly contrasting results of the relationship between cultural diversity and team performance to be reviewed in the next chapter gave rise to the need to clarify the mechanisms and contingencies of cultural diversity’s effect on performance. In fact, scholars have begun to consider processes through which team cultural diversity influences performance, and the conditions under which such effect takes place.

Guided by van Knippenberg, De Dreu and Homan's (2004) categorization-elaboration-model (CEM), I will answer the questions of *how* cultural diversity influences team performance, and *when* cultural diversity could benefit team performance. I will attempt to answer the questions by discussing the key "information elaboration mechanisms" and exploring the conditions under which the benefits of diverse information and perspective can be realized in teams. The core idea of CEM is that the elaboration of task-relevant information and perspectives is positively related to team performance, yet diversity will not always lead to elaboration of information and perspectives (i.e., certain factors work as moderators). Elaboration of information here refers to two different concepts: information exchange and information integration. (It is not the same idea as the concept of information elaboration in the elaboration likelihood model.) In this dissertation, I will show why the relationship between cultural diversity and performance in project teams is mediated by information elaboration, and how this mediating mechanism is moderated by information processing motivations and team cultural intelligence. In short, I attempt to unpack the contrasting results regarding the diversity-performance relationship and answer the call for theorizing more sophisticated understanding of the effects of cultural diversity in work teams (Pieterse et al., 2013; Smith et al., 2013; van Knippenberg & Schippers, 2007).

This introductory discussion showed that multicultural project teams have become a new organizational phenomenon that requires more scholarly understanding. By exploring how multicultural project teams function and when they achieve better performance, the current literature should be extended significantly and organizations should be better at realizing the full advantages of those teams.



## Chapter 2: Theoretical Development

In this chapter, I will provide theoretical rationales for my model, including the overarching theoretical framework and the specific theoretical reasons for each hypothesis and research question. First, I will discuss how cultural diversity may influence team performance, based on the current literature and theories, and present conflicting empirical results. Second, I will discuss the general theoretical framework used to develop my model. Third, hypotheses about how team process variables (i.e., mediators) operate in multicultural teams will be discussed. Finally, I will discuss the conditions on which the operation of the team process variables will depend. This chapter will be devoted to reviewing the current literature and developing my own theoretical model.

### **The Equivocal Influences of Cultural Diversity on Team Performance**

#### ***Defining and Operationalizing Diversity***

Diversity in work teams has been conceptualized and operationalized in two different ways: observable individual differences versus underlying attributes or unobservable characteristics (Jackson et al., 2003; Milliken & Martins, 1996). The observable individual differences, such as race and ethnicity, may stimulate work groups' social categorization processes, which may ultimately lead to intergroup bias. The unobservable characteristics may influence groups' informational or decision making processes. A multicultural project team (MPT), which is a temporary entity whose members are drawn from different functional disciplines, is usually set up for non-routine tasks. The purpose of assembling this type of team is to accomplish a certain task. It is highly likely that members of those teams have seldom or never worked together as a team (Savelsbergh et al., 2015). The scope of this paper is limited to



multicultural project teams (MPTs), with team members of different race and/or ethnicity and different areas of expertise, who have never worked together as a team. For example, MPTs in a consulting company could include a U.S. partner who is in charge of the sales, an Indian engagement manager who streamlines and coordinates the team's work, and two to three business analysts from Europe or Asia with different areas of expertise such as automobile market analysis or skincare market analysis.

In the following sections, the current literature about how cultural diversity may influence team performance will be reviewed. The categorization elaboration model (CEM) is a theory that attempts to explain how information elaboration is the mediating mechanism and proposes how social categorization processes may moderate the mechanism. The theoretical framework integrates the isolated theories discussed below (e.g., impression formation theory), and the following review should set up the background for introducing CEM.

### ***Impression formation theory***

Fiske and Neuberg's (1990) model of impression formation posits that upon encountering someone, people tend to initiate categorization processes that use categorical information to explain others' individual attributes. Physically observable features, especially those that exhibit social groupings (e.g., race, age, sex), heavily influence how people are categorized (p. 11). In a multicultural project team context, race/ethnicity, nationality, age, and gender are visible (or perhaps aural) characteristics that are relevant to the work context (Milliken & Martins, 1996). Members form first impressions of their colleagues based on those observable features, and the social categorization process immediately makes cognition, affect, behavioral expectations available.

Cultural diversity in project teams may create stereotypes, prejudices and/or biases. Racio-ethnicity and nationality differences are most closely related to general treatment of culture (Chao & Moon, 2005). As observable characteristics, race/ethnicity and nationality are situational cues that people may use to simplify the abundant environmental information (Fiske & Neuberg, 1990), and the social-categorization process activated by race/ethnicity is fairly consistent and resistant to short-term manipulations (Hewstone, Hantzi, & Johnston, 1991). Racio-ethnic diversity was found to have a larger negative effect on team cohesion in teams with shorter histories (Harrison, Price, & Bell, 1998). Project teams, by definition, usually do not have long team tenures, perhaps even no team history at all. Therefore, cultural diversity in project teams, which is physically manifested by racio-ethnicity and/or nationality differences, will induce the mechanism of category-based categorization, which may lead to stereotypes, prejudices and/or biases (Fiske & Neuberg, 1990).

### ***Similarity attraction theory***

The possibly biased or stereotypical impressions formed and different cultural identities brought to teamwork may also induce immediate similarity attraction (Byrne, 1971, 1979) and social identity processes (Tajfel & Turner, 1979).

Similarity attraction theory posited that people are more attracted to and like people who are perceived to be similar to them (Byrne, 1971, 1997). The perceived similarity includes both cultural membership and attitudes. People of different racio-ethnic or national backgrounds may be socialized to different social norms, conventions, value orientations, and thinking styles, so that they may be less likely to have similar attitudes than people who have the same cultural background. In fact, Buss (1985) found that people of similar ethnic background are more likely to be attracted to each other. In culturally diverse work teams, people of different racio-ethnicity

and nationality backgrounds perceived themselves to be dissimilar to their fellow team members—two effects that were much stronger than age and sex diversity (Harrison, Price, Gavin, & Florey, 2002; Zellmer-Bruhn, Maloney, Bhappu, & Salvador, 2008) – and thus may be less likely to like or be attracted to each other. Team members who did not like each other had low satisfaction working with each other, and achieved lower team task performance than those who liked each other (Braun, Peus, Weisweiler, & Frey, 2013). Researchers also found that people who had different racial or ethnic background from their work units were evaluated negatively, tended to be less psychologically committed to organizations, and were more likely to be absent (Tsui, Egan, & O'Reilly, 1992). Therefore, working with people from different cultures may result in a higher amount of conflict, which may lead to less efficient work processes and emotional reactance among team members and in turn be detrimental to team performance.

### ***Social identity theory***

Social identity theory posited that people have the need for positive group distinctiveness, which leads to positive views for in-groups and negative views for out-groups (Tajfel & Turner, 1979). In a culturally diverse project team, cultural difference is an immediate and readily recognized salient characteristic of the team (as argued above and through physically manifested features such as physical appearances). The salience of cultural differences may immediately activate the mechanism of category-based rather than person-based impression formation (Brewer, 1988). Thus, people of similar cultural background may have negative views toward out-group members (e.g., see themselves as more competent than those of a different cultural background). This negative view may be detected by those out-groups during social interaction episodes. Therefore, together with out-groups' own need for positive group distinctiveness, there

might be conflicts between subgroups in the team. Those conflicts are harmful to work efficiency, team cohesiveness, and team morale (De Dreu & Weingart, 2003).

Previous research has found that culturally homogenous teams outperform culturally diverse teams. Based on 39 field studies conducted between 1992 and 2009 ( $N=8,757$  teams), a meta-analysis found a negative relationship between cultural diversity and team performance, and the negative impact was more pronounced in occupations dominated by white employees (Joshi & Roh, 2009). The social identification processes that exist within white-dominated occupations may lead to inferior performance ratings of culturally heterogeneous teams. Lab studies also found similar results. For example, for an integrative negotiation task that required intensive and effective information sharing, researchers found inter-culture dyads to have lower joint gains than intra-culture negotiation dyads (Adair, Okumura, & Brett, 2001). Adair et al. argued people's various ways of determining priorities and different views of self-interest led to culturally heterogeneous teams outperforming culturally homogeneous teams. Chatman and Flynn (2001) argued that heterogeneity in project teams made people differentiate themselves from other group members and focus on their own interests rather than team goal pursuit, and thus led to negative cooperative group norms and lower team performance. This body of research suggested that intercultural interaction is "a seedbed for intercultural anxiety, tensions, and conflicts because of differences in world-views, values, and norms" (Chua, 2013, p. 1547). Therefore, based on these lines of research, cultural diversity may impede team task performance.

### ***"Value in diversity"***

In project teams, diverse raw materials to accomplish team tasks, such as work-related information and perspectives, may be presented. Members of different cultural backgrounds have

distinctive expertise, different thinking styles, and perspectives that contribute to the knowledge pool of the team, which improves the probability of finding the best choice and detecting possible errors. For example, Westerners focus more on attributes of an object, whereas Asians focus more on the context of the object (Nisbett, 2003). Euro-Americans and Chinese were found to provide different content of reasons which led to different decision making (Briley, Morris, & Simonson, 2000). People of different cultural groups had different levels of probabilistic judgment accuracy, with Asians (except Japanese) having higher levels of overconfidence than Americans and Europeans (Weber & Hsee, 2000). People of different cultures differed in risk perception and risk preference as well, with Chinese being most willing to take risks and Americans being least willing to take risk, among Americans, Chinese, German, and Polish people (Weber & Hsee, 1998). Given the rare existence of relevant intercultural investigations, those individual level cross-cultural comparisons provided some insights about multicultural teams' decision making processes. During an important time-constrained decision-making episode, having various styles of reasoning and perspectives was found to lead to less ill-informed and more creative decisions (e.g., Cox & Blake, 1991; Doz, Santos, & Williamson, 2004; O'Reilly, Williams, & Barsade, 1998). Similarly, Chao and Moon (2005) argued that the culturally diverse characteristic of project teams can provide the team a multicultural identity, which promotes the adaptability and flexibility of the team. Specifically, the fundamentally different values, beliefs, assumptions, information, and ways of thinking provide information and resources to innovative and effective solutions, and improve the team's ability to tackle various problems in different contexts (Williams & O'Reilly, 1998).

Moreover, based on Shore et al.'s (2011) inclusion framework, people "can be valued for their unique attributes and that, in fact, group members endeavor to feel valued for their unique

attributes at the same time that they want to belong to the group” (p. 1273). Based on Optimal Distinctiveness Theory (Brewer, 1991), people have needs for both being similar and being unique to others, and the two needs became salient under different situations (Correll & Park, 2005). Under certain situations, members with unique cultural attributes may attempt to generate a sense of belonging to the group (Kim, Atkinson, & Yang, 1999). So the unique cultural attributes may not lead to what social identity theorists termed positive group distinctiveness, but may actually motivate people to seek a sense of belonging within the team, promote harmonious interpersonal relationships between members, and contribute to the “knowledge bin” of the whole group. In other words, in certain situations, team members have the need to be valued for their culturally unique characteristics, and attempt to be included. This need for inclusion may improve interpersonal relationships within the team, which helps break down the cultural obstacles and smooth out communication processes (Stahl et al., 2009).

However, previous scholars generally ignore the fact that all the advantages that cultural diversity could possibly bring to multicultural teams are based on the assumption of free flow of communication within teams. Specifically, without free flow of communication within teams, perspectives are less likely to be shared, the multicultural team identity is harder to establish, and members can hardly feel valued by their colleagues. Those may be the reasons for the conflicting empirical results in the literature, which will be discussed below.

### ***Previous Empirical Evidence***

The empirical evidence found for the relationship between cultural diversity and team performance is highly mixed: both positive and negative relationships have been found, and curvilinear relationships with totally different shapes have also been found. For instance, Thomas, Ravlin, and Wallace (1996) and Thomas (1999) found a positive relationship between

diversity and performance, whereas others found a negative one (e.g., Jehn & Mannix, 2001; Kirkman, Tesluk, & Rosen, 2004). Methodologically speaking, in controlled lab settings or classroom settings, cultural diversity is more likely to be associated with high levels of performance, whereas in the field setting of organizations, cultural diversity's effect on team performance is more ambiguous (Schippers et al., 2003). The more ambiguous results in field settings might be due to the more complex nature of work teams (e.g., nature of team tasks, developmental phases of teams, environment of teams). In addition, some researchers found different patterns of non-monotonic relationships. For example, Earley and Mosakowski (2000) found an upright U-shaped curvilinear relationship, "with homogeneous and highly heterogeneous teams outperforming moderately heterogeneous ones" (p. 26), whereas Cheng, Chua, Morris, and Lee (2012) found an inverted U-shaped relationship with moderate variance in cultural value orientations performing better than high or low variance in value orientations. Probably the most consistent results in the cultural diversity and team performance literature is that meta-analyses have found no overall relationship between the two, suggesting there is actually no correlation between the two, that contrasting outcomes cancel out, or that there are inconsistent mediations (Bowers, Pharmer, & Salas, 2000; Joshi & Roh, 2009; Stahl et al., 2010). For example, Stahl et al. (2010) identified 112 articles ( $N = 10,632$  teams in total) that examined the relationship between cultural diversity and team performance, and the corrected mean effect sizes was  $-.02$  (*n.s.*), and the individual effect sizes ranged from  $-.60$  to  $.48$ . In addition, the magnitude of the relationship did differ significantly across different situations, such as occupation and ethnic compositions, industries, or study settings, and the homogeneity Q statistics were significant, which suggested that there might also be potential moderators. Joshi

and Roh (2009) examined the results of 39 studies ( $N = 87,57$  teams) and found the corrected mean effect size between cultural diversity and team performance was  $-.01$  (*n.s.*).

Multicultural project teams are task-oriented groups consisting of people of different national cultures and expertise, which are designed to work on time-constrained short-term goals (Marquardt & Horvath, 2001). In my study, I am interested in exploring the relationship between cultural diversity and team performance in multicultural project teams. Due to different natures of long-term teams and short-term teams (i.e., project teams), such as task time urgency, role clarity, and stability of work rules, the group dynamics may be different. Meta-analyses did find that the relationship between cultural diversity and team performance differed depending on team types (i.e., the performance effect of cultural diversity in short-term teams was positive, and in long-term teams was negative) (Joshi & Roh, 2009; Stahl et al., 2010). So limiting the scope of the study to multicultural project teams may yield cleaner results and clearer theoretical implications. Previous research defined and operationalized team performance in different ways depending on research settings: team grades were used in educational settings and subjective (e.g., supervisor ratings) or objective ratings (e.g., sales figures) of performance (Stahl et al., 2010). For the purpose of this study, I define team performance as “the extent to which the team accomplished its purpose and produced the intended results” (Stahl et al., 2010, p. 9).

Therefore, based on previous theoretical and empirical evidence, the relationship between cultural diversity and team performance is unclear:

RQ1: Is cultural diversity beneficial or detrimental to team performance in multicultural project teams?

### **Categorization-Elaboration Model (CEM) and Culturally Diverse Teams**



Based on the above discussion, the current literature that examines the relationship between cultural diversity and team performance mostly relies on the two isolated lines of reasoning (i.e., social categorization that hurts performance, value in diversity that promotes performance), which had contradictory predictions and results. In other words, researchers relied on either line of reasoning and both produced empirical support, which may lead to the result of zero effect in meta-analyses. First, culturally heterogeneous team members should possess a greater pool of task-relevant information (e.g., expertise, experience, etc.) and culturally specific perspectives. The potentially larger amount of information and number of perspectives may bring advantages to the team (i.e., a better information process). Second, the readily recognized differences of team members lead to impression formation, social categorization, and similarity attractions. These processes may prevent culturally heterogeneous teams from taking full advantage of the value in diversity, or even become disadvantages (i.e., the social categorization process).

The categorization-elaboration model (CEM) challenged the assumption that most previous research relied on. That is, existing literature tends to suggest that diversity may induce either one of the processes (i.e., the better information process or the defensive social categorization process), and each theory focuses on only one of the processes as the basis of its reasoning. CEM proposed that each dimension (e.g., age, gender, racio-ethnicity) of diversity may in fact elicit both processes (Van Knippenberg et al., 2004). Particularly, if work project team members are from different cultures, it is possible that they received different types of training, possessed different kinds of expertise, had various work and/or life experiences, and had various culturally related values, beliefs, perspectives. These differences provide culturally heterogeneous teams with greater information pools. Moreover, if work project team members

are from different cultures, they may have observable differences (e.g., the ways they look, accent, nonverbal behaviors, etc.). These observable characteristics may work as activators for social categorization processes, which may result in processes such as intergroup biases that prohibit the team from benefitting from cultural diversity. In other words, both information processes and social categorization processes may be induced simultaneously.

CEM argued that both the availability and use of information help diverse teams achieve their potentially superior task performance (Van Knippenberg et al., 2004). In other words, information processes and social categorization processes interact to affect team performance. Specifically, CEM proposed that information elaboration, defined as “the exchange of information and perspectives, individual-level processing of the information and perspectives, the process of feeding back the results of this individual-level processing into the group, and discussion and integration of its implications” (Van Knippenberg et al., 2004, p. 1011), is the underlying process that helps teams harvest the benefits of diversity. They argued that although conflicts or dissent within teams were usually considered to be beneficial for team processes, the ways conflicts or dissent were managed (e.g., avoid or confront) probably would make a difference in influencing team performance. Therefore, whether and to what extent information and perspectives were used (i.e., whether and to what extent information is elaborated) was argued to be the underlying key positive process. Moreover, CEM suggested that the positive effect of information elaboration on team performance depends on members’ ability, motivation, and task requirements. In addition, whether information is elaborated depends on whether social categorization leads to intergroup bias. That is, the relationship between social categorization and team conflict, cohesion, identification, or commitment is moderated by intergroup bias.

CEM may be able to explicate the conflicting results of culturally diverse team performance. Existing literature had no luck in obtaining a consistent relationship between cultural diversity and team performance. The highly conflicting results were probably because of the existence of both mediators and moderators, possibly the interaction between information elaboration process (i.e., information exchange and integration) and social categorization process (i.e., whether and to what extent information is elaborated within teams depend on whether the social categorization processes induce intergroup biases). In a culturally diverse project team, members received different types of education and work-related training because of different teaching philosophies adopted in different cultures. For example, French teachers see education as providing access to and passing knowledge from one generation to the next (i.e., teaching as initiation), United States teachers usually argue they create knowledge with students together, while Russian teachers adopt the philosophy that education is planned and guided acceleration rather than natural development (Alexander, 2005, 2009). Being educated and trained differently, members from different cultures may possess distinct knowledge and perspectives. Culturally diverse members also had various work and life experience, and may possess culturally-specific values, beliefs, and/or thinking styles. Thus, culturally heterogeneous teams may have larger information pools than culturally homogeneous teams. In other words, those teams have higher availability of information and perspectives. Project teams usually deal with non-routine and time-constrained projects (Pinto, Pinto, & Prescott, 1993), such as consultants of various expertise working together for a client, or designer, researcher, marketer, and sales working together to develop a new product plan. Most of these non-routine projects require members with multiple backgrounds to share, exchange, process, and integrate information and perspectives.

Therefore, elaboration of information may be one of the mechanisms that translates the positive potential of cultural diversity to team performance.

Nevertheless, availability of information does not equal elaboration of information. CEM proposed that whether the social categorization process leads to intergroup bias may serve as an important moderating mechanism that explains why some culturally diverse teams are more able to elaborate information. It is important to note that social categorization does not always lead to intergroup bias, an assumption that many previous studies relied on. For example, if team members have high cultural intelligence (Ang & Van Dyne, 2008) and the team is able to establish a multicultural team identity, the social categorization processes, which differentiate “us” from “them,” may actually help the project team to realize the benefits of having conflicting ideas and take advantage of them.

The above discussion suggested that CEM might be a useful theoretical framework to rely on in explicating the conflicting results of the relationship between cultural diversity and team performance. I will discuss more details about my hypotheses below.

### **Information Elaboration in Culturally Diverse Teams: Teams as Cognitive Information Processors**

Information elaboration, according to Van Knippenberg et al. (2004), includes the sharing or exchange of information, and the processing or integration of information. For a project team to take full advantage of members’ information and perspectives, both sharing and processing of information within culturally diverse teams are necessary informational processes. If information gets shared without being processed, such as receiving no or minimum feedback instead of being discussed or challenged, the piece of shared information may only be minimally useful for the project team. And it is impossible for a piece of information to be processed without being

shared, because team information processing requires multiple team members' involvement. Therefore, both sharing and processing of the information processes are essential in accomplishing project team tasks.

### ***Information Sharing Processes: Uniqueness and Openness***

Effective information sharing within teams is critical in attaining high team task performance, because it is the primary process through which teams take advantage of their available informational resources (Bunderson & Sutcliffe, 2002; Mesmer-Magnus & DeChurch, 2009). *Information sharing uniqueness* captures the “variability in how many group members have access to a piece of information” (Hinsz, Tindale, & Vollrath, 1997, p. 54). *Information sharing openness* captures “team communication related to goals, progress, coordination, and the like, independent of the initial distribution pattern of information among team members” (Mesmer-Magnus & DeChurch, 2009, p. 535).

Qualitative and quantitative reviews suggested that information sharing uniqueness and openness were two primary foci when scholars investigated information sharing processes, and the two aspects parallel the task and social-emotional functions of teams (Mesmer-Magnus & DeChurch, 2009). In Mesmer-Magnus and DeChurch's typology of team information sharing and outcomes, they argued that the two aspects are not orthogonal nor perfectly related. The two dimensions of information sharing, uniqueness and openness, are influenced by team contexts differently and also rely on distinct mechanisms to affect team performance. For example, a meta-analysis conducted by Mesmer-Magnus, DeChurch, Jimenez-Rodriguez, Wildman, and Shuffler (2011) found that whether a team communicated face to face or virtually through mediated channels contributed to information sharing uniqueness positively and openness negatively, and information sharing uniqueness was more important to face-to-face teams.

Cultural diversity in teams greatly influences communication processes in teams, including information sharing processes (Stahl et al., 2010).

In culturally diverse teams, members of different racio-ethnicity or nationality are more likely to have unique information available than members of the same racio-ethnicity or nationality due to different ways of education and training, various work and life experience, cultural specific values, beliefs, and thinking styles (Nisbett, 2003). Therefore, I argue that in culturally diverse project teams, information sharing uniqueness should not only be access to certain information, but also accesses to culturally-specific perspectives. It should be noted here that “information” does not only refer to “facts,” but also how people make meanings based on facts with the influence of their cultural background.

One of the unique information sharing processes for culturally diverse teams is the sharing of culturally different perspectives and opinions based on different thinking styles. Nisbett, Peng, Choi, and Norenzayan (2001) defined two types of thinking styles. *Holistic thinking* is the orientation toward the context and whole, including attention toward relationships between the object and the context/whole and using such relationships to explain and predict things. The holistic thinking style is based on experience rather than abstract logic and is dialectical, emphasizing the need for multiple perspectives and searching for a “middle way.” *Analytical thinking* was defined as the orientation of detaching the focal object from its context, using rules about the attributes of the object to explain and predict events. The analytical thinking style focuses on using formal logic and avoiding contradiction.

Scholars have provided many details about how East Asians and Americans may differ because of their difference in holistic thinking and analytical thinking styles. For example, East Asians and Americans respond differently to weak anti-arguments against their initially held

position (Weber & Hsee, 2000); East Asians have higher tolerance for contradictions than Americans, and would more commonly transcend, accept, or even insist on the contradictions. In addition to thinking styles, Westerners see the world as comprised of unconnected objects while Asians see the world as composed of continuous masses (Nisbett, 2003). Ji, Schwarz, and Nisbett (1998) provided evidence that Americans and Chinese differed in their attention, memory encoding, and thus their judgment strategies, because Chinese were not impacted by response alternatives when they were asked to report frequency while Americans were. If both Westerners and Asians are in the same work group, the attributes of the events may be more readily detected by Westerners than Asians, and the relationships among the events may more naturally occur to Asians than Westerners. Thus, having both Westerners and Asians in the same group may allow higher availability of unique information. Another example of different cultural perspectives could be the different causal attribution styles between Westerners and Asians. Based on several scholars' investigation results (e.g., Choi, Nisbett, & Norenzayan, 1999; Morris & Peng, 1994; Nisbett, 2003), when making causal attributions, Westerners are more likely than Asians to attribute to personal dispositions such as attitudes and traits, while Asians are more likely than Westerners to attribute to situational factors such as the influence of environment or other people. So in a group consisting of both Westerners and Asians, it is reasonable to expect that both causal attributions may be made, and dialogues may be opened about which one is more appropriate for the situation.

Cross-cultural comparisons also showed that culture's influences on individual cognitions presented in peoples' risk assessment behaviors. Chinese socialization processes tended to induce a prevention orientation (Briley, Morrison, & Simonson, 2005; Miller, 1994), which is characterized by people's sensitivity to negative outcomes of action. In addition, Asians

(Malaysian, Indonesian, and Chinese were sampled in the study), who were speculated to have a more fatalistic world view, reported more extreme numerical probabilities than the British, who were speculated to have a Laplacean probabilistic-causal worldview (Wright & Philips, 1980). Other studies also supported this result that Asians (except Japanese) were generally more prone to overconfidence (Weber & Hsee, 2000; Yates, Lee, & Bush, 1997). Different cultures also selectively attend certain risks and ignore others (Douglas & Wildavsky, 1982). For example, the probability of a loss had a larger effect on risk perceptions of Netherlands and U.S. participants, whereas the magnitude of a loss had a larger effect on risk perceptions of Hong Kong and Taiwan participants (Bontempo, Bottom, & Weber, 1997). Along this line of research, Chinese were found to be the least risk-averse sample, followed by Polish and German, and Americans were found to be the most risk-averse (Weber & Hsee, 1998).

People from different cultures also differ in their decision-making behaviors. For example, French-Canadians were more likely to use cost-benefit considerations than Americans, while Chinese were suggested to use the folk-precedent-matching decision mode (Weber & Hsee, 2000). Relatedly, Chen, Chiu, Roese, Tam, and Lau (2006) found that Chinese participants generated a significantly higher percentage of subtractive counterfactuals (i.e., a wish to remove something from the past that has happened) than American participants, which suggested that learning from past mistakes, rather than being vigilant to future opportunities, is more important for Chinese than Americans.

Although the results discussed in the last two paragraphs were cross-cultural comparisons, I believe they provided some insights about how multicultural team members differ in risk assessment and decision making.



As Briley et al. (2000) put it, “cultures endow individuals with different rules or principles that provide guidance for making decisions, and a need to provide reasons activates such cultural knowledge” (p. 157). When people need to provide reasons for their judgment or decision, which is usually the case in teamwork rather than leadership orders, their cultural knowledge (e.g., values, beliefs, decision principles) is brought to the fore of their mind (Morris & Fu, 2001). Therefore, in multicultural project teams, members’ distinct cultural related information and perspectives may become accessible to them and may influence the level of information sharing uniqueness.

Diverse cultures in teams may make more unique information and perspectives available, thus having a higher probability to find a better solution, and more creativity in problem-solving processes (Hinsz et al., 1997; Stahl et al., 2010). Specifically, meta-analyses have found that cultural diversity contributed positively to task conflict when task complexity was high (but unrelated to conflict when task complexity was low), and task conflict was found to be positively related to team performance (de Wit, Greer, & Jehn, 2012; Stahl et al., 2010). The positive relationship between task conflict and team performance was more pronounced in decision-making tasks, especially when performance was measured by decision-making quality or financial performance (de Wit et al., 2012). In addition, multiple information processors (i.e., team members) with different cultural backgrounds may look at the same issue from different perspectives, thus making the error detection process more thorough, which should contribute to higher team task performance. Researchers found that by sharing normally unshared information, groups make superior decisions (Stasser & Birchmeier, 2003). Therefore,

Hypothesis 1: Cultural diversity contributes positively to information sharing uniqueness in teams, and information sharing uniqueness will be positively related to team performance.

Now we move to the second dimension of information sharing, its openness. Following CEM's reasoning, whether social categorization processes lead to intergroup biases should also be considered when examining the relationship between diversity and team performance. Information sharing openness could be one of the team processes that may be influenced by the social categorization processes in teams.

People are more willing to share information with people who are similar to them (Bezrukova, Jehn, Zanutto, & Thatcher, 2009; Devine, 1999), and thus the social category faultlines may emerge (i.e., "the hypothetical dividing lines that split a group into relatively homogeneous subgroups," Bezrukova et al., 2009, p. 35). Any social category faultlines based on cultural membership may damage the openness of information sharing processes. Research has shown that teams with social category faultlines experienced communication problems due to in-group favoritism, out-group hostility, and stereotyping (Bezrukova et al., 2009; Tajfel & Turner, 1979). With this type of team climate, members were less likely to share information within teams to avoid possible conflict, personal attacks, and uncivil arguments (Gelfand, Erez, & Aycan, 2007). In addition, people from different cultures typically have various levels on different value orientations (Hofstede, 2001; Nisbett, 2003). Even if people from different cultures are willing to share information, sometimes there may be difficulties in understanding each other. Repeated misunderstanding during team cross-cultural interaction should reduce members' motivation to bring up issues again. In addition, information sharing openness calls for shared languages or common background (Stahl et al., 2010), but people from different cultures

usually do not share the same language (or the same facility with a common language), and have different value orientations and follow different social norms (Hofstede, 2001; Nisbett, 2003). Moreover, race and citizenship heterogeneity formed the group norm of differentiating themselves from the group (i.e., decreased cooperative group norm) in project teams (Chatman & Flynn, 2001), which may influence members' information sharing openness negatively. Finally, due to the diverse cultures presented in groups that may induce social category faultlines, it is more difficult to form team identity (Ellemers, Sleebos, Stam, & Gilder, 2013) that usually promotes members' motivation to speak up and contribute their ideas. Therefore, member cultural heterogeneity can create barriers for information sharing openness in teams.

Multicultural project teams are usually composed of people of different expertise, so that sufficient information sharing openness will facilitate the process of accomplishing work tasks by having people of various expertise contributing to the working process. Besides, an open team communication climate will give rise to member's job and communication satisfaction (Trombetta & Rogers, 1988), contribute to member commitment and identification (Bartels, Pruyn, De Jong, & Joustra, 2007), and in turn will lead to high team task performance (Pincus, 1986). Thus,

Hypothesis 2: Cultural diversity leads to decreased information sharing openness, and higher information sharing openness leads to higher team performance.

### ***Information Integration Processes***

As mentioned above, information elaboration within teams does not only include information sharing processes, the foci of the first two hypotheses. If information gets shared without being processed (i.e., discussion, integration, challenging, etc.), the sharing of information may generate minimum benefits.

Because of the fundamental differences in metaphysics (i.e., ontology) and epistemology, people from different cultures working together are more likely to have conflicts than people from the same culture (Stahl et al., 2010). Members of different cultures attend information from their environment differently and give different importance to the information they sample (Triandis, 2006). For example, Nisbett et al. (2001) argued that East Asians are more field dependent and better at detecting variations, while Americans are better at isolating an object and analyzing it independent from its environment. It is possible that when East Asians and Americans work together on a time-constrained project, they may have different opinions about the role of the context or environment. In addition, East Asians were more susceptible to hindsight bias (i.e., think he/she knows it all along), German and Dutch people experienced almost no hindsight bias, while Americans were more likely to experience illusion of power (Choi & Nisbett, 2000; Pohl, Bender, & Lachmann, 2002). As a consequence, there might be relevant conflicts when working in teams. Moreover, due to different thinking styles and/or potential language barriers, team members may experience difficulties in understanding each other, so that the information integration process may not be useful in achieving better team performance. In sum, because people with different cultural backgrounds have diverse experiences and hold different values, beliefs, and thinking styles, they may prioritize, interpret, and respond to things differently. Those often subconsciously held beliefs may make sources of conflict difficult to identify and resolve (Wiersema & Bantel, 1992), which may make the information integration process a barrier for achieving better team performance.

However, on the other hand, information integration in culturally diverse teams may bring benefits to teams. First, having different information and perspectives discussed and integrated should provide teams with more complete understanding of tasks, better error

detection ability, etc. (Van Knippenberg et al., 2004). Second, research has shown that people from collectivistic cultures used more indirect ways of communication, especially in work settings (Sanchez-Burks et al., 2003), which may lead to less conflict. In addition, members with holistic thinking styles usually tend to find a “middle way” and compromise (Nisbett et al., 2001), and this may also lead to the harmonious climate of the team.

In sum, meta-analyses have found task conflict, relationship conflict, and process conflict to be negatively related to team performance, but when the effects of relationship conflict and process conflict were controlled, task conflict contributed to team performance positively (De Dreu & Weingart, 2003; de Wit et al., 2012). It is unclear, in culturally diverse teams, how often each type of conflict is likely to happen. In addition, whether different thinking styles in culturally diverse teams will lead to conflicts remains unclear. Therefore, based on the existing literature, whether a culturally diverse team will benefit from diverse thinking styles remains unclear:

RQ2: Will the different cultural specific thinking styles benefit or harm collective performance in multicultural project teams?

The above discussion is based on cognitive processing of information. Whether cultural diversity is beneficial or detrimental to team performance through the information elaboration process overall, should also depend on motivation (e.g, commitment to task, group identity). In addition, according to CEM, solely relying on the information processes (i.e., information elaboration: sharing and integration) to examine the relationship between cultural diversity and team performance is problematic, so that whether the social categorization process leads to intergroup bias will also be discussed. This should lead to the next sections, motivated information processing and the moderating role of cultural intelligence.

## **Culturally Diverse Teams as Motivated Information Processors**

The above mechanisms concern the “can do” of culturally diverse team members’ information elaboration processes. In other words, whether team members have unique information available and whether intergroup bias leads to barriers of information sharing openness was discussed. How about members’ motivation that explains whether they “will do?” Researchers have argued that motivation plays an important role in small group interpersonal interactions (e.g., Higgins & Kruglanski, 2000; Kelley & Thibaut, 1978).

De Dreu, Nijstad, and Van Knippenberg (2008) proposed that group information processing such as group judgment and group decision making is a motivated information process in a group (i.e., MIP-G; G indicates it is a group-level theory). They argued that group information processing such as information exchange and integration are influenced by two types of “global motivations” (De Dreu et al., 2008, p. 23). *Epistemic motivation* is defined as the willingness to spend effort to achieve a thorough, rich, and accurate understanding of the world. *Social motivation* is defined as the individual preference for outcome distributions between oneself and other group members and can be proself (i.e., the individual is concerned with own outcomes only) or prosocial (i.e., the individual is concerned with joint outcomes and fairness).

Culturally diverse teams tend to have more conflicts than culturally homogeneous teams (Stahl et al., 2010), and this may influence teams’ epistemic motivation. The MIP-G model argued that the extent to which new information is searched, generated, and processed is driven by epistemic motivation (e.g., need for cognition, need for closure). Conflicts within groups, including interpersonal incompatibilities (i.e., relational conflict), differences in viewpoints and opinions related to a group task (i.e., task conflict), and controversies about issue and resources delegation (i.e., process conflict), usually invite members to search, generate, and process new

facts and/or reasoning to back up their positions (Jehn & Mannix, 2001). Moreover, people's information seeking, generating, and processing are often biased based on their "previously held beliefs, expectation, or desired conclusions" (Jonas, Schultz-Hardt, Frey, & Thelen, 2001, p. 557). Culturally homogenous team members are likely to be socialized in similar ways and thus hold similar beliefs and expectations, so that their information seeking, generating, and processing are likely to be biased in similar ways. Research has shown that teams with high levels of agreement among members were more confident about their decision or judgment correctness, which in turn led to group level confirmation bias (Schulz-Hardt, Jochims, & Frey, 2002). But in a culturally diverse project team, members hold various information and perspectives and therefore possibly hold less confidence, and make decisions less quickly. They are more likely to encounter conflicts, so that culturally heterogeneous teams may be less susceptible to confirmation bias. The biased information processing mechanism is especially important to be considered in non-routine decision making groups, because biased preference for an alternative may obscure potential risks and danger (Jonas et al., 2001). In addition, higher epistemic motivation was found to decrease people's selective use of information (Stuhlmacher & Champagne, 2000), reduce the likelihood of rejecting different opinions (Kruglanski & Webster, 1991), and stereotyping (Fiske & Neuberg, 1990). Therefore, the low levels of agreement within multicultural teams should increase members' epistemic motivation, lead to less group confirmation bias, and thus increase team performance. Thus, the following hypotheses are proposed (see Figure 1).

Hypothesis 3: Culturally diverse project teams have higher epistemic motivation than culturally homogeneous project teams, and higher epistemic motivation leads to higher project team performance.



*Figure 1. The Mediating Role of Epistemic Motivation in Multicultural Project Teams*

There is some evidence that collectivist cultures make prosocial motivation more accessible than individualistic cultures do (e.g., Probst, Carnevale, & Triandis, 1999; Wong & Hong, 2005). Different social motives may lead to biased information processing (De Dreu et al., 2008). Members with prosocial motives, who value group harmony and inclusiveness are less likely to comment negatively on other's positions and are less likely to develop ownership issues (owner of certain positions). Members with proself motives, who concern their own interest rather than others' or the group's, are more likely to argue for their own positions and only share information that supports their positions. Therefore, it may not be the case that culturally diverse teams would have more unique information shared, for example if an homogenous team were composed only of collectivists. The difference in social motives may differentiate culturally homogenous teams regarding information sharing uniqueness. Individuals with prosocial motives are more likely to trust others, value harmony (i.e., avoid conflict) and collective welfare, and support decisions that foster collective goals, whereas proself members may be more aggressive in defending their own positions (De Dreu et al., 2008). So, prosocial team members tend to be influenced by proself members in a culturally diverse team.

Based on the above discussion, the following hypotheses are proposed (see Figure 2):

Hypothesis 4a: Social motivation moderates the relationship between cultural diversity and information sharing uniqueness, such that the relationship between cultural



diversity and information sharing uniqueness will be more positive when team prosocial motivation is high.

Hypothesis 4b: Social motivation moderates the relationship between cultural diversity and information sharing openness, such that the relationship between cultural diversity and information sharing openness will be more positive when team prosocial motivation is high.

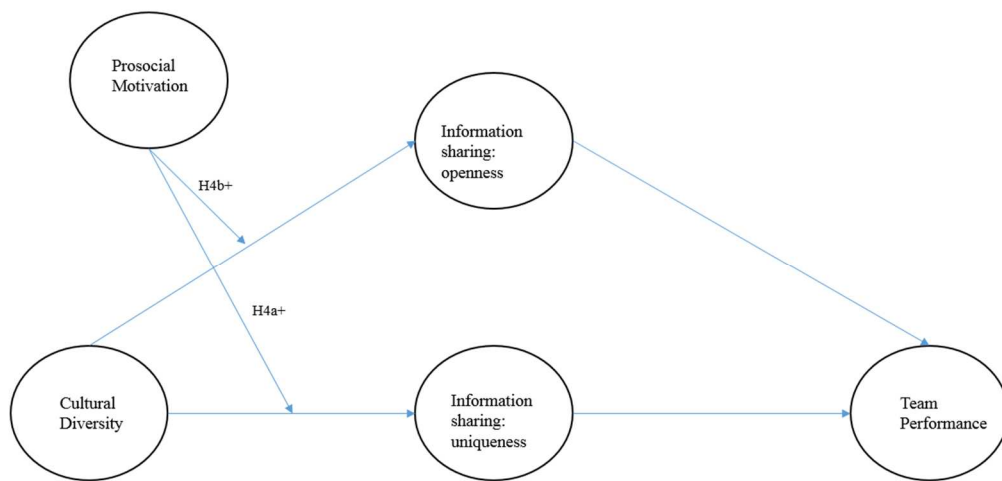


Figure 2. The Moderated Mediation between Cultural Diversity and Team Performance in Multicultural Project Teams: Social Motivation

### Cultural Intelligence as a Moderator

#### *Shared cultural intelligence and information sharing openness*

*Cultural intelligence (CQ)*, defined as “an individual’s ability to function and manage effectively in culturally diverse settings” (Ang et al., 2007, p. 337), is a measure assessing an individual’s ability to function effectively with culturally heterogeneous others. *Shared* cultural intelligence in teams captures the overall ability of the team handling issues in cultural diverse environments, and will be operationalized on the assumption of isomorphism across levels

(Klein & Kozlowski, 2000). In other words, shared cultural intelligence is the average of individual cultural intelligence in teams. Despite the construct's relevance to the multicultural team context, there has been little research that investigates the role of CQ in multicultural team dynamics (Flaherty, 2008).

Cultural intelligence is a multidimensional construct, representing different “loci” of individual intelligence (Ang et al., 2007, p. 337). Based on Ang et al.'s conceptualization of CQ, four dimensions have been proposed: *Metacognitive* CQ reflects an individual's higher-order cognitive processes that are used to understand cultural knowledge, such as “planning, monitoring, or revising mental models of cultural norms for countries or groups of people” (Ang et al., 2007, p. 338); *cognitive* CQ focuses on actual cultural knowledge of such things as norms and practices of different countries or groups of people; *motivational* CQ deals with people's intrinsic interest and confidence in investing energy in intercultural interactions; and *behavioral* CQ focuses on individuals' ability to adjust verbal and non-verbal behaviors when interacting with people from different culture. CQ is a very important personal characteristic in cross-cultural interaction for members working in culturally diverse teams that captures individuals' cultural adaptability, but little empirical research has been done to investigate its role in culturally diverse teams (Chen, Liu, & Portnoy, 2012; Gelfand et al., 2007).

Individuals with high metacognitive CQ act within culturally diverse teams strategically, possibly coming up with strategic interaction plans and rehearsing in mind before interactions, checking whether cultural assumptions of interaction partners are correct constantly during interactions, adapting cognitive processes or mental models correspondingly if actual interactions suggest cultural assumptions are wrong, and changing the assumptions if the experiences happen over and over again (Ang et al., 2007). Teams members with high

metacognitive CQ are more likely to develop global identities (i.e., sense of belonging to the multicultural work environment) (Shokef & Erez, 2008). An internalized global social identity helps team members understand the teams' norms, values, and behaviors in multicultural environments. When members know that other fellow team members are aware of how the team works, they would not be worried about being judged by others, and would feel comfortable about sharing their own ideas. In addition, Triandis suggested that "a culturally intelligent person suspends judgment until information becomes available beyond the ethnicity of the other person" (2006, p. 21). Therefore, for teams with high levels of CQ, social-categorization processes may not lead to stereotypes and biases based on ethnicities of team members, so that the negative relationship between cultural diversity and information sharing openness may be weaker. These processes may help the team to form an open climate of information sharing.

Individuals with high cognitive CQ understand social systems, religious beliefs, aesthetic values, norms, language, and conventions of other cultures (Ang et al., 2007). In a culturally diverse team where each member understands other members' cultures to some degree, they will be able to understand each other better, and feel respected, trusted, and accepted (Rockstuhl & Ng, 2008). For example, Flaherty (2008) found that higher cognitive CQ was correlated with team acceptance positively. By having interpersonal trust and acceptance within teams, members may be more willing to share ideas and perspectives. Based on previous research, intra-group respect will help to improve work engagement (Ellemers et al., 2013), and engaged workers are committed to their work (Christian, Garza, & Slaughter, 2011) and should be more likely to share information. For example, if a member in the team's culture is understood by at least one other member, the person will be more likely to share information that only makes sense in his or her own culture, which might help accomplish team tasks. Therefore, based on the above

discussion, if members feel that other colleagues in the team understand them, they will be more likely to share culture related information that is expected to be understood.

Motivational CQ deals with a team member's willingness to spend effort on culturally diverse interactions, pushing the team to approach goal achievement (Ang et al., 2007). If members within a culturally diverse team have high motivation to interact with people from different cultures, they will show this motivation probably by asking culture-related questions. When other team members are asked those type of questions, they should feel the motivation and feel needed, so that they may be more likely to share information within teams. When enjoying successful cross-cultural interactions within teams, they are also likely to share information within teams (Chen & Lin, 2013). In addition, individuals with high motivational CQ will enjoy devoting more effort in understanding and communicating with their cross-cultural counterparts, which should lead to higher openness in information sharing (Ang et al., 2007; Chen, Liu, & Portnoy, 2012). These whole processes will promote an open climate in teams, and openness in information sharing will be promoted as well. Moreover, people with higher motivational CQ were found to have fewer difficulties negotiating everyday situations (e.g., making oneself understood) in intercultural interactions (Ward & Fischer, 2008), so that team members with high motivational CQ should be better at taking advantage of unique cultural-relevant information and/or perspectives shared within teams.

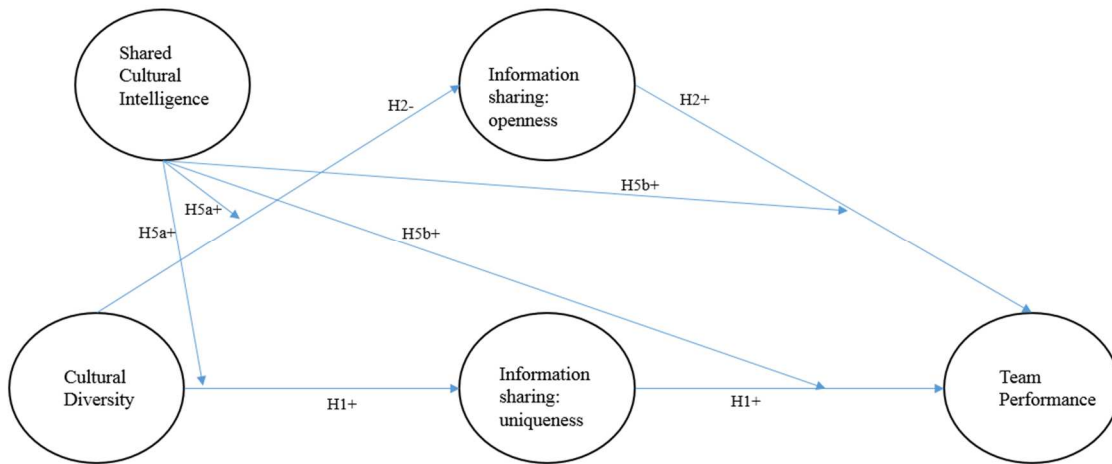
Behavioral CQ is a person's ability to adapt his or her verbal or non-verbal behaviors to different cultures. Within a culturally diverse team, if members adapt to each other's culture, members in the team will feel satisfied working in the team, which may increase their motivation to contribute to the team task accomplishment by providing as much information as they can. There was a significant interaction effect between cultural diversity and behavioral CQ on

interpersonal trust (Rockstuhl & Ng, 2008), which suggested that if members adapt to each other's cultures both verbally and non-verbally, they are more likely to trust each other, and this should mitigate the negative relationship between cultural diversity and information sharing openness. In addition, interpersonal trust should help teams better utilize unique information and achieve better team performance.

In summary, teams with high CQ may be more aware of culture differences and have more accurate background information about people from different cultural backgrounds, thus making it possible for them to be able to communicate effectively with people from different cultural backgrounds and “adjust their mental models during and after interaction” (Ang & Van Dyne, 2008, p. 210), which should mitigate the negative impact of cultural diversity on effective information sharing openness (see Figure 3).

Hypothesis 5a: Shared cultural intelligence moderates the relationship between cultural diversity and information sharing openness and uniqueness, such that the relationship between cultural diversity and information sharing openness and uniqueness is more positive for high team-level shared cultural intelligence.

Hypothesis 5b: Shared cultural intelligence moderates the relationship between information sharing openness and uniqueness and team performance, such that the relationship between information sharing uniqueness, openness and team performance is stronger for high team-level shared cultural intelligence.



*Figure 3. The Moderated Mediation between Cultural Diversity and Team Performance in Multicultural Project Teams: Shared Cultural Intelligence*

### **Dispersion of Cultural Intelligence in Teams**

The above discussion of shared cultural intelligence is based on the assumption that the construct is isomorphic (Klein & Kozlowski, 2000), which means that an individual’s cultural intelligence is essentially the same as it converges to the team-level cultural intelligence. Although previous research has operationalized cultural intelligence as an isomorphic construct across levels (e.g., Chen, Liu, & Portnoy, 2012; Miriam et al., 2013), when we average the individual scores to operationalize the corresponding team-level construct, some information, such as how high and low scores are distributed in teams, is lost, which might be important in investigating cultural intelligence’s effect on information sharing openness. Following the logic of De Rue, Hollenbeck, Ilgen, and Feltz (2010), it is proposed that different dispersion of individual-level cultural intelligence will manifest various individual-level psychological

processes and have disparate effects on the openness of information sharing in teams. In other words, the variance and the composition of a team's cultural intelligence matters.

The first form proposed by De Rue et al. (2010) is the shared construct, meaning there is a lack of variance in the team members' cultural intelligence scores. The effect of shared cultural intelligence has already been discussed in the last section.

The second form proposed by De Rue et al. (2010) is the *minority* construct, representing the dispersion of cultural intelligence such that one single team member has a relatively higher or lower level of cultural intelligence compared to other team members. Following the logic of De Rue and colleagues, the individual who has the different level of cultural intelligence compared to others may have three options: withdraw completely, attempt to change, or conform to the majority. First, if one member has relatively higher cultural intelligence than the other three (in the four-person groups used in this study), a high motivation to interact with people from different cultures (Ang et al., 2007), he/she may attempt to change others' intention to interact within teams, pulling the overall openness of information sharing higher than the one formed by the other three. In other words, the person probably will control the whole team's interaction, or even become a team leader. Based on the existing theories, comparing to teams with same average but shared dispersion:

Hypothesis 6: After controlling for the effects of average level of cultural intelligence, teams with a minority of high cultural intelligence members will have higher information sharing openness and uniqueness than teams with shared cultural intelligence.

Second, if one member has relatively lower cultural intelligence than the other three, the low motivation to interact with people from different cultures (Ang et al., 2007) is more likely to

make the person withdraw from the situation or conform to others. The low cultural intelligence member lacks the ability to interact cross culturally effectively, is quite ignorant about other cultures' norms, conventions, and languages, does not have high motivation to interact with other members, and may show those tendencies behaviorally. With that being said, possible repeated failures in communicating with others from different culture might occur within the team, and in turn further decrease members' motivation to interact culturally, so that:

Hypothesis 7: Given that the average level of cultural intelligence is the same, teams with minority of low cultural intelligence members will have lower information sharing openness and uniqueness than teams with shared cultural intelligence.

When two of the team members have relatively higher cultural intelligence than the other two members, this is the *bimodal* circumstance, where two subgroups will be formed within the team (DeRue et al., 2010; Lau & Murnighan, 2005). A hypothetical faultline is presented here based on team members' high versus low cultural intelligence. According to Lau and Murnighan, strong faultlines lead to less inter-subgroup communications. That is to say, if the faultline formed based on levels of cultural intelligence is strong enough, members with high cultural intelligence tend to communicate within their subgroups but not with members with low cultural intelligence, which makes the openness lower:

Hypothesis 8: Controlling for the average level of cultural intelligence, teams with a bimodal cultural intelligence dispersion will have lower levels of information sharing openness and uniqueness than teams with shared dispersion.



If team members' cultural intelligence scores vary to the degree that no subgroups (Lau & Murnighan, 1998) are formed, the dispersion model is called *fragmented* (De Rue et al., 2010). No existing theories provide theoretical or empirical evidence to support predictions for the fragmented construct, so no hypothesis will be proposed.

## **Summary**

In this chapter, I provided theoretical rationales for my proposed models. First, I reviewed existing theories and presented conflicting empirical results that investigated the relationship between cultural diversity and team performance. Second, I introduced CEM as my general theoretical framework used to develop the models. Third, hypotheses about how team process variables (i.e., information sharing uniqueness, information sharing openness, and information integration) operate in multicultural teams were proposed. Finally, I discussed the conditions on which the operation of the team processes variables will depend. First, epistemic motivation and social motivation were proposed to be moderators, and cultural intelligence was also proposed to be moderators. The next chapter will be devoted to discuss study designs.

## Chapter 3: Methodology

In this study, four-person student teams were assembled to work together on a business problem solving task. Pre-experiment survey data were collected through an online survey platform, which included measures of variables of interest. In this chapter, I will discuss the sample, the experimental task and procedure, and the measures used.

### **Sample**

Participants were 416 students at a Mid-Atlantic American university (for all-American and mixed teams) and at a Southeastern Chinese University (for all-Chinese teams), which formed 104 experimental teams. 186 (44.5%) males and 230 (55.5%) females participated in the study, and their ages ranged from 18 to 34 (  $M = 20.67$ ,  $SD = 2.97$ ). The 416 students formed 32 American teams (30.8%), 34 Chinese teams (32.7%), and 38 mixed teams (two Americans and two Chinese) (36.5%). 28.1% of the participants identified themselves as Euro-Americans, 8.7% African-Americans, 2.9% Hispanic-Americans, 7.7% Asian-Americans, 0.2% Native Americans, 3.4% Pacific-Islander Americans, 1.2% a combination of the above or other, and 47.1% of the participants identified themselves as Chinese. 88.2% of the participants reported that they had had full-time jobs, part-time jobs, internships, or summer jobs.

To conduct the study, I used a student sample . Using a student sample was based on for the following reasons. First, a student sample is relatively homogeneous with respect to certain characteristics (e.g., educational background, socioeconomic status, etc.). If a random sample is recruited locally, it is likely that some demographic characteristics will distribute unevenly with American participants and participants from Chinese culture. For example, given that the research site is a college town, local participants of Chinese cultures may be international

students, while American participants may be more likely to be working adults. The study was not a true experiment with random assignment. I tried to control potential systematic differences among participants as much as possible, to increase internal validity. Second, although obtaining external validity is not always the major aim of experimental or quasi-experimental studies (Berkowitz & Donnerstein, 1982), I attempted to address the external validity problem by providing top performers monetary incentives. The set-up made it easier for the participants to imagine that they were in a real work setting. Further, the use of zero-history groups approximated the formation of ad hoc functional teams in organizations. Third, although the teams existed because of the study, they were told the monetary compensation varied based on their team performance. That means each participant's performance in teams had meaningful outcomes, which resembled field teams and should increase the study's external validity (Harrison et al., 2002). They were not "role-playing." They were recruited to earn their incentive, as in real work settings. Finally, from a theory-testing perspective, there is no evidence in the literature that my theory would not work in a quasi-experiment context (Homan et al., 2008). In other words, the proposed theory should work in both field and lab settings. The quasi-experimental design was appropriate for this study. A true experiment was not possible because cultural backgrounds cannot be randomly assigned to individual participants. Using a quasi-experimental design cannot fully eliminate the possibility of alternative explanations, but the design confirmed that the cause (group composition, etc.) existed before the effect was measured (Shadish, Cook, & Campbell, 2002).

## **Procedures**

The present study incorporated a combination of survey and quasi-experimental methods to assess the relationships among cultural diversity, information elaboration processes, and team performance in culturally diverse teams.

U.S. participants were recruited using the departmental online participant pool portal. The participants were then directed to the online survey. After they gave consent to participation in the study, they finished measures of the variables of interest, such as epistemic motivation, social motivation, and cultural intelligence. At the end of the survey, they were asked to give their email addresses for the in-lab part of the study. Participants were randomly put into same-sex four-person teams based on their reported demographic information and availability. Chinese students from China were recruited by a research assistant, who is a student member of the community, by word of mouth. The participants recruited in China were randomly put into same-sex four-person teams based on their reported demographic information and availability. In addition, participants who were friends were assigned to different teams.

### ***Experimental task***

Previous experimental work investigating the relationship between team processes and performance has used student class project teams (e.g., Chatman & Flynn, 2001; Dahlin et al., 2005), *real-effort tasks*, or field experiments with organizational employees (e.g., Pelled et al., 1999). In the present study, a real-effort task was used as an experimental task (Brüggen & Strobel, 2007). In the literature, many real-effort tasks have been considered, including solving mazes, solving an optimization problem, or finding an appropriate number (Corgnet, 2012). For the purposes of this study, the real-effort experimental task should require communication within teams due to the interdependent nature of the task (including uniqueness and openness of

information sharing), and at the same time, the task should be a decision-making task with preferred answers.

For these reasons, I chose the Farm E-Z task (Joyce, 2003, and originally published in Pfeiffer & Jones, 1974). Farm E-Z is an agricultural producer that recently released a new product, and the decision-making task required team members to work as a team to reverse profit losses of the new product and sustain profit in the long term. The task was introduced to participants as an organizational team decision-making task, and the participants should help Farm E-Z company to identify the root problems for why the new grinder-blower product led to profit loss for the company.

Upon arrival, four participants were randomly assigned to four roles (i.e., accounting manager, chief engineer, sales manager, and manufacturing superintendent). The participants were given some of the 27 short emails that were the correspondence between the general manager of the company and five of his colleagues (i.e., accounting manager, chief engineer, sales manager, and the manufacturing superintendent). Besides some general background information, each participant only had access to emails addressed to them and the emails sent by them (i.e., their designated roles of the company). The emails included summaries of customer complaints, production capability concerns, union problems, sales data, distributor suggestions, and repair problems. After they finished reading the given information, instructions for the team task were given. They were given the problem classification sheet (Joyce, 2003), in which they were asked to use the next 45 minutes to answer whether their team as a whole perceived the listed problems to be a true problem, a symptom, a future problem, or irrelevant (explanations for each type of problem were provided to them). Before they started discussion, they were reminded that if their team performance was among the top 10%, they each would get \$20 as a

reward. After experimental task completion, participants filled out a post-experimental survey about information sharing openness and uniqueness within their teams. Top 10% teams received \$20 (same for all teams, Chinese teams received Renmingbi that worth \$20) after all data collection finished and email addresses were then deleted to protect participants' identity.

## **Measures**

### ***Cultural diversity***

The cultural diversity construct was operationalized as high versus low cultural diversity at the team level. In high cultural diversity teams, there were two Americans and two Chinese. In low cultural diversity teams, two types of groups were formed: one type with four Americans, and the other type with four Chinese. Same-sex participants were randomly assigned to different teams as long as they qualified for the above criteria. This design provided a methodological control for internal demographic diversity (i.e., gender).

To make sure that the self-reported national identification did work as a proxy for cultures, every participant completed the independent and interdependent self-construal scales (Hackman, Ellis, Johnson, & Staley, 1999, see Appendix I), measuring the extent to which individuals view themselves as independent and the extent to which they view themselves interdependent with others. The Cronbach's alpha was .89 for independent self-construal and .91 for interdependent self-construal.

At the team level, culturally diverse teams had higher variances than culturally homogenous teams on dimensions of the cultural value orientations. The variance of interdependent self-construal in culturally diverse teams was significantly higher than culturally homogeneous teams ( $F(2, 102) = 5.822, p < .01, \eta^2 = .10$ ). The variance of power distance in

culturally diverse teams was significantly higher than culturally homogeneous teams ( $F(2, 102) = 3.804, p < .05, \eta^2 = .07$ ). The variance of uncertainty avoidance in culturally diverse teams was significantly higher than culturally homogeneous teams ( $F(2, 102) = 11.751, p < .001, \eta^2 = .19$ ). The variance of masculinity/femininity in culturally diverse teams was significantly higher than culturally homogeneous teams ( $F(2, 102) = 3.334, p < .05, \eta^2 = .06$ ).

### ***Information sharing uniqueness***

Information sharing uniqueness, a team-level variable, was measured following Devine's (1999) instrument. Participants responded to a 3-item self-report measure, such as "Unique information was shared among the members of the team." Cronbach's alpha was .70.

### ***Information sharing openness***

Information sharing openness, a team-level variable, was measured using a 3-item self-report instrument (Mesmer-Magnus & DeChurch, 2009), such as "Information used to make key decisions was freely shared among the members of the team." Cronbach's alpha was .67.

Considering the influence of number of items on Cronbach's alpha, the measure is considered to be acceptable.

Confirmatory factor analysis was run for the measures of information sharing uniqueness and openness. Each item had a loading of higher than 0.50 on its latent factor, and the data fit the model well ( $\chi^2(8) = 25.94, p < .001, RMSEA = .07, 90\% CI = [0.04, 0.11], CFI = 0.97, SRMR = .04$ ).

### ***Cultural thinking styles***

Cultural thinking styles were measured using Choi, Koo, and Choi's (2007) measure of analytical and holistic thinking styles. The specific items are in Appendix III. Due to the limited

sample size, following previous literature, only 3 items for each dimension were retained.

Correlation analyses showed the reduced item measures had high correlations with the original measures, ranging from .78 to .86. The reliabilities for the self-report measures were .64 for attitude toward change, .73 for locus of attention, .70 for perception of change, and .79 for causality, respectively.

Confirmatory factor analyses were run for these measures, and the four factor model had the best data-model-fit compared to the one, two, and three factor models. Confirmatory factor analysis (CFA) also showed that all of the items had higher than 0.50 loadings on their respective latent variables, and the data fit the model well ( $\chi^2(48) = 140.04, p < 0.001, RMSEA = .07, 90\% CI = [0.06, 0.08], CFI = .93, SRMR = .05$ ).

To avoid common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and to establish discriminant validity of the dimensions of measures, CFA for the 3-factor, 2-factor, and 1-factor model were run, and the models that fit best within each category are shown below. The results supported discriminant validity of the measure and pointed toward use of the 4-factor model.

*Table 1. CFA Results for the Cultural Thinking Styles Measures*

	$\chi^2$	df.	<i>p</i>	$\Delta\chi^2$	<i>p</i>	RMSE	CF	SRMR	AIC
						A	I		
4 factor model	140.04	48	<.001	----	----	.07	.93	.05	20172.61
3 factor model	326.58	51	<.001	185.54	<.001	.11	.79	.07	20353.16
2 factor model	488.36	53	<.001	348.32	<.001	.14	.65	.10	20510.93
1 factor model	643.16	54	<.001	503.12	<.001	.16	.52	.11	20663.73



### ***Epistemic motivation***

Epistemic motivation was measured with a 12-item scale developed by Neuberg and Newsom (1993) and used in Van Kleef et al. (2009) (see Appendix IV). Although the scale was originally developed as a need for structure scale, much research has validated its ability to differentiate people's epistemic information processing motivation (e.g., Thompson, Naccarato, Parker, & Moskowitz, 2001). Due to the limited sample size, following previous literature, only 3 items for each dimension were retained. Correlation analyses showed the reduced item measures had high correlations with the original measures (i.e., .85). The Cronbach's alpha was .80.

### ***Social motivation***

Social motivation was measured for each individual using the Kuhlman and Marshello (1975) decomposed game measure (see Appendix V). Participants were asked to make decisions in nine decomposed games. In each decomposed game, participants chose from different distributions of points to themselves and a (hypothetical) other person. Participants were given a choice among three alternatives, each corresponding to one of the social value orientations under study. The prosocial response is the one where the participant maximizes the combined payoff for other and self, such as "you get 480, other gets 480." The individualistic response is the one where the participant maximizes the payoff for self and disregards the payoff for other, such as "you get 540, other gets 280.". The competitive response is one where the participant maximizes the difference between the payoff of other and self, such as "you get 480, other gets 80.". The individualistic and competitive orientation were combined and referred to as proself motivation (De Cremer & Van Lange, 2001).

### ***Cultural intelligence***

Cultural intelligence was operationalized using Ang et al.'s (2007) measure (CQS; see Appendix VI). Due to the limited sample size, in order to maintain a high ratio of sample size to free parameters, I chose the three best indicators for each latent variable (using their R<sup>2</sup> values with their latents) and retained them in subsequent analyses (e.g., Zhan & Hample, 2016).

Correlation analyses showed the reduced item measures had high correlations with the original measures, ranging from .88 to .92. The Cronbach's alpha for each dimension of cultural intelligence was .89 for meta cognitive CQ, .93 for cognitive CQ, .89 for motivational CQ, and .87 for behavioral CQ.

CFA showed that data fit the model well ( $\chi^2(48) = 130.67, p < 0.001, RMSEA = .06, 90\% CI = [0.05, 0.08], CFI = .97, SRMR = .04$ ). To avoid common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and to establish discriminant validity of the dimensions of measure, CFAs for the 3-factor, 2-factor, and 1-factor model were run, and the model that fit best within each category is shown below. The results provided discriminant validity of the measure and justified use of the 4-factor model.

*Table 2. CFA Results for the Cultural Intelligence Measures*

	$\chi^2$	df.	$p$	$\Delta \chi^2$	$p$	RMSEA	CFI	SRMR	AIC
4 factor model	130.67	48	<.001	----	----	.06	.97	.04	19464.56
3 factor model	641.40	51	<.001	510.73	<.001	.17	.78	.14	19969.29
2 factor model	930.64	53	<.001	799.97	<.001	.20	.68	.16	20254.53
1 factor model	1372.50	54	<.001	1241.83	<.001	.24	.51	.14	20694.40

### **Team Performance**

The Farm E-Z task was designed to have correct answers. In other words, if information given to each team member is properly shared and processed, the team would be able to categorize the problems correctly. To ensure that there is no different cultural understandings for

the problem categorization, the experimental materials were reviewed by six Chinese experts. The experts all agreed with the problem categorization provided by the experimental task author. Team performance was then measured based on the correct answers provided.

### Measurement Model

Confirmatory factor analyses for the whole measurement model were run. All the above mentioned measured variables were included in the total model, including information sharing openness and uniqueness, the four dimensions of cultural intelligence, the four dimensions of cultural thinking styles, and epistemic motivation. Reduced items (i.e., 3 per construct) were used due to convergence requirements and limited sample size, and no residual variances were allowed to covary. The results suggested all of the items had high loadings on their respective latent variables (see Table 3 for loadings), and the model showed good data-model-fit ( $\chi^2(440) = 847.49, p < 0.001, RMSEA = .05, 90\% CI = [0.04, 0.05], CFI = .92, SRMR = .05$ ).

*Table 3. Loadings for CFA*

	Estimate	S.E.	<i>p</i>
Information Sharing Openness 1	.73	.04	<.001
2	.76	.04	<.001
3	.52	.05	<.001
Information Sharing Uniqueness1	.61	.04	<.001
2	.82	.04	<.001
3	.59	.04	<.001
Epistemic Motivation3	.89	.03	<.001
4	.75	.03	<.001
1	.67	.03	<.001
Attitude toward Contradiction3	.68	.04	<.001
5	.78	.03	<.001
6	.65	.04	<.001
Perception toward Change2	.69	.04	<.001
3	.69	.04	<.001
5	.62	.04	<.001
Locus of Attention1	.56	.04	<.001
4	.80	.04	<.001
6	.67	.04	<.001

Causality1	.55	.04	<.001
2	.80	.04	<.001
4	.69	.04	<.001
Motivational CQ3	.85	.02	<.001
4	.79	.03	<.001
5	.77	.03	<.001
Metacognitive CQ1	.85	.02	<.001
2	.83	.02	<.001
3	.83	.02	<.001
Behavioral CQ3	.81	.02	<.001
5	.86	.02	<.001
6	.90	.02	<.001
Cognitive CQ3	.71	.03	<.001
4	.88	.02	<.001
5	.75	.03	<.001

*\*Note.* Estimates are standardized.

### **Control Variables**

Gender of team members was controlled methodologically. Ely (1994) and Sackett, DuBois, and Noe (1991) found that women behaved differently in male-dominated groups and were more supportive to their peers. Based on these results, Milliken and Martins (1996) argued that gender distribution in teams was likely to be an important predictor of diversity outcomes. Gender diversity was controlled by having only same-sex teams.

## Chapter 4: Analysis and Results

### Analytical Strategies

The hypotheses proposed included both mediation and moderated mediation, generally using groups as the unit of analysis ( $N = 104$ ). Preacher, Rucks, and Hayes' (2007) methods were used for mediation analysis. Edwards and Lambert's (2007) analysis strategies for moderated mediation, or conditional indirect effects, were followed to conduct moderated mediation analysis. This method integrates moderated regression analysis and path analysis, providing an analytical framework that combines mediation and moderation. They frame mediating relationships in terms of a path model, specify the relationships in the model in regression equations, and integrate moderation by incorporating the moderator variable and its product with the independent variable and the mediator variable.

The moderated mediation models to be tested in this dissertation are first stage moderation models (see Figure 4). Edwards and Lambert (2007) proposed that (substituting the regression equation for  $M$  into the regression equation for  $Y$ ) the reduced form equation for first stage moderated mediation model is (the subscripts are used as in Edwards and Lambert (2007)):

$$\begin{aligned} Y &= b_{04} + a_{05}b_{M4} + a_{z5}b_{M4}Z + (b_{X4} + a_{X5}b_{M4} + a_{XZ5}b_{M4}Z)X + e_{Y4} + b_{M4}e_{M5} \\ &= [b_{04} + (a_{05} + a_{z5}Z)b_{M4}] + [b_{X4} + (a_{X5} + a_{XZ5}Z)b_{M4}]X + e_{Y4} + b_{M4}e_{M5}. \end{aligned} \quad (1)$$

Equation 1 represents the indirect effect with the compound term  $(a_{X5} + a_{XZ5}Z)b_{M4}$ , which shows that the path linking  $X$  to  $M$  varies as a function of  $Z$ . Yet, the direct effect of  $X$  on  $Y$ , represented by  $b_{X4}$ , is not affected by  $Z$ . Equation 1 also illustrates that the intercept varies as a function of  $Z$  because of the contribution of  $a_{z5}Z$ .

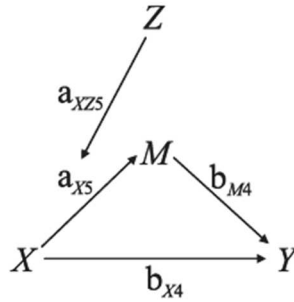


Figure 4. First Stage Moderation Model (Edwards & Lambert, 2007)

In addition, the method uses bootstrapping because then “no assumptions about the shape of the sampling distribution of the statistic are necessary when conducting inferential tests” (Preacher, Rucks, & Hayes, 2007, p. 190). Analyses were conducted in Mplus 7.0, using Liu, Zhang, and Wang’s (2008) code for mono-level first-stage moderated mediation.

The method is theoretically and empirically more appropriate than other current approaches for the following reasons (Edwards & Lambert, 2007). First, the *piecemeal approach* that analyzes moderation and mediation separately, yet interprets the results jointly, does not reveal which path(s) vary as a function of the moderator(s), and is subject to the limitations of Baron and Kenny’s (1986) approach for assessing mediation. Second, the *subgroup approach* that splits the sample into subgroups with different values of the moderator variable and assesses mediation within each subgroup has lower statistical power due to smaller sample size and lost information due to moderator dichotomizing. In addition, the subgroup approach does not test differences in mediation across levels of the moderators. Third, the *moderated causal steps approach* adds product terms to the regression equations involved in the causal steps procedure. In fact, the first step in this method is establishing the moderating role of  $Z$  between  $X$  and  $Y$ . However, a nonsignificant interaction between  $X$  and  $Z$  does not rule out the possibility that  $Z$  exerts moderating effects of opposite sign on the indirect effects relating  $X$  to  $Y$ .

The reasons for choosing Edward and Lambert's (2007) method based on regression and path-analytic framework over SEM are as follows. First, although SEM can test multiple relationships simultaneously, provide fit statistics, and allows for model comparison, to obtain stable parameter estimates, the sample size to parameters ratio should be at least 10:1 (Klein, 2016). Klein (2016) also suggested that a 200 sample size is the median sample size for models with moderate level of complexity. The unit of analysis in this paper is teams. With a sample size of 104 teams and considering the level of complexity of the model, using SEM may yield unstable parameter estimates and inaccurate standard errors of the effects of latent factors. Second, one benefit of SEM is that it controls for measurement error. In my study, many variables are operationalized in ways that measurement error cannot be controlled. For example, people will be assigned to teams based on their reported identity. SEM does not help in controlling the measurement error for a quasi-manipulated dichotomous variable. In addition, team performances were calculated based on objective criteria and social motivation was measured using a decomposed game structure, neither of which can be controlled for measurement errors. More important, moderation analysis in SEM uses a multi-group analysis approach. As Edwards and Lambert (2007) suggested, splitting the sample into subgroups with different values of the moderator variable and assessing mediation within each subgroup has lower statistical power due to smaller sample size and lost information due to moderator dichotomizing. Moreover, using the same method throughout the paper allows easier interpretation of different hypotheses.

### **Aggregation**

Theoretically, the present study examined team-level process and outcomes, yet operationally, most of the variables measured were at the individual level. The operationalization

makes sense because individual team members are the ones who are most familiar with team attributes (Gibson & Gibbs, 2006). Collecting data from all of the group members allows a panoramic view of how the team worked, compared to collecting data from only one or more individual team members. To justify the development and validation of constructs that may be qualitatively different at the individual level and team level, functional relationships of constructs at different levels need to be specified (Chan, 1998).

In *reference-shift consensus models*, the team level construct has a referent shift prior to consensus assessment, while maintaining the meaning of the original construct (Chan, 1998). For example, shifting the focus from individuals to teams, researchers ask participants to rate items such as “I am confident that my team can perform this task,” instead of “I am confident that I can perform this task” (i.e., self-efficacy to team-efficacy). However, the team level construct must be developed based on *member consensus* of the original individual-level construct with a shifted-referent. Information sharing openness and uniqueness at the team level were conceptualized as referent-shift consensus models. The individual level focal concepts were information sharing openness and uniqueness, which were concerned about to what extent information was shared openly and uniquely *by themselves*. With a reference-shift model, individual team members were asked about their perception about information sharing openness and uniqueness *within their work teams*. The aggregated scores were calculated to be indicators of team-level information sharing openness and uniqueness. And the aggregation needed to be justified empirically with value of within-group agreement index (e.g.,  $r_{wg}(j)$ ) and inter-rater reliability (e.g., ICC(1) and ICC(2)).



### ***Information sharing uniqueness***

I calculated intraclass correlation coefficients and  $r_{wg}(j)$  to determine whether aggregation of the measures to the team level was appropriate. ICC(1) is a measure of the proportion of variance that can be attributed to team membership, and ICC(2) is a measure of the reliability of team mean differences (Bliese, 2000). For information sharing uniqueness, ICC(1) was .32, which means 32% of the variance in ratings was explained by group membership. According to LeBreton and Senter (2008), this was a large effect. ICC(2) is the reliability of group means (Bliese, 2000) and was .65. The  $F$  value was 2.88 ( $df = (103, 312)$ ,  $p < .001$ ). Previous literature suggested that constructs with an ICC(1) value above .05, an significant  $F$  value, and an ICC(2) value of .60 (Glick, 1985) could be aggregated to the team level meaningfully.

I calculated  $r_{wg}(j)$  as a measure of inter-rater agreement for multiple-item measures (James, Demaree, & Wolf, 1993).  $r_{wg}$  is a measure of inter-rater agreement within teams, and (j) indicates that the measure contains multiple items.  $r_{wg}(j)$  is calculated by comparing an observed group variance to a rectangular/uniform null distribution variance (i.e., a symmetric probability distribution such that all intervals of the same length on the distribution's support are equally probable: Rogelberg, 2016). LeBreton and Senter (2008) argued that researchers should not rely on a rectangular null distributions too often, which may lead to overestimates of within-group agreement (Bliese, 2000). In fact, most organizational measures are susceptible to response biases (e.g., social desirability bias). They suggested using a random variance of 2.90 for slightly skewed 7-point scales. The  $r_{wg}(j)$  was 0.79 ( $ranvar=2.90$ ), which indicated strong within group agreement (Bliese, 2000, LeBreton & Senter, 2008).

Thus, based on the ICCs and the  $r_{wg}(j)$  statistics, the individual-level information sharing uniqueness measure was aggregated to the team level meaningfully, to form the team information sharing uniqueness.

### ***Information sharing openness***

I calculated intraclass correlation coefficients and  $r_{wg}(j)$  to determine whether aggregation of the measures to the team level was appropriate. ICC(1) was .11, which means 11% of the variance in ratings for information sharing openness was explained by group membership, and it was a medium effect (LeBreton & Senter, 2008). ICC(2) was .34. The  $F$  value was 1.52 ( $df = (103, 312)$ ,  $p < .001$ ).

Although the ICC(2) was lower than the .60 value that is sometimes recommended for aggregation, the ICC(2) is dependent on the extremely small group size, and was comparable to previous studies of similar group size (e.g., Yuan, Bazarova, Fulk, & Zhang, 2013). Moreover, scholars recommended data collected in clusters use aggregation (Snijders & Bosker, 1999).

$R_{wg}(j)$  was calculated as a measure of inter-rater agreement for multiple-item measures (James et al., 1993). The  $r_{wg}(j)$  was 0.92 ( $\text{ranvar}=2.90$ ), which indicated very strong within group agreement (Bliese, 2000, LeBreton & Senter, 2008).

Thus, based on the ICCs and the  $r_{wg}(j)$  statistics, the individual-level information sharing openness measure was aggregated to the team level meaningfully, which formed the team information sharing openness.

### ***Additive measures***

In *additive models*, the meaning of team level constructs is in the aggregation of individual level constructs regardless of the variances (Chan, 1998). Operationally, individual

level construct ratings are aggregated to the team level to represent the value of the team-level construct. In the present study, the conceptualization of team-level shared cultural intelligence, epistemic motivation, and prosocial motivation followed the additive model, because the variance of the individual level ratings is of no theoretical and operational concern to the current study. Therefore, the three team-level constructs were operationalized as aggregation of their respective individual-level constructs. See Table 4 for descriptive statistics.

In this section, I discussed the analytical strategies and aggregation of measures used in this dissertation. In summary, Hayes et al.'s (2007) method for mediation and Edwards and Lambert's (2007) method for first stage moderated mediation were used. Cultural diversity and team performance were inherently team-level measures. Information sharing uniqueness and openness were aggregated to the team level based on reference shift models and were justified by examining ICC1, ICC2, and  $R_{wg}(j)$  statistics. Cultural intelligence was aggregated to the team level based on additive models.

Table 4. Team level Variable Descriptive Statistics

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1 GPA	3.29	0.31													
2 Openness	6.54	0.38	-.10												
3 Uniqueness	6.03	0.69	.31**	.43**											
4 Meta	7.54	0.85	.06	.12	.24*										
Cognitive CQ															
5	6.81	1.01	.26**	.08	.30**	.48**									
Motivational CQ															
6 Behavioral CQ	7.01	0.94	-.03	.13	.03	.49**	.35**								
7 Cognitive CQ	5.61	1.39	.52**	.04	.46**	.21*	.52**	.10							
8 Epistemic Motivation	6.93	0.91	-.09	.17	-.11	.13	-.05	.14	-.03						
9 Causal Belief	7.45	0.90	-.32**	.02	-.39**	.10	-.26**	.22*	-.41**	.24*					
10 Perception of Change	4.97	0.99	.04	.15	.12	.04	.14	.02	.22	.20*	.14				
11 Locus of Attention	6.70	0.88	-.14	-.02	-.23*	.11	-.09	.07	-.05	.19	.56**	.37**			
12 Attitude Toward Contradiction	7.12	0.77	-.11	.12	.05	.31**	.07	.18	.12	.31**	.31**	.21*	.31**		
13 Social Motivation	0.69	0.26	.04	-.02	.26**	.07	.16	-.09	.23*	-.10	-.28**	-.16	-.21*	.12	
14 Perf.	10.36	2.47	.04	.21	.26**	-.05	.02	-.03	.04	-.03	.04	.05	-.07	.11	.13

Note. Two-tailed. \*\* $p < .01$ , \* $p < .05$ . Perf.=Performance

## Research Question 1

To answer RQ1, which asked about the relationship between cultural diversity and multicultural project teams' performance, a linear regression was run. Dummy 1 was set up as the difference between Chinese and diverse teams, and dummy 2 was set up as the difference between American and diverse teams. Hierarchical linear regression was run to test RQ1. Aggregated GPA and team gender were entered in the first step, and the two dummies were entered in the second step.  $R^2$  changed from .007 ( $p > .05$ ) to .012 ( $p > .05$ ,  $\Delta R^2 = .005$ ,  $p > .05$ ). Consistent with previous literature, after controlling for team task ability (i.e., aggregated team GPA) ( $b = 0.40$ ,  $p > .05$ ) and gender ( $b = -0.35$ ,  $p > .05$ ), there was no significant difference in culturally heterogeneous and culturally homogenous teams in performance ( $b = 0.25$ ,  $p > .05$  for Dummy 1, and  $b = 0.45$ ,  $p > .05$  for Dummy 2).

## Tests of Mediation by Information Variables

Hypotheses 1 and 2 were about the mediating roles of information sharing uniqueness and information sharing openness, which were hypothesized to transmit the effect of cultural diversity onto team performance. The results for the mediating hypotheses are reported in Table 5.

The models in the table refer to different models that included control variables only (Model 1), control variables and independent variables (Model 2), and control variables, independent variables, and mediating variable (Model 3 included information sharing openness as a mediator, Model 4 included uniqueness as a mediator, Model 5 included both openness and uniqueness as mediators, Model 6 included openness, uniqueness, and epistemic motivation as mediators, Model 7 included only epistemic motivation as a mediator).

First, let us consider information sharing uniqueness. In Model 4, in which only information sharing uniqueness was included as a mediator, the results indicated that the Chinese teams had lower information sharing uniqueness than culturally diverse teams ( $b = -0.71, p < .001$ ; see Table 5), and information sharing uniqueness contributed positively to team performance ( $b = 1.27, p < .001$ ; see Table 6). However, American teams' level of information sharing uniqueness had no significant difference with culturally diverse teams ( $b = .12, p > .05$ ; see Table 5). Thus, hypothesis 1 was partially supported. In other words, information sharing uniqueness mediated the effect of the cultural diversity difference between Chinese team and mixed teams and team performance. Information sharing uniqueness was higher in mixed teams, and contributed positively to team performance.

Now consider openness. In Model 5, in which both information sharing openness and uniqueness were included as mediators, the results indicated that neither American teams nor Chinese teams had significant differences with culturally diverse teams in terms of information sharing openness ( $b = .09$  for Dummy 1,  $b = .10$  for Dummy 2, both  $p > .05$ ; see Table 5), and information sharing openness did not explain significant amounts of variance in team performance controlling for the effect of information sharing uniqueness ( $b = .39, p > .05$ ; see Table 6). Although in Model 3, in which information sharing openness was included as the only mediator, information sharing openness explained significant variance in team performance ( $b = 1.32, p < .05$ ; see Table 6), the effect disappeared after controlling for the effect of information sharing uniqueness, which means that information sharing openness did not explain significant variance above and beyond the effect of information sharing uniqueness. Thus, Hypothesis 2 was not supported.

Next, let us consider epistemic motivation. Surprisingly, Chinese teams had a higher level of epistemic motivation than mixed teams ( $b = 0.62, p < .05$ , see Model 7 in Table 5), whereas American teams had no significant difference with mixed teams in terms of epistemic motivation ( $b = 0.19, p > .05$ ; see Model 7 in Table 5). In addition, there was no indirect effect between cultural diversity and team performance through team epistemic motivation. Thus, Hypothesis 3 was not supported. Overall, Model 4 explained the most variance in team performance, and was also the most parsimonious, so Model 4 was the best.

## **Research Question 2**

RQ2 asked whether the different cultural thinking styles benefit or harm collective performance in multicultural project teams. Team-level cultural thinking style variance was calculated for each team. However, using the variances to predict team performance, none of the coefficients was significant. Specifically, after controlling for GPA ( $b = 0.27, p > .05$ ) and gender ( $b = -0.36, p > .05$ ), team variance of attitude toward contradiction did not predict team performance ( $b = 0.24, p > .05$ ), team variance of locus of attention did not predict team performance ( $b = -0.01, p > .05$ ), team variance of perception of change did not predict team performance ( $b = -0.01, p > .05$ ), and team variance of causality beliefs did not predict team performance ( $b = -0.42, p > .05$ ). The total variance explained by variance in cultural thinking styles was 4.5%. Thus, the population effect of zero cannot be ruled out (O'Keefe, 2007). In other words, whether the different cultural specific thinking styles benefit or harm collective performance in multicultural project teams is unclear.

Table 5. Results for Mediating Hypotheses (Mediators as DV)

Variable	IS Openness as DV			IS Uniqueness as DV			Epistemic as DV	
	Model 3	Model 5	Model 6	Model 6	Model 4	Model 5	Model 6	Model 7
Intercepts	6.40***(0.52)	6.40***(0.52)	5.87***(1.20)	6.40***(0.52)	5.98***(0.80)	5.98***(0.80)	5.98***(0.80)	5.87***(1.20)
<i>Control variables</i>								
GPA	0.03(0.83)	0.03(0.15)	0.20(0.35)	0.03(0.15)	-0.01(0.23)	-0.01(0.23)	-0.01(0.23)	0.20(0.35)
Gender	-0.02(0.08)	-0.02(0.08)	0.10(0.17)	-0.02(0.08)	0.17(0.12)	0.17(0.12)	0.17(0.12)	0.10(0.17)
<i>Main effects</i>								
Dummy1	0.09(0.11)	0.09(0.11)	0.19(0.21)	0.09(0.11)	-0.71***(0.17)	-0.71***(0.17)	-0.71***(0.17)	0.19(0.21)
Dummy2	0.10(0.09)	0.10(0.09)	0.62*(0.25)	0.10(0.09)	0.12(0.14)	0.12(0.14)	0.12(0.14)	0.62*(0.25)
$R^2$	0.01	0.01	0.07	0.01	0.29***	0.29***	0.29***	0.07
$\Delta R^2$		0		0		0	0	

Note. One-tailed. Estimates are unstandardized, and standard errors are in parentheses. \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ . Dummy1 = difference between Chinese and Diverse teams. Dummy 2 = difference between American and Culturally Diverse team.  $\Delta R^2$ s are the differences between the current model and the previous model.



Table 6. Results for Mediating Hypotheses (Team Performance as DV)

Variables	Team Performance as DV						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercepts	9.59**(2.62)	9.10*(3.36)	0.62(5.17)	1.49(3.98)	-0.21(5.04)	0.18(5.13)	9.55*(3.73)
Control variables							
GPA	0.40(0.79)	0.49(0.98)	0.44(0.96)	0.49(0.93)	0.48(0.93)	0.50(0.93)	0.50(0.98)
Gender	-0.35(0.49)	-0.36(0.49)	-0.33(0.48)	-0.57(0.47)	-0.54(0.47)	-0.53(0.47)	-0.08(0.27)
Main effects							
Dummy1		0.25(0.70)	.13(.69)	1.14(0.72)	1.02(0.76)	1.07(0.77)	0.29(0.72)
Dummy2		0.45(0.59)	.31(.58)	0.29(0.56)	0.27(0.56)	0.29(0.57)	0.46(0.59)
Mediating effects							
Openness			1.32*(.62)		0.39(0.58)	0.45(0.73)	
Uniqueness				1.27***(.39)	1.14*(0.46)	1.12*(0.47)	
Epistemic						-0.11(0.27)	-0.05(0.27)
R <sup>2</sup>	0.007	.012	.05	.10*	.09*	.09*	0.01
ΔR <sup>2</sup>		.005	.038	0.088*	-0.01	0	-0.002

Note. One-tailed. Estimates are unstandardized, and standard errors are in parentheses. \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ . Dummy1 = difference between Chinese and Diverse teams. Dummy 2 = difference between American and Culturally Diverse team. ΔR<sup>2</sup>s are the differences between the current model and the previous model.

## Tests of Moderations

Table 7, 8, 9, and 10 report the results of the conditional indirect effects for information sharing uniqueness and openness. Dummy 1 refers to the difference between Chinese and mixed teams, and dummy 2 refers to the difference between American and mixed teams. The first column reports the results for first stage moderation. First stage moderation models are those models in which moderators only influence the relationship between IVs and mediators (see Figure 4). Specifically, it reports the slopes between cultural diversity and information sharing uniqueness (or openness) and their significance levels, when moderators are high or low. It also reports the difference in slopes when moderators are high and low, and whether they are significant. The second column reports the same results for second stage moderation. The effect columns report the coefficients of direct, indirect, or total effect on different levels of moderators. These tables also report considerable information that will be discussed later.

Hypotheses 4a and 4b investigated the first-stage moderating role of social motivation that might change the strength of the relationship between cultural diversity and information sharing openness and uniqueness. The relationship between cultural diversity and information sharing openness was not significant (see Model 3 in Table 5), yet the difference between Chinese teams and culturally diverse teams predicted information sharing uniqueness ( $b = -0.71$ ,  $p < .001$ , Model 4 in Table 5). Hypotheses 4a and 4b proposed that prosocial motivation might be a moderator that suppresses the relationship between cultural diversity and information sharing openness and uniqueness.

Let us consider social motivation as a moderator. The results of moderated mediation analyses showed that the first-stage moderated mediation was not significant for information sharing uniqueness (see Tables 7 and 8). Although there were significant relationships between

dummy 1 and information sharing uniqueness when social motivation was high or low, there was no significant difference between the two slopes ( $b = -0.26, p > .05$ ; Table 7). This means that Chinese teams had lower information sharing uniqueness consistently, or at various levels of team prosocial motivation. At the same time, American teams had significantly higher information sharing uniqueness than culturally diverse teams when team prosocial motivation was low (Table 8).

*Table 7. Results of the Conditional Indirect Effects for Information Sharing Uniqueness (Dummy 1)*

Moderators	Stage		Direct	Effect	
	First	Second		Indirect	Total
Social motivation	D1 → ISU	ISU → TP			
High	-0.79**	1.45*	1.99*	-1.15*	0.85
Low	-0.53*	0.78	0.01	-0.41	-0.41
Difference	-0.26	0.67	1.99*	-0.73	1.26
95% CI for diff.	[-.83, 0.28]	[-.50, 2.35]	[0.23, 4.13]	[-2.56, 0.20]	[-0.58, 2.95]
Metacognitive CQ					
High	-1.09**	1.60*	2.06*	-1.73*	0.34
Low	-0.25	0.84	0.12	-0.20	-0.09
Difference	-0.85**	0.75	1.95	-1.53	0.42
95% CI for diff.	[-1.40,-0.36]	[-0.65,2.12]	[-0.84,3.86]	[-3.50,-0.17]	[-1.45,2.24]
Cognitive CQ					
High	-0.85*	0.33	-0.10	-0.28	-0.38
Low	-0.31	1.48**	-0.09	-0.45	-0.36
Difference	-0.55	-1.16	-0.19	0.18	-0.02
95% CI for diff.	[-1.43,0.28]	[-2.60,0.46]	[-3.34,2.64]	[-1.57,1.53]	[-2.94,2.42]
Motivational CQ					
High	-1.09**	1.55	2.23	-1.69	0.58
Low	-0.27	0.91	0.24	-0.24	-0.01
Difference	-0.83*	0.64	2.03	-1.45	0.58
95% CI for diff.	[-1.36,-0.25]	[-0.87,2.27]	[-0.42,4.53]	[-3.53,0.05]	[-1.13,2.48]
Behavioral CQ					
High	-0.96**	1.14*	1.15	-1.10*	0.05
Low	-0.46*	1.01	0.45	-0.47	0.02
Difference	-0.50	0.13	0.70	-0.63	0.08
95% CI for diff.	[-1.08,0.05]	[-1.52,1.76]	[-1.67,2.98]	[-2.28,0.87]	[-1.70,2.05]

*Note.* One-tailed. \*\* $p < .01$ , \* $p < .05$ . D1= the difference between Chinese and mixed teams. ISO = Information Sharing Openness. ISU = Information Sharing Uniqueness. TP = Team Performance. CQ = Cultural Intelligence. Social motivation: Higher number = More prosocial.

Table 8. Table 8. Results of the Conditional Indirect Effects for Information Sharing Uniqueness (Dummy 2)

Moderators	Stage		Direct	Effect	
	First	Second		Indirect	Total
Social motivation	D2→ISU	ISU→TP			
High	0.43	1.45*	2.55	0.62	3.17
Low	0.69*	0.78	0.56	0.53	1.09
Difference	-0.26	0.67	1.99*	0.09	2.08*
95% CI for diff.	[-0.83, 0.28]	[-0.50, 2.35]	[0.23, 4.13]	[-0.82, 2.32]	[0.10, 5.44]
Metacognitive CQ					
High	1.22	1.60*	13.33*	1.93	15.26*
Low	2.06	0.84	11.38*	1.73	13.12*
Difference	-0.85**	0.75	1.95	0.20	2.15
95% CI for diff.	[-1.40,-0.36]	[-0.65,2.12]	[-0.04,3.86]	[-2.07,5.69]	[-1.26,8.26]
Cognitive CQ					
High	-0.33	0.33	-5.00	-0.11	-5.11
Low	0.21	1.48**	-4.81	0.31	-4.50
Difference	-0.55	-1.16	-0.19	-0.42	-0.61
95% CI for diff.	[-1.43,0.28]	[-2.60,0.46]	[-3.33,2.66]	[-2.31,2.55]	[-4.92,2.91]
Motivational CQ					
High	0.05	1.55*	8.07	0.08	8.15
Low	0.88	0.91	6.04	0.80	6.84
Difference	-0.83*	0.64	2.03	-0.72	1.31
95% CI for diff.	[-1.36,-0.25]	[-0.87,2.27]	[-0.42,4.53]	[-3.00,2.38]	[-1.28,6.85]
Behavioral CQ					
High	0.26	1.14	4.82	0.30	5.13
Low	0.77	1.01	4.12	0.77	4.90
Difference	-0.50	0.13	0.70	-0.47	0.23
95% CI for diff.	[-1.08,0.05]	[-1.52,1.76]	[-1.67,2.98]	[-2.20,2.14]	[-2.46,4.76]

Note. One-tailed. \*\* $p < .01$ , \* $p < .05$ . D2= the difference between American and mixed teams. ISO = Information Sharing Openness. ISU = Information Sharing Uniqueness. TP = Team Performance. CQ = Cultural Intelligence. Social motivation: Higher number = More prosocial.

In addition, the first-stage moderated mediation was not significant for information sharing openness ( $b = -0.11$ ,  $p > .05$ , see Tables 8 and 9). There was a significant relationship between dummy 2 and information sharing openness when social motivation was low. This means that the level of American teams' information sharing openness was higher than culturally diverse teams when team prosocial motivation is low.

Thus, hypotheses 4a and 4b were not supported.

Table 9. Results of the Conditional Indirect Effects for Information Sharing Openness (Dummy 1)

Moderators	Stage		Direct	Effect	
	First	Second		Indirect	Total
Social motivation	D1→ISO	ISO→TP			
High	0.02	0.21	1.57*	0.01	1.57*
Low	0.13	1.23	0.09	0.16	0.26
Difference	-0.11	-1.02	1.48	-0.16	1.32
95% CI for diff.	[-.37, 0.19]	[-3.30, 1.50]	[-0.17, 3.09]	[-0.75,0.19]	[-0.27, 2.85]
Metacognitive CQ					
High	-0.08	1.03	1.59	-0.09	1.51
Low	0.27*	0.06	0.33	.02	0.35
Difference	-0.36*	0.97	1.26	-0.10	1.16
95% CI for diff.	[-0.63,-0.10]	[-1.27,3.34]	[-0.56,3.21]	[-0.62,0.44]	[-0.67,3.05]
Cognitive CQ					
High	-0.01	-0.67	0.55	0.01	0.55
Low	0.16	2.16*	-0.18	0.35*	0.16
Difference	-0.17	-2.83*	0.73	-0.34	0.39
95% CI for diff.	[-0.62,0.30]	[-5.19,-0.70]	[-2.17,2.84]	[-1.22,0.26]	[-2.46,2.56]
Motivational CQ					
High	0.15	0.36	1.79*	0.05	1.84*
Low	0.24	0.31	0.37	0.07	0.45
Difference	-0.09	0.06	1.42	-0.02	1.40
95% CI for diff.	[-0.45,0.21]	[-2.16,1.99]	[-0.21,3.44]	[-0.56,0.48]	[-0.27,3.40]
Behavioral CQ					
High	-0.03	1.10	1.03	-0.04	1.00
Low	0.16	-0.37	0.84	-0.06	0.78
Difference	-0.19	1.47	0.20	0.02	0.22
95% CI for diff.	[-0.52,0.10]	[-0.67,3.37]	[-1.68,2.17]	[-0.35,0.54]	[-1.60,2.17]

Note. One-tailed. \*\* $p < .01$ , \* $p < .05$ . D1= the difference between Chinese and mixed teams. ISO = Information Sharing Openness. ISU = Information Sharing Uniqueness. TP = Team Performance. CQ = Cultural Intelligence. Social motivation: Higher number = More prosocial.

Table 10. Results of the Conditional Indirect Effects for Information Sharing Openness (Dummy 2)

Moderators	Stage		Direct	Effect	
	First	Second		Indirect	Total
Social motivation	D2→ISO	ISO→TP			
High	0.33	0.21	0.76	0.07	0.83
Low	0.44*	1.23	-0.72	0.54	-0.18
Difference	-0.11	-1.02	1.48	-0.47	1.01
95% CI for diff.	[-.37, 0.19]	[-3.30, 1.50]	[-0.17, 3.09]	[-1.82,0.33]	[-0.68, 2.66]
Metacognitive CQ					

High	0.90	1.02	10.36*	0.92	11.28*
Low	1.25	0.05	9.10*	0.07	9.17*
Difference	-0.36*	0.97	1.26	0.85	2.10
95% CI for diff.	[-0.63,-0.11]	[-1.27,3.34]	[-0.56,3.21]	[-0.77,5.64]	[-0.01,6.17]
Cognitive CQ					
High	-0.28	-0.67	-3.05	0.19	-2.86
Low	-0.11	2.16*	-3.77	-0.23	-4.01
Difference	-0.17	-2.83*	0.73	0.42	1.15
95% CI for diff.	[-0.62,0.30]	[-5.19,-0.70]	[-2.17,2.84]	[-1.38,4.53]	[-2.13,4.90]
Motivational CQ					
High	1.84**	0.36	5.84	0.67	6.50
Low	1.93**	0.31	4.42	0.59	5.01
Difference	-0.09	0.06	1.42	0.07	1.49
95% CI for diff.	[-0.45,0.21]	[-2.15,1.99]	[-0.21,3.44]	[-4.21,3.96]	[-2.97,6.21]
Behavioral CQ					
High	1.73**	1.10	4.50	1.90	6.41
Low	1.92**	-0.37	4.31	-0.71	3.60
Difference	-0.19	1.47	0.20	2.61	2.81
95% CI for diff.	[-0.47,0.10]	[-0.67,3.37]	[-1.68,2.17]	[-0.57,7.18]	[-0.84,6.96]

*Note.* One-tailed. \*\* $p < .01$ , \* $p < .05$ . D2= the difference between American and mixed teams. ISO = Information Sharing Openness. ISU = Information Sharing Uniqueness. TP = Team Performance. CQ = Cultural Intelligence. Social motivation: Higher number = More prosocial.

Hypotheses 5a and 5b examined the first-stage moderating role of cultural intelligence on the relationship between cultural diversity and information sharing openness and uniqueness. In other words, the issue was whether cultural intelligence moderated the relationship between cultural diversity and information sharing uniqueness and openness. Cultural intelligence (CQ) had four dimensions, metacognitive CQ, cognitive CQ, motivational CQ, and behavioral CQ. Overall, the results suggest metacognitive CQ amplified the positive relationship between cultural diversity and information sharing uniqueness and openness, and motivational CQ moderated the relationship between cultural diversity and information sharing uniqueness.

The first-stage moderation of metacognitive CQ on the mediated relationship between cultural diversity and team performance through information sharing uniqueness was significant (see Tables 7 and 8). Specifically, metacognitive CQ moderated the relationship between cultural

diversity and information sharing uniqueness ( $b = -0.85, p < .01$ , see Tables 7 and 8, Figure 5 and Figure 6). In other words, the positive relationship between cultural diversity and information sharing uniqueness was amplified by metacognitive CQ.

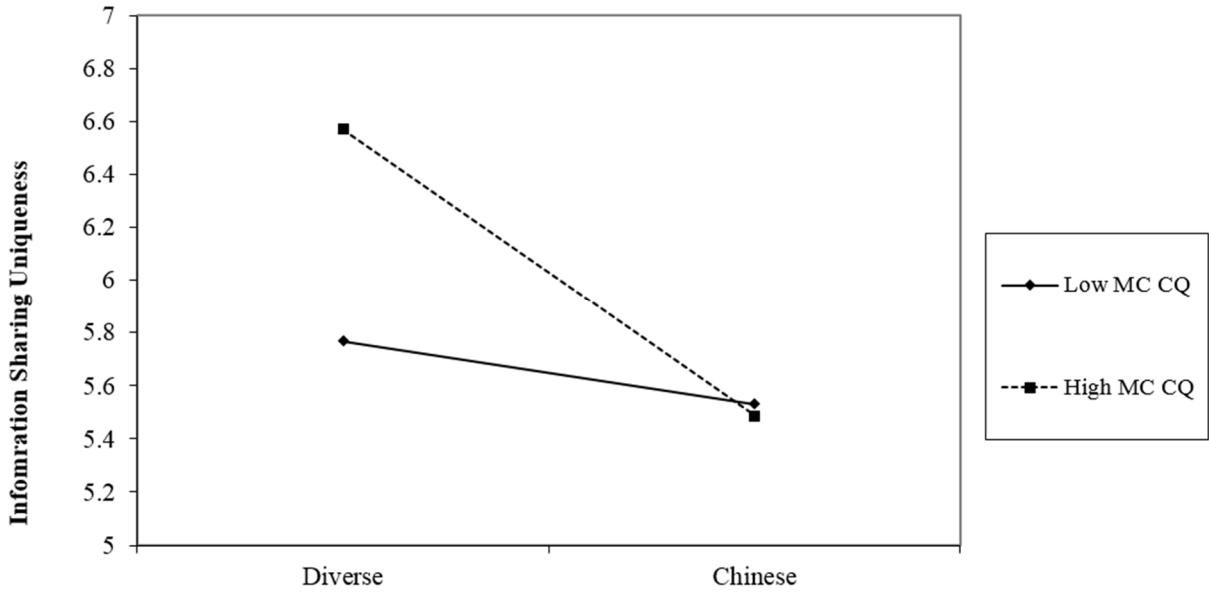


Figure 5. Interaction plot of metacognitive CQ

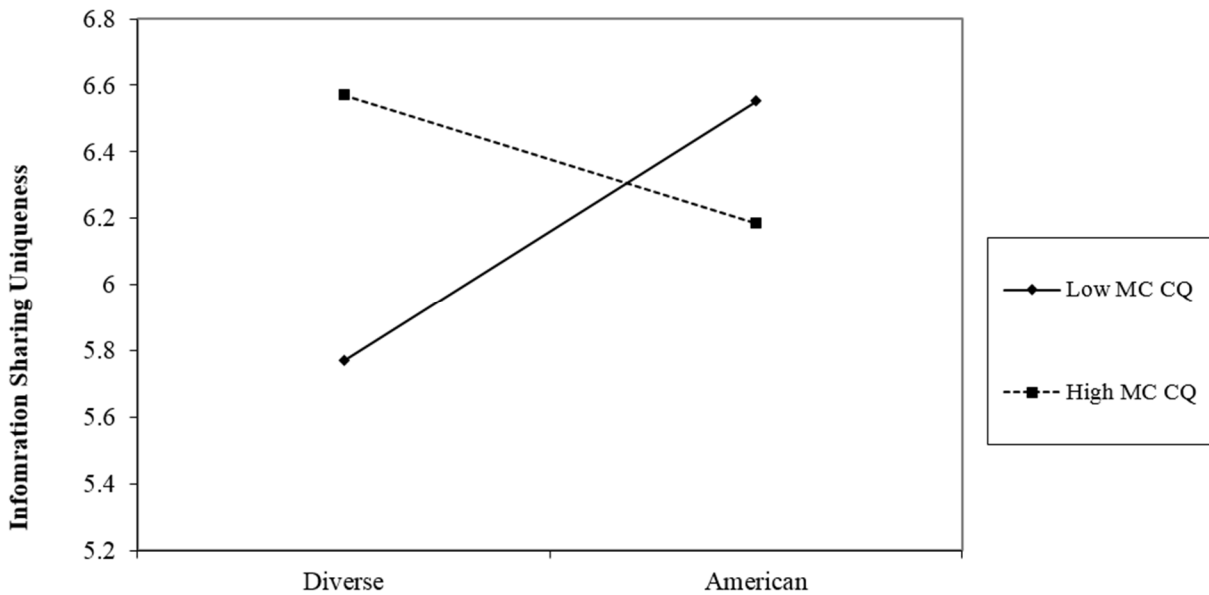


Figure 6. Interaction plot of metacognitive CQ

The first-stage moderation of metacognitive CQ on the mediated relationship between cultural diversity and team performance through information sharing openness was also significant (see Table 9 and Table 10). In particular, metacognitive CQ moderated the relationship between cultural diversity and information sharing openness ( $b = -0.36, p < .05$ , see Figure 7 and Figure 8). In other words, the negative relationship between cultural diversity and information sharing openness was attenuated by metacognitive CQ.

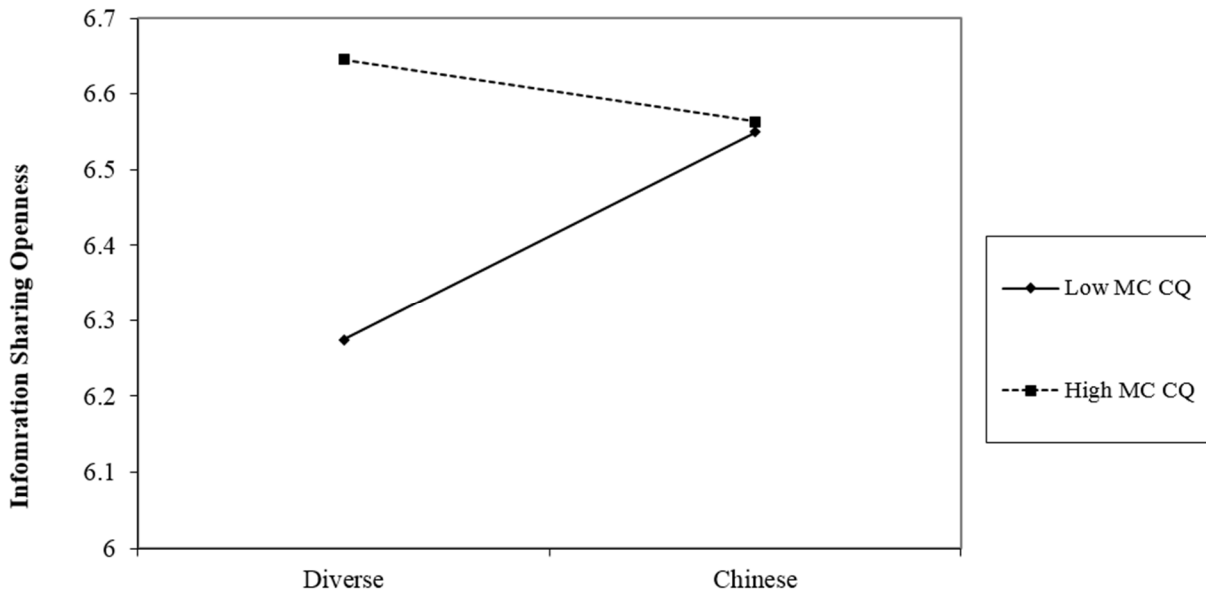


Figure 7. Interaction plot of metacognitive CQ



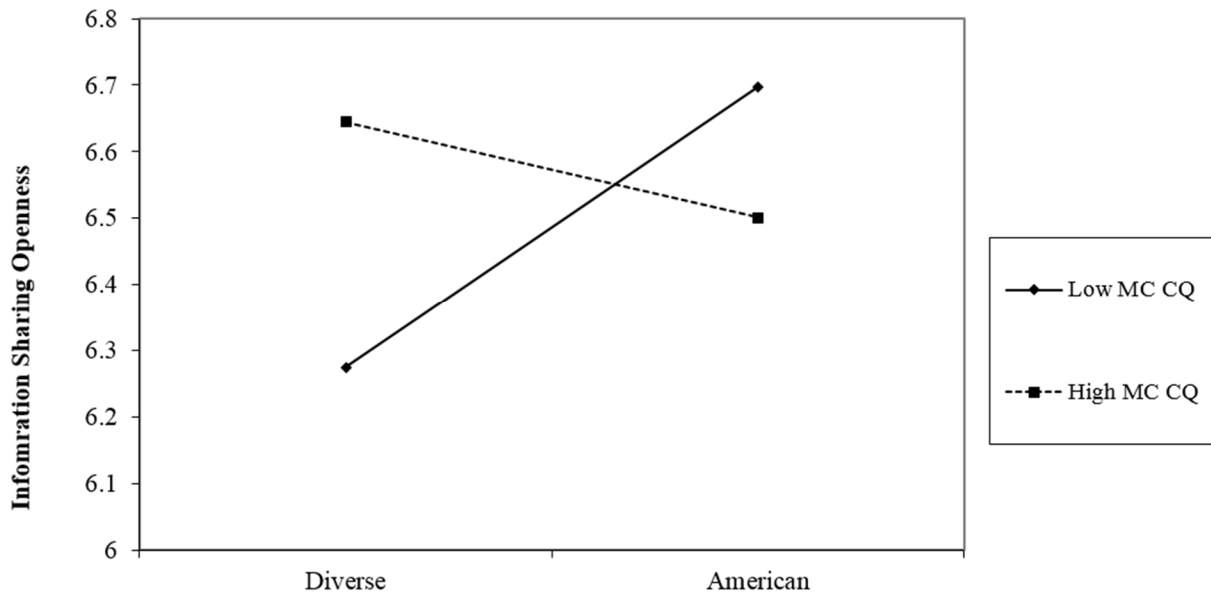


Figure 8. Interaction plot of metacognitive CQ

The first-stage moderation of cognitive CQ on the mediated relationship between cultural diversity and team performance through information sharing uniqueness and openness were both not significant (see Tables 7, 8, 9 and 10).

The first-stage moderation of motivational CQ on the mediated relationship between cultural diversity and team performance through information sharing uniqueness was significant (see Tables 7 and 8). Specifically, motivational CQ moderated the relationship between cultural diversity and information sharing uniqueness ( $b = -0.83, p < .05$ , see Figure 9 and Figure 10). In other words, the relationship between cultural diversity and information sharing uniqueness became more positive when team motivational CQ was high.

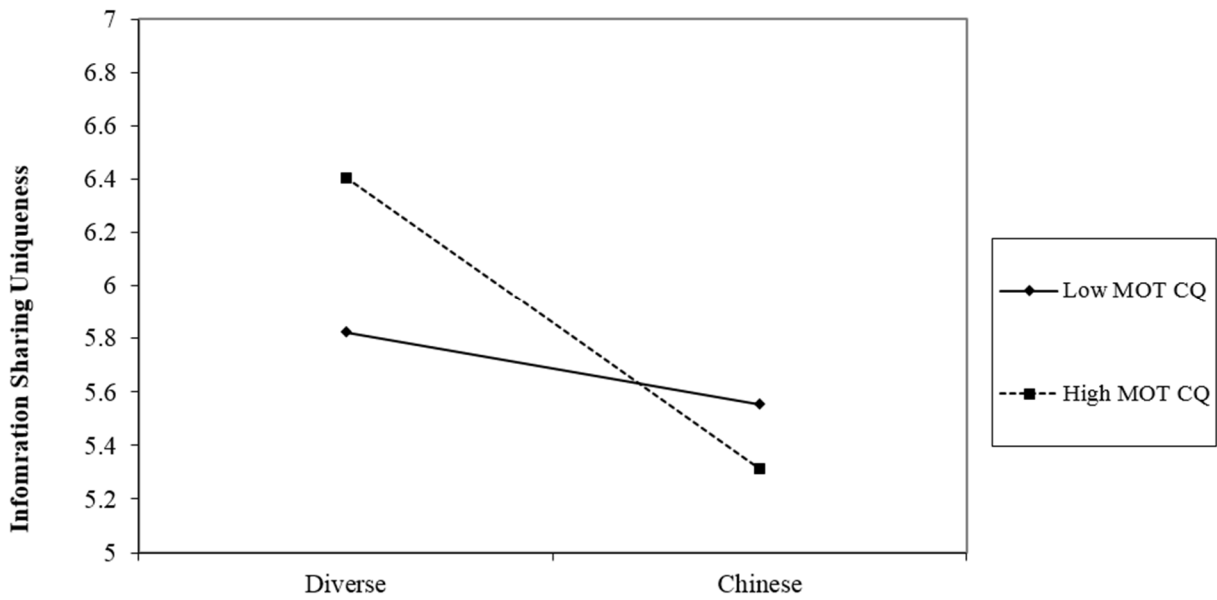


Figure 9. Interaction plot of motivational CQ

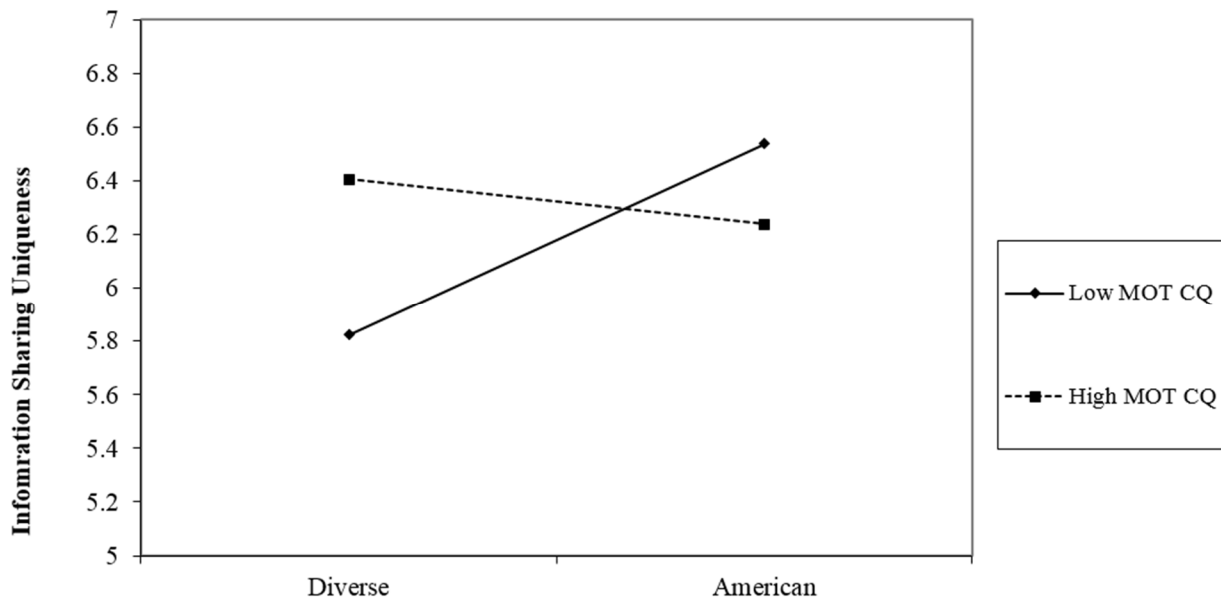


Figure 10. Interaction plot of motivational CQ

The first-stage moderation of motivational CQ on the mediated relationship between cultural diversity and team performance through information sharing openness was not

significant (see Table 9 and 10). Yet, American teams were found to have significantly lower information sharing openness compared to culturally diverse teams when motivational CQ was high (see Table 7, Figure 11).

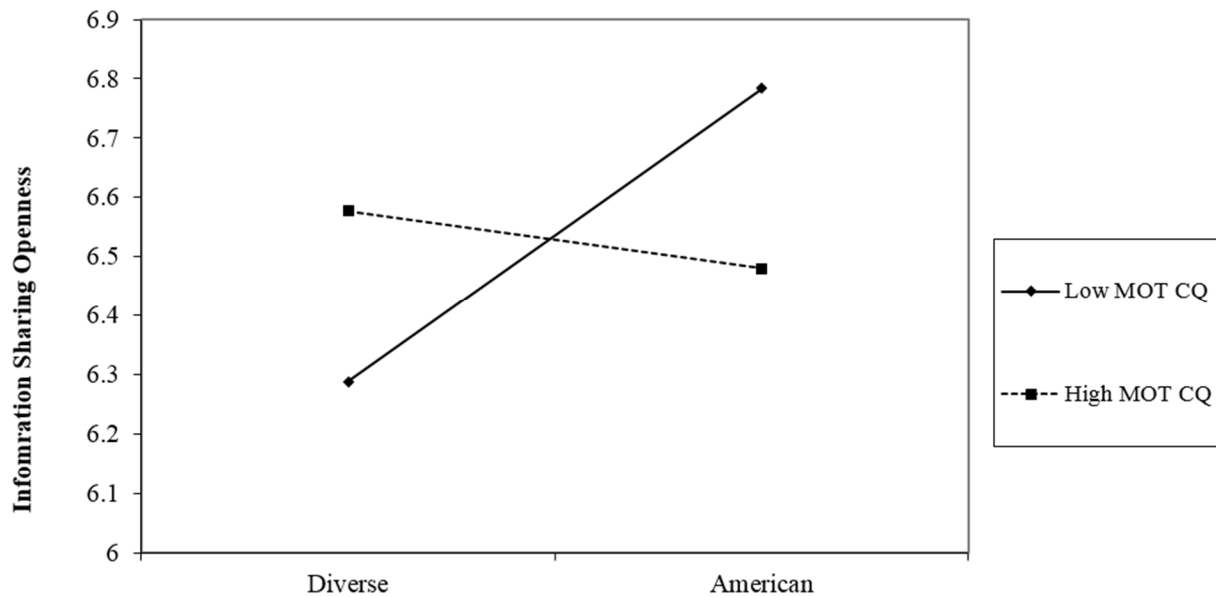


Figure 11. Interaction plot of motivational CQ

The first-stage moderation of behavioral CQ on the mediated relationship between cultural diversity and team performance through information sharing uniqueness and openness were both not significant (see Tables 7, 8, 9 and 10). However, American teams were found to have significantly lower information sharing uniqueness compared to culturally diverse teams when behavioral CQ is high (see Figure 12). Moreover, American teams were found to have significantly lower information sharing openness compared to culturally diverse teams when behavioral CQ was high (see Figure 13).

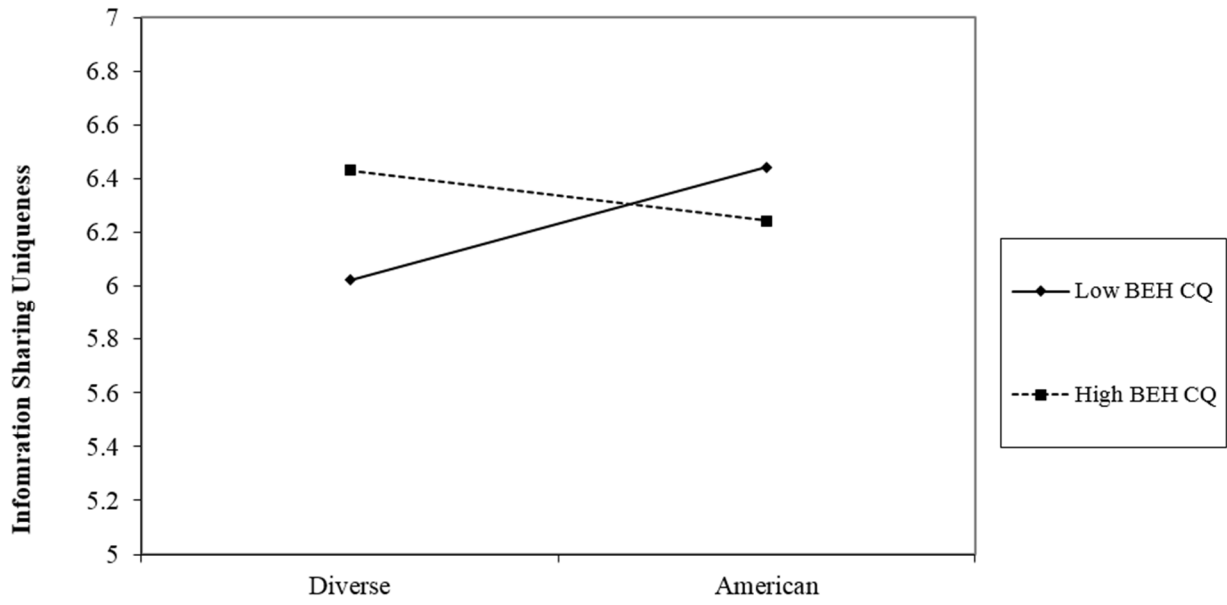


Figure 12. Interaction plot of behavioral CQ

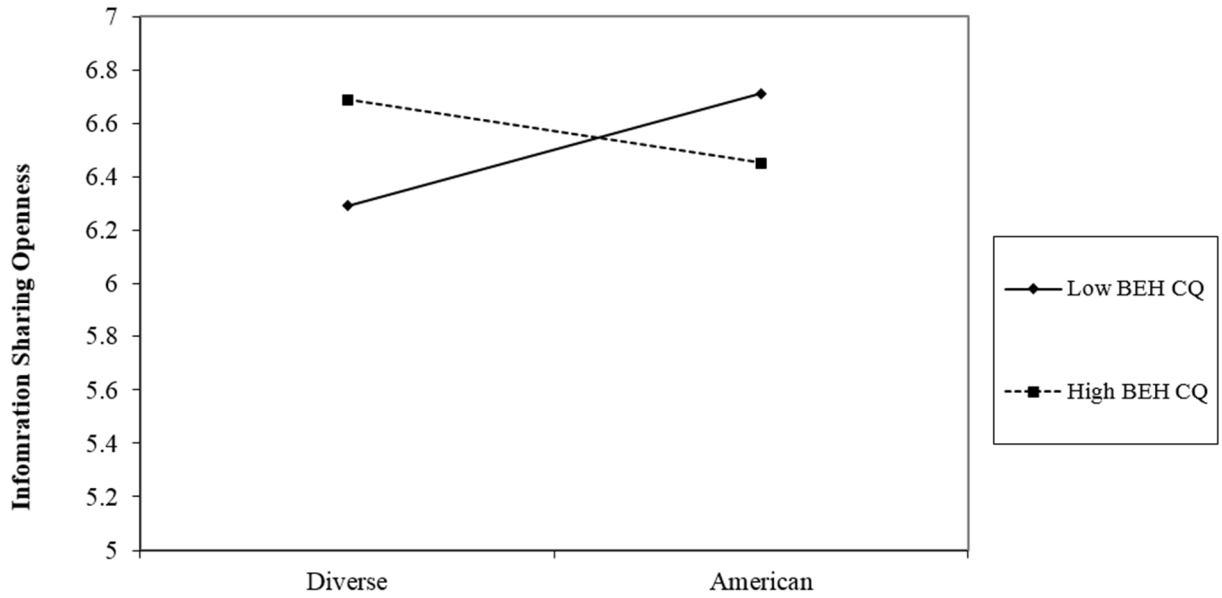


Figure 13. Interaction plot of behavioral CQ

Therefore, hypotheses 5a and 5b were partially supported. Specifically, the results suggest that metacognitive CQ and motivational CQ were significant moderators that influenced the relationship between cultural diversity and information sharing uniqueness and openness.

### **Test of Configural Models**

Hypotheses 6 to 8 examined the relationships between team cultural intelligence configural models and information sharing processes. Configural models reflect the pattern of individual team members' characteristics or interactions (Crawford & LePine, 2013). Those models do not assume isomorphism or convergence, but are concerned about the distribution and variability among team members. The operationalization of team cultural intelligence configural models is explained below.

**Operationalization of team dispersion.** Interrater agreement indices provide insights about how much agreement there is among each rater, but not information about the forms of dispersion (Roberson, Sturman, Simons, 2007). DeRue et al. (2010) pointed out that in smaller teams, skewness and kurtosis sample statistics may not be stable, and proposed a creative way of using the  $r_{wg}$  statistic, traditionally used as an interrater agreement index, for operationalizing the different forms of team dispersion. The  $r_{wg}$  statistic represents the variance of an observed distribution relative to the expected variance of some null distribution (i.e.,  $1 - [\text{variance of an observed distribution divided by the expected variance of a null distribution}]$ ) (James, Demaree, & Wolf, 1993). Using alternative null distributions (e.g., skewed or bimodal distributions) for different types of dispersion models as the expected null distributions in the  $r_{wg}$  formula, one can examine to what extent an observed distribution of team-level measurement ratings compares to each of those null distributions. Consistent with using  $r_{wg}$  as an inter-rater agreement index, high  $r_{wg}$  indicates the refutation of observed data to the expected null distribution, and low  $r_{wg}$

indicates match between the observed data and the expected null distribution. In other words, we should read a high  $r_{wg}$  as suggesting unmatched between the observed data and the expected null distribution it was compared to, and a low  $r_{wg}$  as describing match between the data and the expected null distribution.

To code the forms of team cultural intelligence dispersion, following DeRue's (2010) operationalization, a positively or negatively *skewed* distribution represents the minority form of team cultural intelligence dispersion. Specifically, when magnitude of the team-level cultural intelligence is high (i.e., the minority has a low cultural intelligence score), a negatively skewed distribution is used as the null distribution. Similarly, when magnitude of the team-level cultural intelligence is low (i.e., the minority has a high cultural intelligence score), a positively skewed distribution is used as the null distribution. On the other hand, for the bimodal form of team cultural intelligence dispersion, the expected variance of a bimodal distribution is calculated and used as the null distribution in the formula. I used a 10-point Likert-type scale. As such, I followed LeBreton and Senter's (2008) recommendation to use 3.46 as the expected variance for a heavily skewed expected distribution (i.e., minority dispersion), and 8.25 as the expected variance for a uniform null distribution. For a bimodal distribution, I first used the formula  $\sum_i a_i * p_i$  to calculate the expected value, and then used  $E([X-E(X)]^2)$  to calculate the expected variance. The expected variance for bimodal distribution is 6.65.

Three  $r_{wgs}$  were then calculated for each team. For teams with three  $r_{wgs}$  lower than 0.70, I coded them as bimodal dispersion. For teams with three  $r_{wgs}$  higher than 0.70, I coded them as shared dispersion. For teams with one  $r_{wgs}$  (i.e., with expected variance 8.25) higher than 0.70, I coded them as fragmented dispersion. For teams with two  $r_{wgs}$  higher than 0.70 (i.e., with expected variance 6.65 and 8.25), I coded them as minority dispersion. Furthermore, positively

skewed minority and negatively skewed minority were categorized by examining individual level data.

Hypotheses 6 to 8 examined the relationship between minority cultural intelligence team dispersion and information sharing processes. The results showed that after the average levels of cultural intelligence was controlled, team dispersions did not have significant effect on information sharing processes in teams, except that metacognitive CQ with bimodal team dispersion had a significant effect on both information sharing openness ( $b = 0.28, p < .05$ ) and uniqueness ( $b = 0.47, p < .05$ ). Moreover, cognitive CQ with bimodal team dispersion also had a significant effect on information sharing uniqueness ( $b = 0.47, p < .05$ ) (see Table 7 and 8). Thus, hypotheses 6 to 8 were not supported.

In summary, the results suggest that information sharing uniqueness is a significant mediator that translates the effects of cultural diversity to team performance. Moreover, metacognitive CQ and motivational CQ amplify the positive relationship between cultural diversity and information sharing uniqueness. In other words, the culturally heterogeneous teams shared more unique information in teams, and unique information shared contributed to team performance. Additionally, teams with higher levels of metacognitive CQ or motivational CQ had better information elaboration.

Table 11. Regression results for information sharing openness

Variables	Model 1 Control Only	Model 2 Control +Configural	Model 3 Control Only	Model 4 Control +Configural	Model 5 Control Only	Model 6 Control +Configural	Model 7 Control Only	Model 8 Control +Configural
Intercepts	6.14*** (0.33)	5.97*** (0.39)	6.34*** (0.26)	6.20*** (0.29)	6.17*** (0.28)	6.24** (0.33)	6.48*** (0.16)	6.41*** (0.19)
Control: Means								
Meta Cognitive CQ	0.05(0.04)	0.07(0.05)						
Motivational CQ			0.03 (0.04)	0.04 (0.04)				
Behavioral CQ					0.05 (0.04)	0.04(0.05)		
Cognitive CQ							0.01(0.03)	0.02(0.03)
Configural Dispersions								
Bimodal (Dummy1)		0.28*(0.19)		0.08(0.13)		-0.07(0.13)		-0.01(0.14)
Fragmented (Dummy2)		-0.01(0.13)		0.09(0.12)		-0.06(0.16)		0.07(0.15)
Negatively Skewed (Dummy3)		0.01(0.13)		0.09(0.12)		0.07(0.12)		0.12(0.15)
Positively Skewed (Dummy4)		-0.03(0.10)		-0.03(0.12)		-0.02(0.12)		0.02(0.15)
R <sup>2</sup>	0.01	0.06	0.01	0.02	0.02	0.03	0.001	0.02
ΔR <sup>2</sup>	0.004	0.01	-0.004	-0.03	0.01	-0.02	-0.01	-0.03

Note. One-tailed. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .



Table 12. Regression results for information sharing uniqueness

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercepts	4.53**** (0.59)	4.15*** (0.70)	4.62*** (0.45)	4.55*** (0.50)	5.86*** (0.52)	5.46*** (0.61)	4.75*** (0.25)	4.42*** (0.31)
Control: Means								
Meta Cognitive CQ	0.20* (0.08)	0.23* (0.09)						
Motivational CQ			0.21** (0.07)	0.21** (0.07)				
Behavioral CQ					0.02(0.07)	0.06(0.09)		
Cognitive CQ							0.23*** (0.04)	0.22*** (0.04)
Configural Dispersion								
Bimodal (Dummy1)		0.47*(0.27)		0.22(0.22)		0.36(0.24)		0.52*(0.23)
Fragmented (Dummy2)		0.16(0.23)		0.07(0.21)		0.21(0.23)		0.35(0.23)
Negatively Skewed (Dummy3)		0.33(0.24)		-0.18(0.21)		0.20(0.22)		0.38(0.11)
Positively Skewed (Dummy4)		0.18(0.18)		0.02(0.20)		0.06(0.22)		0.31(0.24)
R <sup>2</sup>	0.06	0.10	0.09	0.12	0.001	0.03	0.21	0.25
ΔR <sup>2</sup>	0.05	0.05	0.08	0.08	-0.009	-0.023	0.21	0.21

Note. One-tailed. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

## Chapter 5: Discussion

This chapter serves several functions. I first summarize the research conducted in this dissertation. Second, I synthesize and discuss the implications of the results in detail. Third, I provide a discussion of the limitations and future research directions of the dissertation. Fourth, I discuss the theoretical and practical implications. Finally, a conclusion is presented.

### **Research Summary**

This dissertation was developed and conducted to determine how and when cultural diversity influences culturally heterogeneous teams' performance positively. In other words, I wanted to investigate the underlying mechanisms that translate the effect of cultural diversity to team performance, and to evaluate whether these mediating effects were contingent upon certain boundary conditions. In this dissertation, I proposed that teams are both cognitive and motivational information processors. Following this line of reasoning, I investigated whether information elaboration and integration processes are some of the mediating processes of cultural diversity and team performance, and if so, whether these mediating mechanisms are contingent upon cultural intelligence and aggregated team motivations (e.g., epistemic motivation and social motivation).

I recruited 416 participants to take part in the experiment. The participants were first asked to answer a questionnaire that contained measures of their demographics and variables of interest. They were then randomly assigned to three conditions based on their reported race-ethnicity identification: American teams, mixed teams, and Chinese teams. Each team completed the same experimental task that involved discussing and identifying problems for a company.

After finishing the task, each team was instructed to finish a post-experimental survey that included measures of information sharing openness and uniqueness.

Confirmatory factor analyses were conducted for cultural intelligence, cultural thinking styles, information sharing uniqueness and openness, as well as the overall measurement model, and results were acceptable. The hypotheses and research questions were all on the team level and were tested using regression and path-analytic based methods (Edwards & Lambert, 2007). I investigated the main effect of cultural diversity on team performance, and the mediating roles of information sharing uniqueness, openness, and integration, as well as the moderating roles of cultural intelligence, epistemic motivation, and social motivation.

Overall, based on my experimental results, information elaboration, especially information sharing uniqueness, is one of the mediating mechanisms that translates the effect of cultural diversity to team performance positively. Moreover, high team-level cultural intelligence, especially metacognitive CQ and motivational CQ, mitigates the negative relationship between cultural diversity and information sharing openness in teams, and amplifies the positive relationship between cultural diversity and information sharing uniqueness. Corroborating the inconsistent results found in the literature, this dissertation generally found that information elaboration processes mediate the relationship between cultural diversity and team performance, and the relationships between cultural diversity and information sharing uniqueness and openness are contingent upon team-level cultural intelligence. Detailed interpretations and implications of the results are provided below.

## Detailed Summary, Interpretation, and Implications of the Results

### *Research question 1: Main effect*

The cultural diversity literature shows that there are inconsistent theoretical expectations and empirical results regarding how cultural diversity impacts team performance. Therefore, RQ1 asked about the relationship between cultural diversity and team performance. The result indicated that after controlling for task ability and gender of the teams, there was no significant relationship between cultural diversity and team performance. Both American and Chinese teams performed a little better than culturally diverse teams, although not significantly better. The absence of the main effect might have been due to a genuinely non-significant relationship existing between cultural diversity and performance. But, as the literature review indicated, it might also have happened because various other causal processes suppressed, magnified, or otherwise occluded possible connections.

The non-significant main effect of cultural diversity on team performance corroborates previous meta-analyses results (Horwitz & Horwitz, 2007; Stahl et al., 2009). It is also consistent with both sides of the argument regarding the relationship between cultural diversity and team performance (i.e., social identification and value in diversity). The result suggested a closer examination of the *processes* through which cultural diversity's effect travels to collective performance. There may have been certain inconsistent mediation processes (i.e., MacKinnon, Fairchild, & Fritz, 2007), and/or boundary conditions that suppressed the effect of cultural diversity on team performance.

***Hypothesis 1 and 2: The mediating roles of information sharing uniqueness and openness***

Information sharing uniqueness and openness were proposed to be two information elaboration processes that translate the effect of cultural diversity to team performance. It was expected that cultural diversity leads to higher information sharing uniqueness and lower information sharing openness. Moreover, information sharing uniqueness and openness both were expected to contribute positively to team performance.

Hypothesis 1 was about the mediating role of information sharing uniqueness in the model. The results indicated that the Chinese teams had lower information sharing uniqueness than culturally diverse teams, and information sharing uniqueness contributed positively to team performance. However, in the other homogenous condition, American teams' level of information sharing uniqueness was not significantly different from culturally diverse teams, yet higher information sharing uniqueness still led to higher team performance.

Surprisingly, among the two types of culturally homogenous teams, only Chinese teams had lower information sharing uniqueness than culturally heterogeneous teams. This may be because of the historically diverse nature of the American society (e.g., Markus & Lin, 1999). Although people living in America may receive similar education and training, and be exposed to similar social norms, they may have higher diversity in values, beliefs, and thinking styles than Chinese people. In other words, the within-culture diversity in American teams may be more pronounced than Chinese teams (Stahl et al., 2009). In fact, most of the cultural value orientations group variances (i.e., interdependent self-construal, power distance, uncertainty avoidance) in Chinese teams are significantly lower than for American teams in the sample. Consequently, Chinese teams had significantly lower information sharing uniqueness than the

other two types of teams, and there was no significant difference in information sharing uniqueness between American and mixed teams. Moreover, it is also possible that Americans disposition of independent mindedness and preference to express disagreements (Dozier & Miceli, 1985) complemented the lack of unique information held by members with different cultural membership. The finding that higher uniqueness led to better performance provided evidence favoring the “value-in-diversity” argument in project team settings, even though this study could not completely connect the effect to the culture differences examined here.

Hypothesis 2 was about the mediating role of information sharing openness in the model. Surprisingly, the results indicated that neither American teams nor Chinese teams differed significantly from culturally diverse teams in information sharing openness, and information sharing openness did not explain a significant amount of variance in team performance above and beyond the effect of information sharing uniqueness.

The surprising result that cultural diversity did not lead to decreased information sharing openness may be because of the globalization in recent years. Due to technological advances, the number of opportunities for meeting and working with people from other cultures, and/or being exposed to other cultures (e.g., movies, TV shows, etc.) has significantly increased (Schwartz, 2006). This has happened in both the U.S. and China, perhaps most markedly in universities and international businesses. Consequently, individuals, regardless of their cultural background, may have higher levels of common knowledge, values, and beliefs than before. Repeated exposure to people who look differently may suppress salience of the physical cues that may induce out-group bias. Moreover, the nature of the experimental task, that is, cooperation as a premise for successful decision-making, was also found to reduce out-group bias (Gaertner, Mann, Dovidio, Murrell, & Pomare; 1990). The non-significant relationship between cultural diversity and

information sharing openness may also be a result of moderators acting as suppressors, and this possibility will be examined in hypotheses discussed later. Finally, results also indicated that higher information sharing openness led to better performance, because more unique information was shared within teams.

### ***Hypothesis 3: The mediating role of epistemic motivation***

Hypothesis 3 proposed that cultural diversity is associated with higher epistemic motivation, which in turn leads to higher team performance. Surprisingly, there was no indirect effect between cultural diversity and team performance through team epistemic motivation. In other words, team members' *preexisting* epistemic motivation did not translate into any effect of cultural diversity on team performance.

The results suggest that higher epistemic motivation may not bring benefits to teams in achieving better team performance (e.g., being immune to confirmation bias). Whether new information gets searched, generated, and processed may not contribute to building more effective teams. It may also be possible that certain moderators suppressed the relationship between epistemic motivation and team performance. Future research may also explore how *emergent* epistemic motivation (Csikszentmihalyi & Rathunde, 1993) plays as an underlying mechanism that translates the effect of cultural diversity to team performance. In contrast to the *preexisting* epistemic motivation, the different levels of epistemic motivation that may emerge *during* the team interactional processes in cultural diverse and culturally homogenous teams may work as one mediating mechanism.

### ***Research Question 2: Cultural thinking styles and team performance***

RQ2 was largely exploratory in nature, and asked whether team member variance in cultural thinking styles benefits or harms team performance. The results indicated that none of the coefficients was significant when using the variances to predict team performance. The non-significant relationships indicated that existence of multiple cultural thinking styles itself may not have a direct effect on team performance. However, similar to the relationship between cultural diversity and team performance, there may be inconsistent mediation or boundary conditions that suppress significance of the main effect. Future research regarding how and when diverse cultural thinking styles influences team performance will greatly complement the current understanding of the relationship.

### ***Hypotheses 4a and 4b: The moderating role of social motivation***

Tests of Hypotheses 4a and 4b found that neither of the first-stage moderated mediations of social motivation was significant. In other words, social motivation did not change the strength of the relationship between cultural diversity and information sharing uniqueness or openness. The results indicated that the relationship between cultural diversity and information sharing uniqueness or openness may not be contingent upon social motivation.

In retrospect, the null results may have been due to the *pre*-survey measurement of social motivation. The pre-survey measurement of social motivation lacked a context and used an imagined interactant, which may actually be measuring the “base-line” social motivation, the general social motivation that is not context-specific. The teamwork context may make social motivation more salient, which problematizes the measurement of social motivation before the experimental task (Hu & Liden, 2015). In other words, social motivation may be changed by different situational cues, rather than being a relatively stable trait. Hu and Liden (2015) argued



that many people are motivated by their work's impact on the well-being of their team members. The work team context provides direct social stimulation that makes social motivation more salient, and may even change the levels of social motivation. Consequently, measuring context-specific situational social motivation may reveal a more precise picture of how social motivation influences the relationship between cultural diversity and information sharing processes.

***Hypotheses 5a and 5b: The moderating role of cultural intelligence***

Hypotheses 5a and 5b investigated whether cultural intelligence changed the strength of the relationship between cultural diversity and information sharing uniqueness and openness. These hypotheses were partially supported.

The hypotheses extended the extant literature on cultural intelligence, in which most of the studies examined main effects of CQ at the individual level. The results in H5a and H5b indicated that the first-stage moderation of metacognitive CQ on the mediated relationship between cultural diversity and team performance through information sharing uniqueness and openness were both significant. In addition, the first-stage moderation of motivational CQ on the mediated relationship between cultural diversity and team performance through information sharing uniqueness was significant, but not for information sharing openness, although culturally diverse teams were found to have significant higher information sharing openness than American teams when motivational CQ is high. However, none of the first-stage moderations of cognitive and behavioral CQ on the mediated relationship between cultural diversity and team performance through information sharing uniqueness and openness were significant.

In teams with high levels of *metacognitive* CQ, the relationship between cultural diversity and information sharing uniqueness or openness was more positive. When metacognitive CQ was high, the culturally diverse teams were more open in communication and shared more

unique information than the culturally homogeneous teams. Metacognitive CQ refers to the ability to consciously question one's cultural assumptions, to develop awareness of how others think, to reflect during interactions, and to learn new social interaction rules in multicultural team settings (Ang et al., 2008; Imai & Gelfand, 2010). In prior work, metacognitive CQ was found to have a positive effect on meaningful participation, creativity, and shared values in multicultural teams, which needed to be achieved by first identifying team members' distinct values (Adair, Hideg, & Spence, 2013; Crotty & Brett, 2010). By putting more cognitive effort into understanding their team partners who were from a different culture, those teams with higher average metacognitive CQ were able to adapt to hurdles pervasive in culturally diverse teams, such as difficulties in communication openness due to cultural difference, which resulted in higher information sharing openness and more unique information shared. The present findings add nuance to these earlier results by implying that some of the effects may have occurred because of better information handling.

As predicted, *motivational* CQ was found to bring benefit to teams. Besides contributing to team performance directly (Chen et al., 2012), this study revealed that motivational CQ amplified the positive relationship between cultural diversity and information sharing uniqueness, which in turn improved team performance. Motivational CQ refers to one's ability to direct affect, cognitive, and behavioral resources toward comprehensively learning about and successfully functioning in situations characterized by cultural differences (Ang et al., 2008). The allocation of resources attended the cultural differences in information sharing processes and attenuated the negative influence cultural diversity in teams brought.

*Cognitive* CQ and *behavioral* CQ did not change relationships between cultural diversity and information sharing uniqueness and openness. Cognitive CQ refers to the cultural knowledge

acquired before the interaction, and behavioral CQ refers to the exhibition of verbal and nonverbal action in multicultural teams. Cognitive CQ was a self-report measure, which asked participants to what extent they know the other culture's values, beliefs, norms, etc. The non-significant results demonstrated that being a non-ability-based measure, cognitive CQ may not capture the true levels of cultural knowledge in participants. Cognitive CQ helps information sharing processes only when participants' cultural knowledge is correct. Similar logic applies to behavioral CQ: only when participants adjust their behaviors based on *correct* understanding of the other culture, they will be able to exhibit *appropriate* behaviors to facilitate information sharing processes in culturally diverse teams.

Surprisingly, motivational CQ was found to bring negative effects to information sharing processes in culturally homogeneous teams, and metacognitive CQ was found to impede the information sharing processes in American teams. In culturally homogenous teams with high metacognitive or motivational CQ, team members are aware of culture and its influence on their teams, and being in culturally homogeneous teams impedes the information sharing processes. Perhaps only heterogeneous cultural contact calls out the positive effects of these forms of CQ, since so much more can be taken for granted in homogenous teams.

Those results added important pieces of empirical evidence to demonstrate how and when cultural diversity contributes to team performance in culturally heterogeneous teams. Results demonstrated that information sharing uniqueness worked as a mediating mechanism that translates the effect of cultural diversity to team performance. Furthermore, high levels of metacognitive CQ or motivational CQ made the first stage mediating relationship more positive. In addition, they also showed that high metacognitive CQ brought risks to culturally homogeneous teams, especially American ones.

### ***Hypotheses 6 to 8: Team configural models***

Hypotheses 6 to 8 examined the relationship between minority cultural intelligence team dispersion and information sharing processes. The results showed that after the average levels of cultural intelligence was controlled, the difference between minority team dispersions and shared team dispersion did not have significant effects on information sharing processes in teams. Thus, hypotheses 6 to 8 were not supported. The results illustrated that, in four-person teams, a minority member (i.e., a cultural intelligence outlier) may not be able to influence the whole team.

Interestingly, the difference between metacognitive CQ with bimodal team dispersion and shared team dispersion had a significant positive effect on both information sharing openness and uniqueness. The results suggested that *two* team members with higher metacognitive CQ were able to change the dynamics of the four person team, which in turn improved the information sharing processes. This set of results revealed that one member would not be able to change the whole dynamics of the team in a positive way, but two probably would.

### **Theoretical Implications**

The results suggest that information elaboration, specifically information sharing uniqueness, mediates the relationship between cultural diversity and project team performance. The more culturally diverse the teams, the more unique information gets shared within teams, which in turn contributes to better team performance. Moreover, cultural intelligence, specifically, metacognitive CQ and motivational CQ, mitigates the negative relationship between cultural diversity and information sharing openness in teams, and amplifies the positive relationship between cultural diversity and information sharing uniqueness.

The results of the dissertation provide some evidence for the categorization-elaboration model, in the sense that information elaboration processes were found to be mediating mechanisms, and the relationship between cultural diversity and information elaboration is influenced by cultural intelligence. Moreover, the results mainly support the “value in diversity” argument, and the impression formation, similarity attraction, and social identity theory. Cultural diversity was found to contribute to higher uniqueness in information sharing. Moreover, although cultural diversity did not impact information sharing openness directly, cultural intelligence worked as a suppressor for the relationship between cultural diversity and information sharing openness. Thus, with proper theoretical and empirical attention to information processing and its moderators, the two theories can be brought into at least an uneasy alliance.

The findings of the dissertation contribute to the intercultural collaboration and team dynamics literature. First, this dissertation provided important insights into understanding how and why cultural diversity impacts team communication dynamics and contributes to team performance, which is one of the first attempts to explicate the conflicting theories and results in the literature. By identifying key mechanisms between cultural diversity and team performance, I believe that my dissertation has made a meaningful contribution to the multicultural team dynamics literature. Second, this dissertation has also extended the team information sharing literature. Information sharing process is a central process during which team members use their available informational sources collectively (Mesmer & DeChurch, 2009). By examining information sharing openness and uniqueness processes in culturally homogeneous and heterogeneous teams, several interesting findings about interplay between cultural diversity and information sharing were found. The different information sharing processes found in culturally

diverse and culturally homogenous teams also pave the way for future research on information dynamics in culturally diverse teams. Third, this dissertation also contributes to intercultural research by providing an explicit examination of processes that may allow successful intercultural collaboration. The globalized economy calls for more research on culture's effect on team collaboration (Earley & Gibson, 2002). This dissertation also answered the call for research studies that examine how people from different cultures work together explicitly (Levine, Park, & Kim, 2007).

### **Practical Implications**

The findings of this dissertation have several practical implications for managers. As globalization and multicultural teams become more pervasive at the workplace, taking advantage of cultural diversity and turning it into workplace productivity become a new challenge. First, information elaboration processes were found to be important predictors of project team performance. The unique information held by diverse team members should be fully utilized. In other words, managers should be cautious about withholding of unique information in teams, which may prevent a team from achieving its full potential. Managers should consider ways to encourage sharing private knowledge.

Moreover, the results of this study suggest that cultural intelligence may be one of the facilitators that translates cultural diversity into productivity. Specifically, cultural intelligence was found to mitigate the negative effects of barriers cultural diversity brings and worked as a catalyst of positive impacts of cultural diversity in teams. More importantly, cultural intelligence is a trainable skill. By improving employees' cultural intelligence levels through training, team performance may be improved.

## **Limitations and Future Directions**

This study has several theoretical and methodological limitations, and suggests interesting directions for future research. When interpreting the results, those limitations should be taken into consideration. The directions pointed out in the following discussion may also direct future research.

The first limitation concerns the sample and design of the study, which could probably be an external validity issue. The study used a quasi-experimental method to test the hypotheses. The two hours in the lab experiment limited the length of interaction among team members. Although project teams often consist of employees who have never met each other, those teams usually have longer lifespans than two hours. Over time, people are more likely to notice deep-level cultural differences, such as attitudes, beliefs, and values (Harrison et al., 1998; Harrison et al., 2002). Also, longer interaction makes more emergent team properties possible. As such, in real project teams in organizations, cultural diversity may influence team performance in different ways. Future research may investigate the mechanisms and boundary conditions between cultural diversity and team performance using field experiments or surveys.

The second limitation concerns another external validity issue. Like the vast majority of studies in intercultural interactions (Imai & Gelfand, 2010), this study focused on Americans and East Asians, or specifically, Chinese. Although the samples allow more specific interpretations of cross-cultural comparisons, the generalizability of the results to other nationalities is unclear. Some results, such as the effects of information uniqueness on team performance, seem cross-culturally plausible, but others may be specific to the particular cultural backgrounds of the two nationalities in the sample. Given the diverse nature of American society and the homogeneous nature of Chinese society, the generalizability of the study results is limited to those nationalities.

Future studies should move beyond examining Pacific-rim cultures to see if cultural intelligence still serves as a boundary condition for information sharing processes in multicultural teams.

The third limitation concerns an internal validity issue that is related to the operationalization of cultural diversity. In this study, cultural diversity was operationalized using reported identities as proxies for cultural memberships. The dichotomized operationalization resulted in coarseness of the scale. Scale coarseness often results in attenuation of observed correlation coefficients to population coefficients (Aguinis, Pierce, & Culpepper, 2009), which may mask the true relationships, particularly if they are subtle.

The fourth limitation is also an internal validity issue. Cultural intelligence was measured using a self-reported measure, which is subject to problems of all self-reported measures. Self-reported measures, especially those that measure certain abilities (e.g., cultural intelligence), are subject to social desirability issues (Podsakoff & Organ, 1986). Moreover, items related to cognitive CQ asked participants about whether they have knowledge about another culture. However, whether participants know about the cultural facts does not mean they have the *precise* cultural knowledge. Therefore, like emotional intelligence, future research should use more objective measures, such as ability-based measures, direct observations, and peer assessments to measure cultural intelligence. It might also be profitable to connect the measures to especially relevant cultures – for example, “Do you know any Mandarin words?”

Members’ preexisting social motivation and epistemic motivation did not translate any effect of cultural diversity to team performance. The motivations can be situational and could have changed magnitude during the experimental session. Future research may explore how emergent motivation (Csikszentmihalyi & Rathunde, 1993) plays as an underlying mechanism that translates the effect of cultural diversity to team performance.



Although using four-member teams is common in small group research, organizational teams differ in their sizes, and it is unclear whether the results will replicate in larger teams. I also used same-gender groups in this study in order to avoid cross-sex perception and behavioral complications. Although the design can control for gender diversity's influences in teams, future studies could also explore whether the same pattern of results will appear in mixed-gender groups, which are common in real organizations.

## **Conclusion**

This dissertation started with the goal of disentangling the inconsistent theoretical and empirical evidence in the literature regarding the relationship between cultural diversity and team performance. Based on the experimental results of the dissertation, it is clear that cultural diversity does influence team performance, but in a sophisticated way. Although there is no main effect between the two variables, I found a mediator (i.e., information sharing uniqueness) translating the effect of cultural diversity to team performance. In addition, the first-stage mediating relationships are subject to the influences of cultural intelligence. As such, the inconsistent relationships reported in the literature are not an indicator of non-relationship, but rather, signal more sophisticated relationships. Due to the limited scope of the dissertation, important pieces of information are still missing. For example, it is still not clear how diverse cultural thinking styles and how dispersion of cultural intelligence manifest in project teams. Future research should continue in exploring those interesting questions, which should help us understand team dynamics in intercultural teams better.

Communicating openly and effectively is one of the major challenges for multicultural teams' performance. Although the CQ literature has pointed out the importance of CQ in multicultural teams, this dissertation is among the first in organizational communication research

to conceptualize and corroborate how information sharing processes and cultural intelligence independently and jointly facilitate cross-cultural team effectiveness.

Specifically, overall, the results of the dissertation illustrated that information sharing uniqueness was one of the mediating mechanisms that translated the positive influence of cultural diversity to team performance. In addition, metacognitive CQ and motivational CQ moderated the first-stage mediation of information sharing uniqueness, which in turn contributed to better team performance. In other words, culturally diverse teams had higher levels of information sharing uniqueness than culturally homogeneous teams, which led to better team performance. Additionally, teams with higher metacognitive or motivational CQ had even more positive information sharing uniqueness than those with lower ones, which again contributed to better team performance.

This dissertation made several contributions to the literature. First, it contributed to the multicultural teams literature by explicating the relationship between cultural diversity and team performance. Besides identifying a mediating mechanism, this study also found that the mediating mechanism is contingent upon certain boundary conditions. Second, the study answers the call of examining CQ's influence in teams (Rockstuhl & Ng, 2008). Most of the extant CQ studies examined CQ's role in interpersonal interactions at the individual level, yet this dissertation investigated how teams' CQ levels influence team dynamics.

I believe my dissertation offered some conceptual and empirical advancement for the organizational communication literature, especially communication in multicultural teams. It should intrigue researchers to conduct more interesting relevant research studies to reveal how employees overcome the hurdles to efficient and effective communication in intercultural work settings.

## Appendix I

### **Hackman et al. (1999) Self-Construal Scale**

Independent self-construal items:

I should be judged on my own merit.

Being able to take care of myself is a primary concern for me.

My personal identity is very important to me.

I prefer to be self-reliant rather than dependent on others.

I am a unique person separate from others.

I try not to depend on others.

I take responsibility for my own actions.

It is important for me to act as an independent person.

I should decide my future on my own.

What happens to me is my own doing.

I enjoy being unique and different from others.

Interdependent self-construal items:

I consult with others before making important decisions.

I consult with co-workers on work-related matters.

I will sacrifice my self-interest for the benefit of my group.

I stick with my group even through difficulties.

I respect decisions made by my group.

I will stay in a group if they need me, even when I am not happy with the group.

I maintain harmony in the groups of which I am a member.

I respect the majority's wishes in groups of which I am a member.

I remain in groups of which I am a member if they need me, even though I am dissatisfied with them.

I try to abide by customs and conventions at work.

I give special consideration to others' personal situations so that I can be efficient at work.

I help acquaintances, even if it is inconvenient.

## Appendix II

### **Earley and Erez Power Distance Scale (1997)**

In most situations managers should make decisions without consulting their subordinates.

In work related matters, managers have a right to expect obedience from their subordinates.

Employees who often question authority sometimes keep their managers from being effective.

Once a decision of a top-level executive is made, people working for the company should not question it.

Employees should not express disagreements with their managers.

Managers should be able to make the right decision without consulting their others.

Managers who let their employees participate in decision lose power.

A company's rules should not be broken – not even when the employee thinks it is in the company's best interest.

### Appendix III

#### **Choi's Analysis-Holism Scale (2007)**

We should avoid going to extremes.

It is more important to pay attention to the whole context rather than the details.

Future events are predictable based on present situations.

The whole is greater than the sum of its parts.

Everything in the world is intertwined in a causal relationship.

An individual who is currently honest will stay honest in the future.

Choosing a middle ground in an argument should be avoided.

Any phenomenon entails a numerous number of consequences, although some of them may not be known.

A person who is currently living a successful life will continue to stay successful.

It is important to find a point of compromise than to debate who is right / wrong, when one's opinions conflict with other's opinions.

Nothing is unrelated.

We should consider the situation a person is faced with, as well as his/her personality, in order to understand one's behavior.

It is more desirable to take the middle ground than go to extremes.

Current situations can change at any time.

It is more important to pay attention to the whole than its parts.

If an event is moving toward a certain direction, it will continue to move toward that direction.

Any phenomenon has numerous numbers of causes, although some of the causes are not known.

Every phenomenon in the world moves in predictable directions.

When disagreement exists among people, they should search for ways to compromise and embrace everyone's opinions.

It is not possible to understand the parts without considering the whole picture.

Even a small change in any element of the universe can lead to significant alterations in other elements.

The whole, rather than its parts, should be considered in order to understand a phenomenon.

It is desirable to be in harmony, rather than in discord, with others of different opinions than one's own.

Everything in the universe is somehow related to each other.

## Appendix IV

### **Epistemic Motivation (Neuberg & Newsom, 1993)**

It upsets me to go into a situation without knowing what I can expect from it.

I'm not bothered by things that interrupt my daily routine.

I enjoy having a clear and structured mode of life.

I like to have a place for everything and everything in its place.

I enjoy being spontaneous.

I find that a well-ordered life with regular hours makes my life tedious.

I don't like situations that are uncertain.

I hate to change my plans at the last minute.

I hate to be with people who are unpredictable.

I find that a consistent routine enables me to enjoy life more.

I enjoy the exhilaration of being in unpredictable situations.

I become uncomfortable when the rules in a situation are not clear.



## Appendix V

### Decomposed Game Measure: Social Motive (Kuhlman & Marshello, 1975)

Below you see nine decisions in which you have to make a choice. Your choice influences the amount of points you and some other person will get. Think of the points as something that is valuable to you, to which you attach great importance. The other person also attaches great importance to the points.

1.

	A	B	C
You Get	480	540	480
Other Gets	80	280	480

2.

	A	B	C
You Get	560	500	500
Other Gets	300	500	100

3.

	A	B	C
You Get	520	520	580
Other Gets	520	120	320

4.

	A	B	C
You Get	500	560	490
Other Gets	100	300	490

5.

	A	B	C
You Get	560	500	490
Other Gets	300	500	90

6.

	A	B	C
You Get	500	500	570
Other Gets	500	100	300

7.

	A	B	C
You Get	510	560	510
Other Gets	510	300	110

8.

	A	B	C
You Get	550	500	500
Other Gets	300	100	500

9.

	A	B	C
You Get	480	490	540
Other Gets	100	490	300

**Scoring:**

“A person is considered to be altruistic if he or she has 6 or more prosocial responses.”

“A person is considered to be egoistic if he or she has 6 or more egoistic responses.”

“A person is considered to be a competitor if he or she has 6 or more competitor responses.”

Participants who do not have at least 6 of one type of response are usually not counted in the analyses.

## Appendix VI

### **The Cultural Intelligence Scale (CQS) (Ang et al., 2007)**

#### Metacognitive CQ

MC1 I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds.

MC2 I adjust my cultural knowledge as I interact with people from a culture that is unfamiliar to me.

MC3 I am conscious of the cultural knowledge I apply to cross-cultural interactions.

MC4 I check the accuracy of my cultural knowledge as I interact with people from different cultures.

#### Cognitive CQ

COG1 I know the legal and economic systems of China/US.

COG2 I know the rules (e.g., vocabulary, grammar) of Chinese/English.

COG3 I know the cultural values and religious beliefs of China/US.

COG4 I know the marriage systems of China/US.

COG5 I know the arts and crafts of China/US.

COG6 I know the rules for expressing nonverbal behaviors in China/US.

#### Motivational CQ

MOT1 I enjoy interacting with people from different cultures.

MOT2 I am confident that I can socialize with locals in a culture that is unfamiliar to me.

MOT3 I am sure I can deal with the stresses of adjusting to a culture that is new to me.

MOT4 I enjoy living in cultures that are unfamiliar to me.

MOT5 I am confident that I can get accustomed to the shopping conditions in a different culture.

Behavioral CQ

BEH1 I change my verbal behavior (e.g., accent, tone) when a cross-cultural interaction requires it.

BEH2 I use pause and silence differently to suit different cross-cultural situations.

BEH3 I vary the rate of my speaking when a cross-cultural situation requires it.

BEH4 I change my nonverbal behavior when a cross-cultural situation requires it.

BEH5 I alter my facial expressions when a cross-cultural interaction requires it.

## Appendix VII

### **Information Sharing Openness and Uniqueness Measure (Zellmer et al., 2008)**

#### Openness

Members of my team are very willing to share information with each other about our projects”,

There is a frequent exchange of information in our team

In our team, members engage in open communication

#### Uniqueness

Unique information was shared among the members of the team.

Team members worked hard to exchange their unique expertise and perspectives.

Team members were kept ‘in the loop’ about unique information processed by each member.

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