Collaborating across Cultures: Cultural Metacognition & Affect-Based Trust in Creative Collaboration

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ABSTRACT

We propose that managers' awareness of their own and others' cultural assumptions (cultural metacognition) enables them to develop affect-based trust with associates from different cultures, promoting creative collaboration. Study 1, a multi-rater assessment of managerial performance, found that managers higher in metacognitive cultural intelligence (CQ) were rated as more effective in intercultural creative collaboration by managers from other cultures. Study 2, a social network survey, found that managers lower in metacognitive CQ reported a deficit of new idea sharing in their intercultural but not intracultural ties. In Study 3, a laboratory experiment involving a collaborative task, higher metacognitive CQ engendered greater idea sharing and creative performance only when participants shared personal experiences prior to the task. The effects of metacognitive CQ in enhancing collaboration were mediated by affect-based trust. We discuss the theoretical and practical implications for understanding and promoting creativity and problem solving in multicultural global contexts.

INTRODUCTION

Bill and Harold studied engineering and then started careers at the same Silicon Valley R&D lab. Bill has done well, winning a patent for a chip he designed with their coworker Ted from Trenton and more recently launching a consulting partnership with their friend Fred from Fresno. Yet Harold has succeeded at another level; his early research project with their coworker Tao, a post doc freshly arrived from China, yielded two patents and a *Science* paper. Then he founded a firm manufacturing cloud computing chips in Bangalore with their neighbor Kumar who comes from there. While Bill and Harold share the same professional network, including people from many different cultures, Harold has managed to leverage his relationships to people from different cultures, whose insights, capabilities, and connections are more distinctive and enable more innovative joint projects. Bill has managed to collaborate only with other Americans, who are easy to communicate with, yet whose ideas, capabilities, and connections are similar to Bill's and those of many others like him. What is it that enables some individuals, like Harold, to collaborate creatively in intercultural relationships while peers who are similarly smart and motivated do not manage to collaborate effectively across cultural lines?

Research in management and organizational behavior has increasingly focused on individual differences that enable managers to succeed in intercultural interactions (e.g., Earley & Ang, 2003; Johnson, Lenartowicz, & Apud, 2006; Thomas, 2006; Shapiro, Ozanne & Saatcioglu, 2008; Ang & Van Dyne, 2008; Imai & Gelfand, 2010). One longstanding theme is that intercultural success accrues from being mindful of one's own and others' assumptions when interacting with individuals from different cultures (Johnson, Cullen, Sakano, & Takenouchi, 1996; LaBahn & Harich, 1997). This skill in reflecting on cultural assumptions in order to prepare for, adapt to, and learn from intercultural interactions is increasingly referred as

cultural metacognition (Earley & Ang, 2003; Earley, Ang, & Tan, 2006; Thomas, 2006; Klafehn, Banerjee, & Chiu, 2008; Van Dyne, Ang, Ng, & Koh, 2008). Under the rubric of cultural intelligence or CQ, instruments have been developed to measure individual differences in cultural metacognition in terms of self-reported awareness of one's cultural assumptions and tendencies to plan for upcoming intercultural activities, check the applicability of and adjust one's assumptions during a given interaction, and update assumptions after each experience (Earley & Ang, 2003; Ang, Van Dyne, & Tan, in press).

In this research, we explore the role of cultural metacognition in intercultural creative collaboration. Although collaboration can occur in larger groups, we focus for the sake of clarity on dyadic collaboration. Just like scientists, businesspeople often share ideas and brainstorm solutions to a problem with a colleague or some other contact within their professional network. Creative solutions to a problem often occur when such conversations bring together two ideas that have never previously been combined, for example using materials developed by bicycle racers to develop lighter wheelchairs, or finding a market for South Pacific coconut juice among American urban professionals (Sutton & Hargadon, 1996). Accordingly, the creative potential in a collaborative dyad comes from the differences between the two people – surface demographic differences such as nationality or ethnic background correspond to deeper differences in people's knowledge of the world, their capabilities, and connections. These deeper differences afford creative potential because the other person brings to the table ideas and resources that are not redundant with one's own; the exchange of ideas in the conversation could result in a novel combination, an innovative solution.

The creative potential in cross-cultural interactions and relationships, however, often goes unrealized. Sharing one's knowledge and insights with another person entails making oneself

vulnerable to the other and thus requires trust - the extent to which a person is confident in and willing to act on the basis of the words, actions, and decision of another (Luhmann, 1979; McAllister, 1995). Ideas could be stolen if they are good or ridiculed if they are bad. Creative collaboration depends on the kind of trust that involves concern for the other and comfort in opening up to them. This set of sentiments is called affect-based trust (McAllister,1995) and has been long been studied by researchers interested in trust as feeling (Lewis & Weigert,1985; Rempel, Holmes, & Zanna, 1985). While collaboration on a mundane task simply requires sharing the labor, creative collaboration involves the exchange of ideas to develop a novel solution that neither person in the dyad would have crafted on their own. Affect-based trust lubricates the risky sharing of new ideas that begins the process of creative collaboration.

We propose that individuals higher in cultural metacognition are more likely to achieve intercultural creative collaboration as they are more likely to develop affect-based trust in their intercultural interactions and relationships. The habit and skill of thinking about one's own and other's assumptions presumably enables individuals to communicate better, to put people at ease, and to avoiding misunderstandings and tensions, Affect-based trust is distinguished from cognition-based trust, defined as confidence built on perceptions of the other's reliability and competence (Butler,1991; Cook & Wall, 1980; Zucker, 1986). This dimension of trust is calculative and based on rational assessments of the other's ability and track record. Both kinds of trust may be more difficult to develop in intercultural relationships (Rockstuhl & Ng, 2008; Branzei et al, 2007). Cognitive processes such as stereotyping can undermine positive judgments about competence, whereas affective processes such as anxiety can hinder emotional openness and sharing (Mackie & Hamilton, 1993; Gelfand, Erez, & Aycan, 2007). For reasons

5

we shall develop, we propose that affect-based trust is more pivotal in the relationship between the individual attribute of cultural metacognition and the outcome of creative collaboration.

We examined these hypotheses using multiple research methods. Study 1 used a multi-rater survey to assess managers' intercultural collaboration from the perspective of work colleagues from different cultures. We tested whether managers with high (vs. low) cultural metacognition achieve more creative collaboration in their intercultural relationships, in part because they develop greater affect-based trust in these relationships. In Study 2, we surveyed managers about their professional networks, assessing their creativity-related communication (sharing of new ideas) in all their key professional relationships. An important feature of Study 2 is that we explicitly compare the effects of cultural metacognition on trust and creative collaboration between intracultural relationships (with someone of the same cultural background) and intercultural relationships (with someone of different cultural background). This approach allows us to examine whether cultural metacognition taps mental habits specific to culture or perspective-taking in general. Study 3 used a laboratory experiment to manipulate the critical mechanism – affect-based trust. Our objective is to show that the effects of cultural metacognition depend on conditions that enable affect-based trust; even if individuals have this important strength they will not develop creative collaboration if the conditions do not afford the development of affect-based trust.

Taken together, these studies make several contributions. First, we present evidence that individuals' cultural metacognition is linked to success in intercultural creative collaborations. This basic finding expands current understanding on how specific aspects of intercultural competence impacts creative performance in a global workplace. Second, we explicate a key psychological mechanism that underlies the relationship between cultural metacognition and

6

creative collaboration – intercultural affect-based trust. This finding pushes theoretical boundaries in creativity research through its direct focus on intercultural creative collaboration and affect at a dyadic level of analysis. Recent research has called for more in-depth theorizing on how individuals might capitalize on interpersonal processes to reap creativity (George, 2007). Yet little extant research has examined creativity at the dyadic level, especially across cultural lines. Additionally, the role of affect in creativity, though widely studied, focuses on incidental affect at the individual level but not on the interpersonal level. Our research fills this gap, leading the way on how scholars might go about studying creativity and affect at the dyadic level. We elaborate on these and other contributions in the discussion section.

CULTURAL METACOGNITION AND INTERCULTURAL COLLABORATION

Scholars have long studied factors that foster intercultural interactions and collaborations (Irani & Dourish, 2009; Johnson, et al., 2006; LaBahn & Harich, 1997). One strategy has been to look for individual differences that predict the success of expatriate managers or international students, such as personality (Caligiuri, 2000), values (Kagan & Cohen, 1990), self-efficacy (Palthe, 2004), and interpersonal skills (Hechanova, Beehr, & Christiansen, 2003). Earley and Ang (2003) integrated many of these ideas in positing multiple dimensions of cultural intelligence (CQ), including knowledge, motivation, behavioral flexibility, and metacognitive awareness. Although there is now evidence that each of these dimensions affects some kinds of intercultural interactions (Ang & Van Dyne, 2008; Imai & Gelfand, 2010), theory about which dimensions are critical for which kinds of interactions is still developing. Furthermore, it is still unclear how these different dimensions of CQ interact with one another or combine into an aggregate construct (Thomas, in press). Hence, rather than studying all CQ dimensions

simultaneously, we focused our investigation on a single dimension – cultural metacognition – which Thomas and colleagues (2008) proposed to be a central linking mechanism among the various dimensions of cultural intelligence as it regulates cognition and behavior.

Metacognition may be the least obvious dimension of cultural intelligence, yet it follows a tradition of research emphasizing the importance of self-awareness and sensitivity toward others when adjusting to new environments (Mendenhall & Oddou, 1985). Cognitive psychologists typically characterize metacognition as thinking about thinking, comprising the processes of monitoring and adjusting one's thoughts and strategies as one learns new skills (Winn & Synder, 1996; Langer, 1989). Expanding this line of theorizing, Ang et al. (2007) defined cultural metacognition as mental processes directed at acquiring, comprehending, and calibrating cultural knowledge. According to these researchers, cultural metacognition increases intercultural effectiveness by promoting (a) contextualized thinking (i.e., heightened sensitivity to the fact that individuals' motivations and behaviors are invariably shaped by the cultural contexts in which they are embedded) and (b) cognitive flexibility (i.e., discriminative use of mental schemas and behavioral scripts when interacting across cultures). Other scholars have also invoked ideas related to cultural metacognition in intercultural collaboration. For example, Johnson et al (1996) emphasized the importance of self-awareness and awareness of others' responses in managing international collaborative alliances. Similarly, LaBahn and Harich (1997) emphasized the importance of cultural sensitivity in international collaborative ventures.

Cultural metacognition may be especially critical to collaborative relationships because of its effects on communication quality and ultimately intercultural trust development. Individuals from different cultures are likely to interpret and represent the same problem in different ways, according to the cultural knowledge and beliefs that they respectively hold. Prior

8

research argued that gaps in problem representation (Cronin & Weingart, 2007) inhibit collaboration because they increase misunderstanding and conflicts. Mere knowledge about the traditional practices of another culture, without accompanying metacognitive awareness, will not necessarily help in the collaborative work with a colleague from that culture. These preconceptions, if applied inappropriately, are likely to alienate coworkers from other cultures, decreasing trust. As the saying goes, "a little bit of knowledge is a dangerous thing." Metacognitive awareness helps individuals overcome these challenges of intercultural collaboration by enabling them to interact in a way that makes the other person feel understood, rather than feeling stereotyped. It also enables individuals to adjust their behavior to the particular audience, increase rapport during interaction, thereby helping to build trust (Ang, et al., 2007). High quality interpersonal communication and trust are especially critical for creative collaboration because unlike noncreative collaboration that involves just sharing of labor to implement preconceived ideas, partners in creative collaboration constantly grapple with uncertainty and new ideas and thus can easily feel vulnerable. Effective interpersonal relationships smooth this difficult process. Initial evidence that cultural metacognition may promote intercultural creative collaboration comes from research by Crotty and Brett (2009). In a study of multicultural teams, these researchers found that team members with high cultural metacognition were more likely to report that their teams engaged in "fusion" teamwork, suggesting effective intercultural creative collaboration.

Hypothesis H1: Individuals' cultural metacognition is positively associated with effectiveness in their intercultural creative collaborations.

THE INTERVENING PROCESS: AFFECT- VERSUS COGNITION-BASED TRUST

9

We propose that the effect of cultural metacognition runs through affect-based trust, which arises proximally out of communication experiences. In a recent study, Liu, Chua, and Stahl (2010) found evidence that feelings that one's communication with another person is clear, comfortable, and responsive are particularly predictive of success in intercultural as opposed to intracultural negotiations. This is consistent with the view that there are challenges distinctive to intercultural relationships that cultural metacognition may ameliorate. Our argument involves two more specific claims. First, the level of affect-based trust that one establishes in relationships to people of different cultures is a function of one's cultural metacognition. Second, affect-based trust in an intercultural relationship determines the success of creative collaboration.

Regarding the first claim, we argue that cultural metacognition affects managers' interaction by enabling them to adapt their styles appropriately, taking into account cultural differences, yet not assuming more differences than truly exist. This adaptation creates the feeling of meshing—of being "on same wavelength"—with the other person, which is otherwise known as rapport. Rapport is a state of mutual positivity and interest that arises from communication experiences featuring coordination and synchrony (Tickle-Degnen & Rosenthal, 1990; Bernieri, 1988) and statements by the other that resonate with one's assumptions (Gillis, Bernieri, & Wooten, 1995; Bernieri, & Gillis, 1995). If the conditions allow for a meaningful personal exchange, resonant communication allows initial rapport to grow into affect-based trust, which is a more focused feeling of wanting to share with the other person and help them do well. If an intercultural dyad has a member high in cultural metacognition who can adapt to the other person, the dyad is more likely to have a resonant ("same wavelength") conversation that results in mutual affect-based trust. This is, of course, not to say that maintaining trust is a one-way street. Sustaining trust likely requires some contributions from both sides of the dyad.

10

Evidence also supports our second claim that affect-based trust enables creative collaboration. Recent research linking social network and creativity has emphasized that creativity is a social process (Perry-Smith, 2006; Burt, 2004) and that fluency and openness in the sharing of diverse and novel ideas is a key to creative performance (Albrecht & Hall, 1991; Perry-Smith, 2006). Several studies manipulating whether or not dyads engaged in personalized commuiciation found that this factor increases feelings of rapport and thereby increases collaborative approaches to resolving a conflict (Argyle, 1990; Drolet & Morris, 2000; Moore, Kurtzberg, Thompson, & Morris, 1999). Chua et al (2010) more directly showed that affect-based trust is a key predictor of new idea sharing in managers' professional networks. Affect-based trust may be particularly important in intercultural relationships, where the emotional process of intercultural anxiety often inhibits close cooperation (Stephan, Helms, & Haynes, 1995; Stephan & Stephan, 1985; Thomas, Bonieci, Vescio, Biernat, & Brown, 1996) and, specifically, the sharing of new ideas (Stephan, Stephan, Wenzel, & Cornelius, 1991). Related to anxiety, managers often feel strain and stress in intercultural relationships in the workplace (Takeuchi, Wang, & Marinova, 2005). Because it is often affective anxiety that shuts down communication and cooperation in intercultural relationships, it stands to reason that affect-based trust would be the key to opening up communication and the flow of new ideas.

Additionally, affect-based trust helps address the challenges of conflict and misunderstanding that arise from cognitive gaps in problem representation common in intercultural relationships. Affect-based trust can increase the motivation for the parties involved to carefully listen to and understand the other's alternative perspectives, as opposed to outright dismissing them. When individuals understand and appreciate perspectives that are different from their own, they can better manage the associated frictions, engage in constructive debate,

and harness the inherent differences to generate creative solutions to problems, processes sometimes referred to as "creative abrasion" by management scholars (Leonard & Swap, 1999; Nonaka, 1994). In sum, we posit that because affect-based trust opens up the conduit for frank two-way communication of new ideas and motivates individuals to better understand diverse perspectives, it enables creative collaboration between culturally different individuals.

Hypothesis H2a: The relationship between individuals' cultural metacognition and effectiveness in their intercultural creative collaborations is mediated by affect-based trust.

An alternative account centers on cognition-based trust. That is, individuals with low cultural metacognition may rely on pejorative stereotypes about cultural out-groups in part because they have overly simplistic routines or templates for engaging people of other cultures and hence underestimate the competence and reliability of their colleagues from other cultures. Yet, while all of these may be true and may affect their interpersonal interactions, individuals' perceptions of colleagues' reliability and competence probably does not hinge as much on the quality of their communication as does their affective feelings toward the colleagues. In the professional world, and even in the university, one's judgment of others' competence and reliability comes largely from their reputations and track records. They do not depend as much on one's first-hand interactions as do one's feelings of affect-based trust.

The second part of this alternative account involving a cognition-based trust mechanism would be that lower judgments of colleagues' competence and reliability would interfere with creative collaboration. This part is hard to dispute. Outside of the cultural psychology literature, studies of team interaction highlight the importance of cognitive perceptions of colleagues' capacities as opposed to affective bonds. Team performance on well-structured problems like

puzzles is fostered by group task training, which affords accurate perceptions of others'

competencies (transactive memory), and not by team-building training, which instills affective

bonds (Moreland, Argote, & Krishnan, 1996; Moreland & Myaskovsky, 2000). More generally,

negative expectations of competence and reliability in culturally different others would reduce

their attractiveness as exchange partners or "sounding boards" for new ideas. Low confidence in

the competence of the other would also decrease one's willingness to listen to alternative ideas

and perspectives from that person. These effects would in turn dampen creative collaboration. In

sum, it is important to test an alternative account predicting that cognition-based trust is the

mechanism for the effect of cultural metacognition on intercultural creative collaboration.

  Hypothesis H2b*: The relationship between individuals' cultural metacognition and*

effectiveness in their intercultural creative collaborations is mediated by cognition-based trust.

Study 1

Participants and Procedures

  A total of 43 middle-level managers (81% male, mean age 38) attending an executive

MBA course at a large west coast U.S. university participated in this study. Of these, 51% were

European American, 35% East- or South Asian, and the rest were of other cultural backgrounds

(e.g., European, Middle Eastern, etc). These participants rated themselves on the cultural

metacognition and international experience measures. Our dependent measures — managers'

affect-based trust and creative collaboration in intercultural relationships — were rated by

individuals on the other end of those relationships, namely, people of *different* cultural

backgrounds who had worked with the focal managers. Our focus is to get an overall assessment

of each manager's creativity-related effectiveness in their range of dyadic working relationships with coworkers of other cultures.

As part of their course requirement, these participants were asked to nominate up to 10 people of *different* cultural backgrounds with whom they had previously worked professionally to provide them with feedback. We told participants that they would receive only aggregate feedback and would never learn which of their observers had filed reports. We checked that these nominated "observers" reported different cultural backgrounds than the focal manager. The observers identified included peers, bosses, and subordinates. On average, 4.37 observers responded for each focal manager, resulting in a total of 188 data points. Observers were asked to rate the participant on an array of measures related to leadership development, including items tapping affect-based trust and creative collaboration. Rather than asking observers narrowly about their own personal experiences with the focal manager, we asked observers for their general impressions based on what they have experienced and observed, in order to more broadly capture the manager's tendencies in intercultural interactions.

Key Measures

Cultural metacognition. Participants rated their own cultural metacognition using a six-item metacognitive CQ scale developed by Ng and colleagues (Ng, Rocksthul, Ang, & Van Dyne, 2010). These items tap (a) cultural awareness ("I know how to apply what I know of a culture when interacting with people from that culture," "I am aware of how to use my cultural knowledge when interacting with people from different cultures,"), (b) adjustment during intercultural interactions ("I adjust my cultural knowledge while interacting with people from a new or an unfamiliar culture," "I check my cultural knowledge to ensure it is correct during cross-cultural interactions.") and (c) planning before intercultural interactions ("I develop action

14

plans for interacting with people from a different culture," "I determine what I need to know about a culture before interacting with people from that culture."). Cronbach's alpha for this scale is 0.88 for the current sample.

Intercultural creative behaviors. The dependent measures came from peers who were of different cultural backgrounds than the participants. These observers responded to two items designed to asses participants' effectiveness in interacting with people of other cultures: (a) "This person typically proposes win-win solutions when people from different cultural backgrounds have divergent ideas." and (b) "This person's working relationships with people of other cultural backgrounds help this person and the others do creative, innovative work." Respondents used a 7-point scale (1 = not at all, 7 = to a great extent). Correlation between these two items was 0.57. The *rwg* for the scale is 0.78, suggesting adequate inter-rater agreement on the outcome variable. We averaged these two items to form our dependent variable.

Affect-based trust. We assessed participants' affect-based trust in people of other cultures using the item, "This person's working relationships with people of other cultural backgrounds are as warm, open, and trusting as his/her working relationships with same-culture others." The observers rated this item on a 7-point scale (1 = not at all, 7 = to a great extent).

Control variables

Because multicultural experience has been found to influence creative performance (Leung, et al., 2008), we controlled for related measures. Specifically, we assessed the number of languages the participants spoke and the number of countries where they have lived ("How many different countries [including the U.S.] have you lived in [for at least 6 months] over your lifetime?") and visited in the previous year ("How many different countries have you visited during the last year?"). Lastly, we also assessed the degree of participants' previous experiences

in interacting with people from different cultures and countries using these items "your overall experience interacting with people who have different cultural backgrounds" and "your overall experience interacting with people from other countries." These items were rated on a 5-point scale ranging from 1 = no experience to 5 = very experienced. All responses on the control variables were reported by the participants themselves.

Analyses and Results

Our data involved hierarchically nested variables given that up to 10 observers are nested within a particular respondent. A methodological concern therefore was the non-independence of observations (Klein, Dansereau, & Hall, 1994). To address this data non-independence issue, we used the random-effects regression model (also known as the hierarchical linear model) to control for the influence of a given participant on multiple dyadic observations (Hausman, Hall, & Griliches, 1984; Hoffman, Griffin, & Gavin, 2000). We chose the random-effects model because cultural metacognition is a participant-level variable; moreover, this model also allows estimates for other substantively interesting aggregate participant-level variables such as international experience and foreign language ability.

Table 1 shows the descriptive statistics and correlations among the key variables. Table 2 reports the results from the hierarchical linear model analyses of observers' rating of participants' intercultural innovation effectiveness. Model 1 contains the control variables whereas model 2 adds the predictor of self-reported cultural metacognition. Results indicate that cultural metacognition has a positive effect ($b = 0.19$, $p < 0.05$) on observers' ratings of participants' ability to engage in intercultural creativity-related work, controlling for prior multicultural experience and foreign language ability. With the addition of affect-based trust into model 3, we found that the positive effect between cultural metacognition and intercultural

creative behavior disappeared ($b = 0.06$, p > 0.10), suggesting a mediation effect. Cultural

metacognition had a marginally significant effect on affect-based trust ($b = 0.22$, p < 0.10).

Given our small sample size, we used the boot-strapping approach for mediation analyses

(Preacher & Hayes, 2004; Shrout, & Bolger, 2002). The traditional method of mediation using

the Sobel (1982) test lacks statistical power when the sample size is small. Mediation analyses

using the bootstrapping approach with 5000 iterations reviewed a partially significant indirect

effect through trust — 90% confidence interval (CI) (0.02 to 0.28) does not contain zero but

95% CI (-0.07 to 0.30) does. Figure 1 presents the detailed results of this analysis.

Discussion

The evidence for mediation in Study 1 provides support for our thesis regarding the role

of trust in intercultural creative behaviors. The mediation test was only marginally significant,

yet it stands to reason that the mediation would be less tight in this study because affect between

two individuals is naturally harder to accurately detect by third parties compared to the parties

who are themselves involved in that particular relationship. Further, in this study, the affect and

creativity ratings were not constrained to particular coworkers. Observers might have taken into

account the managers' visible affective closeness toward many coworkers yet only taken into

account creative collaboration success with a smaller set of colleagues for whom the dimension

seemed applicable.

A key contribution of Study 1 is disambiguating cultural metacognition from individual

differences in experience as we controlled for dimensions of international and multicultural

experience. While cultural metacognition may be in part a consequence of such experiences, we

show that it is not simply a proxy for them—cultural metacognition predicts our effects even

when levels of these experiences are controlled. Another important contribution is the use of

independent ratings by coworkers from other cultures which provides further assurance that the findings reflect real (rather than imagined) collaborative success. In our next study, we aim to further unpack the trust mechanism by measuring both affect- and cognition-based trust and testing their effects. Additionally, we go beyond the general assessment of collaboration effectiveness to measure a specific behavior of creative collaboration – new idea sharing (Albrecht & Hall, 1991; Hennessey, & Amabile, 2010; Taggar, 2002).

Study 2

Participants and Procedures

We surveyed 60 managers attending an executive MBA course in the U.S. (77% male, mean age 35). Of these managers, 66% were European Americans, 19% East or South Asians, and the rest were of other cultural backgrounds (e.g., African American, European, Middle Eastern, etc). All had substantial careers as professionals, most as managers in private sector companies, with high-tech firms most commonly represented.

As part of their course requirement, participants completed a social network survey that allowed them to list up to 24 contacts (alters) they considered important members of their professional networks. Specifically, we asked participants to "list anyone that you feel is a significant part of your professional network. One way to identify these people is to go through your address book, and ask 'is this person significant in my professional network?' If you have more than 24 significant contacts, list the most significant 24." This method of surveying our participants' networks allowed us to identify key network members with whom they were likely to collaborate at work and yet not cue participants about the nature of our hypotheses.

On average, participants listed 22 contacts, resulting in a total of 1219 dyadic

participant-alter observations. For each alter listed, the participants provided details regarding

their relationship (e.g., frequency of interaction and length of relationship). Also, they indicated

whether the basic content of their tie included emotional, economic, task advice, and career

advice exchange, standard categories in the study of professional networks. Our key criterion

variable of sharing new ideas was measured after these relationship questions were completed.

Participants finally indicated whether or not the listed contacts were themselves connected.

Key Measures

      Cultural metacognition. Several weeks prior to the network survey, participants

completed the Ang et al (2007) metacognitive CQ subscale. The four items include: "I am

conscious of the cultural knowledge I use when interacting with people with different cultural

backgrounds," "I am conscious of the cultural knowledge I apply to cross-cultural interactions,"

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

and "I check the accuracy of my cultural knowledge as I interact with people from different

cultures." Cronbach's alpha for this sample is 0.78.

      Inter- versus intra-cultural relationships. We asked participants to indicate the cultural

background of each listed contact. The categories, designed to fit the population, were European

American, African American, and Asian American, as well as European, Asian, Middle Eastern,

Latino, and other. We then matched the cultural background of the participants with each

indicated response to derive a dummy variable, coded "1" if participant and alter's cultural

backgrounds are different, "0" if otherwise.

      Sharing of new ideas. After the questions regarding social networks, participants were

asked a final query that focused on the exchange of *new* ideas and information with each contact.

We measured the likelihood that participants discuss new ideas at work with each alter through

the item: "How likely are you to share new insights or information with this person?" Responses were rated on a 5-point scale: 1 (not at all) to 5 (to a great extent). We used a single-item measure to minimize tedium in completing the survey because participants had to answer the same question for every contact they listed. Single-item measures are commonly used in network research for this reason (Marsden, 1990; Umphress, Labianca, Brass, Kass, & Scholten, 2003; Ferrin, Dirks, & Shah, 2006). Prior research suggests that single-item measures are acceptable when it is impractical to use multi-item scales due to situational constraints (Wanous, Reichers, & Hudy, 1997).

We queried participants' *prospective* willingness to share new ideas, as opposed to their *retrospective* recall of sharing new ideas. This approach avoids some problems related to memory biases. Research on memory for relationships suggests that people can accurately recall tendencies (e.g., how often on average one talks to someone per week) but not specific interactions (Stafford, Burggraf, & Sharkey, 1987). In particular, the sharing of an idea that was new at the time might not be remembered as so upon retrospection, when the idea has become so familiar it seems obvious. Our approach of measuring idea sharing as a prospective intention skirts these problems.

Trust. We adapted measures of affect- and cognition-based trust from high factor-loading items (above 0.80) in McAllister's (1995) study. For affect-based trust, participants indicated on a 5-point scale (1=not at all, 5=to a great extent) the extent to which they felt comfortable going to each listed alter to share (a) their personal problems and difficulties and (b) their hopes and dreams. These items capture the extent to which participants are willing to make themselves vulnerable to their network alters by disclosing personal information. For cognition-based trust, participants indicated on the same five-point scale the extent to which they could *rely* on each

20

listed alter to (a) complete a task that alter has agreed to do and (b) have the knowledge and competence for getting tasks done. The correlation for the two affect-based trust items is 0.81, whereas that for the two cognition-based trust items is 0.65.

Exploratory factor analyses showed that these four trust items loaded onto two separate factors in the expected fashion. The factor loadings for the two affect-based trust items were above 0.82 whereas those for the two cognition-based trust items were 0.70. Prior research has also used these four items to measure affect- and cognition-based trust in similar network studies (e.g., Chua, Ingram, & Morris, 2008).

Control Variables

Participants' tendency to share new ideas with alters may be influenced by the extent of exposure to people of different cultures. To control for cultural diversity in professional networks, we measured the degree of cultural diversity in participants' networks using Blau's (1977) heterogeneity index. A high score on this index indicates variability in the cultural backgrounds among network members. We also controlled for other attributes that could influence the development of interpersonal trust and hence the sharing of new ideas. Specifically, we controlled for the size of participants' network (number of alters) because prior research suggests that people have limited capacity in maintaining relationships (Granovetter, 1973).

We also controlled for the degree to which alters are embedded (how connected a given alter is to the other alters in the participant's network) and the content of the relationship between participant and alter (e.g., friendship, economic exchange) because past research found that these factors differentially influence cognition and affect-based trust (see Chua, et al (2008) for details). Finally, we controlled for the job function that the participant was in given that different types of jobs may require different levels of creative collaborations. We coded the participant's

job function based on eight categories: (1) finance/accounting, (2) sales/marketing, (3) operations, (4) general management, (5) technical, (6) business development, (7) research & development, and (8) others. Dummy coding for these categories were used and entered as controls in the regression analyses.

Analyses and Results

Data non-independence is an issue with our dataset given that up to 24 dyadic relationships are nest within a single respondent. As in Study 1, we used random-effects models for our analyses. Although our analysis focus was on the dyadic relationships, the random-effects model allows for estimation and control of important participant-level variables such network size and the degree of cultural diversity in participants' networks.

Table 3 shows the descriptive statistics and correlations among key variables. Table 4 reports the results from hierarchical linear model analyses of participants' networks. Model 1 contains the control variables and the key predictors. Model 2 adds the interaction effect between participant-alter cultural difference and cultural metacognition. We found a significant interaction effect ($b = 0.21$, $p < 0.01$) such that participants' cultural metacognition predicts new idea sharing with alters of different cultural background ($b = 0.21$, $p = 0.05$) but not with alters of the same cultural background ($b = -0.07$, n.s.). This interaction is illustrated in Figure 2a.

Models 3 and 4 show results for affect-based trust. We observed the same pattern of results as that for sharing new insights. In model 3, cultural metacognition and participant-alter cultural difference did not have any significant direct effect on affect-based trust. In model 4, the interaction involving these two variables is significant ($b = 0.26$, $p < 0.01$) such that a participant's cultural metacognition predicts his or her affect-based trust in alters of different cultural background ($b = 0.29$, $p < 0.05$) but not in alters of the same cultural background ($b = $

22

0.00, n.s.). As may be seen in Figure 2b, this interaction effect has the same form as that for new idea sharing. There is a deficit in affect-based trust for low metacognitive CQ managers in their intercultural ties compared to intracultural ties, or compared to high metacognitive CQ managers in either type of ties. Models 5 and 6 show results for cognition-based trust. The key predictors and their interaction exert no significant effect on this type of trust.

Next, we examined both types of trust as mediators. Because the effect of cultural metacognition on new insight sharing occurs only when alters are culturally different from the participant, we focused on this subset of alters. Bootstrapping mediation analyses with 5000 iterations showed that the indirect effect through affect-based trust as mediator is significant (95% CI = 0.01 to 0.17), but that for cognition-based trust is not (95% CI = -0.10 to 0.01). These results (details in Figure 3) suggest that with low cultural metacognition, managers' reduced likelihood to share new ideas is mediated by affect-based trust but not cognition-based trust.

Discussion

Study 2 demonstrated that managers with lower cultural metacognition are less likely to have developed affect-based trust in their intercultural relationships and are thereby less likely to share new ideas in these relationships. A strength of the network survey method in Study 2 is specifying the scope of the effect: results showed that the deficits in trust and creativity-related communications associated with lower cultural metacognition appear solely in *inter*cultural relationships, not in *intra*cultural relationships. This finding provides assurance that the individual difference measure is not simply a proxy for openness or creativity, but truly an individual difference specifically relevant to culture.

Although the egocentric network survey in Study 2 allows assessment of the mediating and dependent variables with respect to all of the important relationships in a manager's

professional life, it has the limitation of relying on the respondent's self-report. Relatedly, all the responses in Study 2 were collected from the same source (i.e., the respondent). Although the key predictor of cultural metacognition was administered separately from the rest of the survey at a different point in time, ameliorating some concerns associated with common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), it would be valuable to replicate the key effects with independent and dependent variables collected from separate sources and at different points in time. In the next study, we do so.

Study 3

Our prior studies have surveyed executives and their associates about the important professional relationships in their career. The evidence these studies have provided for the link between cultural metacognition and creative collaboration is high in external validity; however, the purely associational nature of survey methods means that the evidence is lower in internal validity. To know whether cultural metacognition causes affect-based trust and creative collaboration, rather than the causality flowing in the opposite direction, it is necessary to investigate the development of trust in an interaction between people who do not already have a close working relationship.

An pilot study examined whether the relationships among cultural metacognition, trust, and creative collaboration hold in dyads assembled for a task who have no prior working relationship. 76 MBA students (58% male, mean age 28.6) were assigned into dyads for an in-class negotiation exercise. These 38 dyads were constructed such that each consists of two students with different cultural background. These students did not know each other well prior to this exercise – a pre-negotiation survey found that students reported a low interaction frequency

with their assigned partner both socially (average = 1.67) and professionally (average = 1.37) on a 7-point frequency scale (1=never, 4=two to three times a month, 7=daily). Following a 5 minutes ice-breaker where students talked about their experiences at the university, they were given 20 minutes to complete the negotiation. Students then completed a post-negotiation survey which, among other things, tapped their degree of trust and assessment on whether their partner would be a good partner for future creative collaboration, our criterion variable. The key measures in this pilot study are (a) *cultural metacognition* – measured using the same 6-item scale as in Study 1; Cronbach's alpha for this scale is 0.88 for the current sample, (b) *intercultural trust* – measured with the question "Did the negotiation make you trust your counterpart? (1=not at all, 4=to some extent, 7=to a great extent)," and (c) *intercultural creative collaboration* – measured with the question: "Based on your interaction with your counterpart in this negotiation exercise, to what extent is he or she a good partner to work with on future projects that require considerable innovation and creativity? (1=not at all, 4=to some extent, 7=to a great extent)"

We analyzed our data at the dyadic level, computing dyad-level cultural metacognition, trust, and creative collaboration by taking the average of the two partners' ratings on these variables. We found that dyad-level cultural metacognition positively predicts creative collaboration (b = 0.52, $p < 0.05$). When trust was included in our analyses, this effect disappeared (b = 0.31, p = 0.14), suggesting a mediation effect. Using 5000 bootstrap re-samples with a 95% confidence interval in our analyses, we found a significant mediation effect – bias corrected confidence interval for the indirect effect does not include zero (95% CI = 0.07 to 0.50). Average cultural metacognition had a positive effect on trust ($b = 0.68$, t = 2.19, $p < 0.05$) which in turn had a positive effect on creative collaboration ($b = 0.30$, t = 2.90, $p < 0.01$).

We further analyzed the dyad composition to better understand if it was the higher or lower of the dyads' cultural metacognition that drove this pattern of result. Thus, instead of using the average level of the partners' cultural metacognition ratings, we created two variables to denote the higher and the lower value of this variable in each dyad. We found that it was the person with the higher cultural metacognition in the dyad that is driving the effect. Mediation analyses indicated a significant mediation effect – bias corrected confidence interval for the indirect effect does not include zero (95% CI = 0.07 to 0.50).

The pilot experiment adds to the prior evidence by measuring the development of trust. Importantly, it shows that a dyad needs at least one person high in cultural metacognition to bridge the gap in intercultural collaboration. This pilot experiment, however, did not have any concrete measure of creative collaboration, relying on self report of whether the other would be a good partner for future creative collaboration. Additionally, there was no manipulation of trust that would allow us to ascertain the causal mechanism. We next conducted a laboratory experiment to address these concerns. We used third party expert assessments to gauge creativity of products jointly created by dyads comprising individuals from different cultures. We also manipulated the development of affect-based trust, our mediator, to more incisively demonstrate the effect of this variable.

Participants and Procedures

We recruited 236 students (45% male, mean age 21.3) from a large east coast university to complete a series of tasks. Upon arriving at our laboratory, participants independently completed a battery of individual differences questionnaires, including a measure of cultural metacognition. This was followed by a filler survey for an unrelated study and an individual task.

In this task, participants were given a list of ingredients from different cultures (e.g., American, Chinese, Indian, Thai, etc) and asked to generate a recipe for a new chicken dish for a soon-to-open restaurant. A similar task was used in the Cheng, Sanchez-Burks, and Lee (2008) paper.

Next, participants were randomly assigned into different-culture dyads based on their self-report cultural backgrounds (including European-Americans, African-Americans, Asian-Americans, and international students from various countries). We checked with the participants in each dyad to ensure that they had no prior relationships. These dyads were then assigned into one of two experimental conditions (see below) and asked to jointly complete the same task of coming up with a new chicken dish recipe. This joint task represents a scenario that an entrepreneurial team might face and that would reward creative collaboration. The joint recipe had to be different from the individual recipes created earlier. In both individual and joint tasks, we told participants that their recipes had to be creative – defined as "new, delicious, and popular with potential customers." Upon completing the joint task, participants independently completed a post-task survey on their collaboration experience.

Manipulation

About half of the 118 dyads (62) were randomly assigned to an affect-based trust condition, with the remaining assigned to a control condition. In the trust condition, participants in the dyad were given ten minutes to bond with each other in an ice-breaker exercise. This exercise required participants to share with each other important and meaning personal moments that they had experienced at the university. We also asked participants to discuss how these experiences shaped their feelings toward the university community. In the control condition, participants were simply introduced and asked to begin working on the joint task immediately. In essence, we were allowing participants to build affect-based trust prior to the joint task in one

condition but not the other.

Key Measures

Cultural metacognition. As in Study 1, participants rated their own cultural metacognition using the six-item metacognitive CQ scale (Ng, et al, 2010). Cronbach's alpha for this scale is 0.88 for the current sample.

Trust. We measured both cognition- and affect-based trust using three items each (adapted from McAllister, 1995) right before the participants began the joint task. For cognition-based trust (Cronbach's alpha = 0.89), participants rated the extent that they could rely on their assigned partners to (a) complete a task that they had agree to do, (b) have the knowledge and competence for getting tasks done, and (c) approach their work with dedication and professionalism. For affect-based trust (Cronbach's alpha = 0.82), participants rated the extent that they felt comfortable going to their partners to (a) share their personal problems and difficulties, (b) share their hopes and dreams for the future, and (c) obtain constructive and caring feedback about problems they had. We aggregated the two partners' responses to derive dyad level measures for each type of trust.

Creative collaboration. We assessed effectiveness in intercultural creative collaboration with three measures. First, participants rated their counterparts using a 7-point scale the extent that they were good partners for creative work. We used the following three items: (a) "How interested are you in working on another creativity task with your partner if given a chance to do so in the future?" (b) "Overall, how would you rate your partner's creativity?" and (c) "To what extent is he or she a good partner to work with on projects that require considerable innovation and creativity?" Cronbach's alpha for this scale is 0.92. Second, we measured participants' assessment of information and idea exchange during the joint task. The items were: (a) ""How

forthcoming is your partner in sharing his or her ideas with you?" and (b) "How open is your partner in sharing information that he or she knows with you?" Correlation between these two items was 0.86. We aggregated the two partners' responses to derive dyad level measures for each of these criteria variables.

Our third measure involved third party ratings of the joint recipes created by dyads. Two expert judges with culinary experience independently evaluated the recipes on five dimensions (delicious, popular, novel, unique, and creative); judges were told that a "creative" dish is one that is both new and tasty. Overall, this performance measure captured both the usefulness and novelty aspects of creativity. Cronbach's alpha for this scale is 0.95 and inter-rater reliability is 0.64; we thus aggregated the items across the two judges to create a composite score for joint creative performance. We also evaluated the individually created recipes in the same way.

Manipulation Check

Analysis of variance indicated that, controlling for dyad level cognition-based trust, dyad level affect-based trust is higher in the affect-based trust condition than in the control condition (affect-based trust condition: Mean=3.57, SD=0.76; control condition: Mean=2.98, SD=0.90; $F(1, 115)= 12.17$, $p< 0.01$). Cognition-based trust did not differ significantly between these two conditions (affect-based trust condition: Mean=4.95, SD=0.94; control condition: Mean=4.72, SD=0.64; $F(1, 115) = 0.35$, $p = 0.56$).

Preliminary Analyses

We first conducted analysis of variance on individual creative performance as measured by evaluations on the individual task and found no difference across the two conditions ($F(1,231) = 0.85$; $p = 0.36$). This result assures that participants in the two conditions have comparable prior creative ability on the recipe task. Individuals' cultural metacognition did not predict their

creative performance on the individual task ($b = 0.00$, $p > 0.10$). Further analyses found that joint creative performance (but not idea sharing or perceptions of counterparts as effective partners for creative work) was positively associated with the higher of the individual creative performance in a dyad ($b = 0.25$; $p < 0.05$), implying that a dyad's creative performance is in part driven by the more creative partner. Thus, we would further control for the influence of this factor in the subsequent analyses involving dyads' joint creative performance. Whether or not the dyads are of same or different gender did not impact trust or any of the outcome variables.

Analyses and Results

We analyzed our data at the dyadic level. Table 5 presents the correlations and descriptive statistics for the key variables in this study. Table 6 presents multivariate regressions on the three dependent variables. Because results from the pilot experiment suggested that it was the individual with the higher cultural metacognition in a dyad that primarily accounted for our proposed effects, we tested our hypotheses with this variable. For each dyad, we derive a new variable that takes the value of the higher of the two cultural metacognition scores. Model 1 shows that affect-based trust manipulation had no main effect on the dependent variables ($p > 0.10$). Model 2 adds the higher of the two cultural metacognition scores in each dyad. Results indicate that cultural metacognition had a significant main effect on joint creative outcome ($b = 0.14$, $p < 0.05$) but not the other two variables. Model 3 adds the interaction term between cultural metacognition and affect-based trust manipulation, revealing significant interaction effects for all three dependent variables. The pattern of interaction is such that cultural metacognition had positive impact on the creative collaboration variables in the affect-based trust manipulation condition ($p < 0.05$ for all three variables) but not the control condition. The results remained significant for the joint creative performance measure even when the higher individual

creative performance in the dyad was controlled for. We also analyzed the interaction effect between cultural metacognition and affect-trust manipulation on affect-based trust measures, controlling for cognition-based trust. A similar pattern of results emerged – cultural metacognition moderates the effect of trust manipulation such that dyads with one party having high cultural metacognition resulted in higher overall affect-based trust in the intercultural relationship (b = 0.26, p = 0.065). The same set of analyses repeated using the average scores of the two partners' cultural metacognition or the lower of the two cultural metacognition scores did not yield any significant result.

Given that the effects of cultural metacognition on intercultural creative collaboration were restricted to the situation when individuals who had no prior relationships with their counterparts had a chance to build affect-based trust, we next focused our analyses on the dyads in the affect-based trust condition. Multivariate regression indicates that cultural metacognition had positive significant impact on all three outcome variables (p < 0.05). Controlling for cognition-based trust, when affect-based trust was added to the analyses, the effects of cultural metacognition were either reduced or became non-significant. Mediation analyses using the boot-strapping approach with 5000 iterations indicated that affect-based trust partially mediates the effect of cultural metacognition on joint creative performance and perceptions of the other as effective partner for creative work; affect-based trust fully mediates the effect of cultural metacognition on idea sharing. Figure 4 shows details of these mediation analyses. All the indirect effects are significant with the 95% CI excluding zero.

Cognition-based trust was not a viable mediator – when this variable was added in our analyses, all the effects of cultural metacognition on the outcome variables remained intact. Because the higher of the two individual creative performance scores in a dyad was positively

31

associated with the joint creative performance, we further controlled for this additional variable in the analyses of joint creative performance and found that the effects of cultural metacognition remained. None of these above reported effects surfaced when we analyzed only data in the control condition.

Discussion

This study shows that when working with a stranger from a different culture on a task that rewards creative collaboration, high cultural metacognition in one of the two individuals gives the dyad the potential for affect-based trust and creativity. This potential, however, is only realized if the partners have a bonding conversation. This finding is consistent with prior findings in the rapport literature that similarity creates the potential for rapport but it only arises if they have a conversation that reveals things they have common (e.g., Drolet & Morris, 2000). Additionally, this study provided the first empirical evidence that cultural metacognition in intercultural collaboration produces actual creative outcomes.

GENERAL DISCUSSION

Our research demonstrates that individual differences in cultural metacognition play a critical role in intercultural creative collaboration. Four studies collectively provided the first empirical evidence that individuals high in cultural metacognition are more effective in intercultural creative collaboration, in part because they develop higher affect-based trust in intercultural relationships.

Theoretical Implications

This research has several key theoretical implications. First, cultural metacognition appears linked to a certain type of trust development. Affect-based trust, but not cognition-based

trust, is positively associated with cultural metacognition. Why not cognition-based trust, i.e., individuals' expectations of the other's competence and reliability? Most likely, these expectations are less contingent on ones' personal interaction with a given colleague and more on the reputation or objective indicators, such as the other's track record. Put differently, individuals with low cultural metacognition may have just as much cognition-based trust in their intercultural ties as do individuals with high cultural metacognition, but they lack the affect-based trust that arises out of their personal experiences of meshing well through mindful intercultural interactions. Another explanation could be that the driving force that underlies cultural metacognition is related to people's motivation to adapt and modify their cognitive schema during intercultural interaction. This motivation might have an affective root to the extent that people are more motivated to adjust their schemas if they are inclined to build stronger emotional bonds with their partners of different cultures and genuinely want their collaborative relationship to work[1].

Second, we extend existing research on culture and creativity (Leung, et al., 2008; Goncalo, & Staw, 2006). Several areas of psychology and organizational research have linked cultural diversity and creativity. At the individual level, performance on creativity tasks is higher for people with extended life experience in diverse cultures (Leung, Maddux, Galinsky, & Chiu, 2008; Maddux & Galinsky, 2009). At the group level, cultural diversity is associated with increased creative problem solving, provided there is enough time to work through miscommunications and conflicts (Hackman, 1990; Swann, Kwan, Polzer, & Milton, 2003; Giambatista, & Bhappu, 2010). Our research looks at the dyad level to explore creative collaboration between people of different cultures. Our findings join emerging psychological research (Cheng, et al 2008) in emphasizing the role of individual differences in harnessing the

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[1] We thank an anonymous reviewer for this interesting insight.

power of multiculturalism for creativity. Cheng and colleagues found that only bicultural individuals with integrated cultural identities tend to be creative on tasks calling for knowledge that draws on both identities; we show that individuals who are low in cultural metacognition are less likely to share new ideas in cross-cultural relationships and succeed in intercultural creative work. Hence, merely having access to multiple cultural knowledge sources seems insufficient for creativity and its related processes to flourish. Similarly, having multiple cognitive structures does not necessarily mean that one is able to recombine them creatively to suit new cultural challenges. Only individuals with the attributes needed for connecting the multiple knowledge sources or cognitive structures gain an innovation advantage. Our finding therefore extends a growing area of organizational research that suggests that innovation can arise from having diverse social network ties in combination with a communication process that enables ideas to come together (Burt, 2004; Hargadon & Bechky, 2006).

Third, our research expands existing creativity research by focusing squarely on intercultural creative collaboration. Over the past decades, researchers have produced voluminous research on individual and group creativity, documenting effects of various antecedents (e.g., intrinsic motivation and team diversity, etc.) and contextual factors (e.g., leadership style, network structures, and organizational climate, etc.) (George, 2007). Surprisingly little research has been conducted on creativity at the dyadic level. In addition, it is only in recent years that scholars have begun to explore the effects of culture on creativity (Leung, et al., 2008; Maddux & Galinsky, 2009). Given that global problems increasingly call for intercultural collaboration, it is important that researchers explicitly investigate antecedents and barriers to effective intercultural creative work. Our research represents an original effort in this direction.

In a similar vein, we contribute to current understanding of the role of affect in creative performance. Existing research has focused largely on incidental affect. One stream of research found that a positive affective state enhances individual creativity by promoting more flexible and divergent thinking (e.g., Davis, 2009; Amabile, Barsade, Mueller, & Staw, 2005; Isen, Daubman, & Nowicki, 1987). Another stream of work proposed that negative affect can also improve creative problem solving through increased self-reflection or detailed thinking (e.g., Kaufman & Baer, 2002; De Dreu, Baas, & Nijstad, 2008; Akinola & Mendes, 2008). One way to reconcile these findings is that positive affect may help in the idea generation phase whereas negative affect in the idea refinement phase. Rather than incidental affect, our research focuses on affect that is inherent to a relationship as a determinant of creativity. Our dyadic process is analogous to the effect that positive affective state has on idea generation, except it is idea communication within the dyad. It is, however, possible that too much affect-based trust might hinder idea refinement if that were to take place within the dyad, as negotiation research finds that highly intimate relationships can impair constructive conflict (Fry, Firestone, & Williams, 1983). In sum, we believe the present research can stimulate new research questions and hence open up a new line of inquiry on how affect impacts dyadic creativity.

Finally, our research contributes to the growing body of research on cultural intelligence (CQ). Recent research by Imai and Gelfand (2010) found that in the context of intercultural negotiations, only minimum overall CQ and motivational CQ (the motivation and efficacy to engage culturally different others) predicted integrative behaviors, resulting in higher joint gains. Additionally, only behavioral CQ (behavioral flexibility during intercultural interactions), but not other dimensions of CQ, predicted sequences of cooperative strategies. Our research adds to this stream of findings by demonstrating the effects of metacognitive CQ on intercultural creative

collaboration. These findings collectively suggest that different dimensions of CQ seem to have specific distinct effects on interactions between individuals from different cultures. Thus, it is important that research on CQ be clear on what specific dimension of CQ is responsible for its predicted effects.

Our finding that it was the higher cultural metacognition in a dyad that matter more for creative collaboration differs from findings in Imai and Gelfand (2010)'s recent research. These researchers found that it was the weaker link in the dyad (lower motivational CQ) that mattered most. We speculate that solving a negotiation exercise is a well-structured problem that primarily requires a certain level of motivation to persist and to cooperate with someone from another culture. Creative collaboration is much more complex and a less structured problem; collaboration requires that people share new ideas and try out new ways of combining ideas and hence requires trust. As affect-based trust is often lacking in intercultural interactions and relationships, the predictor of intercultural collaboration should be a cultural intelligence strength that enables people to develop affect-based trust with people from other cultures. A person with high metacognitive CQ can mesh conversationally with people from other cultures and thereby bring about affect-based trust and ultimately creative collaboration.

Is it possible that metacognitive CQ, besides enhancing intercultural interactions, can potentially help individuals draw on knowledge from other cultures more effectively and ultimately come up with more novel ideas? In Study 3, we were able to check for the influence of individuals' creativity and found that the effects of metacognitive CQ still hold even when the higher score of the two persons' creativity score was controlled for. Hence, while it is plausible that metacognitive CQ might enable individuals to come up with better ideas during collaboration, this individual level creativity process is unlikely to be the key driver to

36

intercultural creative collaboration which we believe relies much more on the way the individuals interact with each other than the individuals' creativity per se.

Practical Implications

Findings from our research also have practical implications for promoting knowledge sharing and innovation in global teams and organizations. Global teams often face the challenge of getting members from different cultures and countries to work effectively with one another (Hagel III & Brown, 2005). Research on teams and groups has been generally critical of training activities focused on affect and socio-emotional connections rather than on task-specific strategies (Moreland, et al., 1996). However, our findings accord with recent integrative models suggesting that coaching designed to cultivate more emotional and personal connections may be particularly valuable early in a team's work together (Hackman & Wageman, 2005). Establishing affect-based trust increases the likelihood that new ideas will be shared, without which a global team has little chance of leveraging its diversity for innovation.

In addition, the present research highlights the importance of cultural awareness in intercultural interactions. As managers develop their intercultural skills, it is important to note that acquiring knowledge about other cultures, although important, may not be sufficient for effective intercultural work. Managers need to build metacognitive strategies for managing cultural knowledge, knowing how to learn about other cultures in anticipation of intercultural encounters, and checking and updating assumptions during interactions in relation to the cultural environment (Ang, et al., 2007; Shapiro, et al., 2008). Some ways to develop cultural metacognition include tactics such as deep reflection and development of generalizable lessons based on past intercultural experiences (Earley & Peterson, 2004; Ng, Van Dyne, & Ang, 2009).

For instance, Ng and colleagues (2009) recommended that managers should actively reflect on their intercultural experiences and systematically document their insights and lessons learned in a journal. Keeping a journal would help managers identify strengths and weaknesses in their past intercultural experiences, consider what they could have done differently and what they can do differently the next time, and hence cultivate the habit of cultural metacognition.

Limitations and Future Research

As with all research, there are limitations to the present studies. A key concern is that cultural metacognition was measured solely based on self-report. Given that individuals who are unskilled on a given dimension often lack awareness of this (Kruger & Dunning, 1999), an externally assessed measure of cultural metacognition would strengthen our studies. To our knowledge, no such assessment exists yet but some CQ researchers are in the midst of developing ways to assess cultural metacognition as well as other dimensions of CQ using more objective tests. It would be interesting to see if these new forms of cultural metacognition assessment would yield similar results in future research.

Another limitation is that while we measured a specific behavioral aspect of creative collaboration, i.e., new idea sharing, there are likely to be other psychological and behavioral processes that might also be important. Thus, another direction for future research is to examine the specific cognitive processes and behaviors of individuals with high versus low cultural metacognition during the intercultural creative collaboration process. Do people with high cultural metacognition think and conduct conversations differently than those with low cultural metacognition? One approach would be to videotape the intercultural meetings and systematically code the various types of verbal and nonverbal behaviors. Individuals with high

cultural metacognition may hedge their statements more and ask clarifying questions rather than making presumptuous statements. Another could be to use fMRI scans to distinguish brain regions that are activated when individuals with high cultural metacognition interact with someone of another culture. We expect activation in areas involved in checking for conflicts and less activation in areas associated with stereotype use (Kerns et al, 2004; Lieberman, 2003).

Finally, it is important to investigate what engenders cultural metacognition. To what extent is cultural metacognition a relatively stable trait? Can it be enhanced via specific interventions? Klafehn and colleagues (2008) suggested that the development of cultural metacognition could very well involve both stable individual differences such as personality and environmental exposure. Multicultural experiences such as living abroad can provide individuals with opportunities to interact with people from other cultures, helping them to develop their awareness and sensitivity toward cultures different from theirs. However, not everyone can harness these opportunities to the fullest extent. Individuals low in the personality trait of openness to new experiences, for example, might resort to cultural stereotypes to manage the uncertainties associated with interacting across cultures, preventing them from forming nuanced cognitive strategies for cross-cultural interactions. Although the argument that one's level of cultural metacognition depends on the interaction between personality traits and prior cultural experiences seems plausible, it has not been empirically tested. Future research that tests this hypothesis would make a valuable contribution to the literature and help shed light on the nature of cultural metacognition.

CONCLUSION

The current research has clear theoretical and practical implications for understanding and promoting creativity, innovation, and problem solving in multicultural global contexts.

Managers seeking creative collaborations from their relationships with people of different cultures should be advised to cultivate cultural metacognition. Such cultural metacognition guides individuals to better navigate intercultural interactions and serves to foster affect-based trust between people of different cultures, in turn smoothing the creativity process. To date, there has been little research that directly examines how creative work between people of different cultures can be enhanced. We believe our research serves as an important step toward stimulating investigations in this area.

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TABLE 1: DESCRIPTIVE STATISTICS AND CORRELATIONS (STUDY 1)

Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7	8
1. Intercultural creative behavior	5.74	1.02	1	7	1.00							
2. Cultural metacognition	4.92	0.99	2.5	6.5	0.09	1.00						
3. Number of language	2.02	1.08	1	7	-0.11	0.25*	1.00					
4. Number of countries lived	1.85	0.88	1	6	-0.01	0.22*	0.61*	1.00				
5. Number of countries visited	2.69	2.14	0	10	-0.03	0.27*	-0.08	0.01	1.00			
6. Past experience interacting with people of different cultures	4.05	0.83	2	5	-0.04	0.33*	0.32*	0.24	0.13	1.00		
7. Past experience interacting with people of different countries	3.92	0.83	2	5	-0.10	0.34*	0.20*	0.26*	0.25*	0.81*	1.00	
8. Affect-based trust	6.07	1.27	1	7	0.77*	0.09	-0.08	0.02	-0.02	-0.01	0.09	1.00

*$p<0.05$

TABLE 2: STUDY 1—HIERARCHICAL LINEAR MODEL REGRESSION
ON OBSERVER-REPORTED INTERCULTURAL CREATIVE BEHAVIOR

	Model 1	Model 2	Model 3
Key Predictors			
Cultural metacognition (self-reported)	-	0.19* (0.10)	0.06 (0.05)
Affect-based trust (observer-reported)	-	-	0.57** (0.04)
Control Variables			
Number of languages known	-0.15 (0.11)	-0.18+ (0.11)	-0.06 (0.06)
Number of countries lived in (at least 6 months)	0.11 (0.13)	0.11 (0.12)	0.01 (0.07)
Number of countries visited last year	-0.01 (0.05)	-0.03 (0.05)	-0.02 (0.02)
Past experience interacting with people of different cultures	0.20 (0.20)	0.17 (0.19)	-0.02 (0.11)
Past experience interacting with people of different countries	-0.29 (0.21)	-0.33 (0.19)	-0.03 (0.11)
Intercept	6.16** (0.48)	5.56** (0.54)	2.28** (0.37)
Number of dyadic observations	188	188	188
Overall R-square	0.04	0.06	0.58
Chi-square change [a]	4.08	4.47	241.14**

[a] Chi-square change for model 1 is with respect to a constant-only model. Chi-square changes for models 2 and 3 are with respect to the previous model.

Notes:

1. *Numbers in parenthesis are standard errors*

3. *$** p < 0.01$ $* p < 0.05$ $+ p < 0.10$*

TABLE 3: DESCRIPTIVE STATISTICS AND CORRELATIONS (STUDY 2)

Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9
1. Share insight	3.72	1.18	1	5	1.00								
2. Affect-based trust	3.18	1.34	1	5	0.58*	1.00							
3. Cognition-based trust	4.13	0.95	1	5	0.38*	0.41*	1.00						
4. Cultural metacognition	5.13	0.99	1.75	6.75	-0.03	-0.02	-0.06	1.00					
5. Participant-Alter different culture	0.39	0.49	0	1	0.01	-0.03	0.01	0.05	1.00				
6. Alter's embeddedness	0.29	0.25	0	1	0.13*	0.03	-0.03	-0.03	0.01	1.00			
7. Economic resource tie	0.23	0.42	0	1	0.04	-0.04	0.01	-0.03	-0.02	0.02	1.00		
8. Career-guidance tie	0.59	0.49	0	1	0.19*	0.17*	0.18*	-0.07*	-0.02	0.00	-0.02	1.00	
9. Task-advice tie	0.62	0.48	0	1	0.24*	0.11	0.15*	-0.06*	0.06*	0.08*	0.00	0.15*	1.00
10. Friendship tie	0.68	0.47	0	1	0.29*	0.46*	0.17*	0.02	0.03	-0.07*	-0.16*	0.11*	0.08*
11. Interaction frequency	2.37	1.00	1	4	0.25*	0.09*	0.08*	0.02	0.02	0.18*	0.12*	-0.11*	0.27*
12. Relationship duration	7.35	7.46	1	48	0.18*	0.34*	0.07*	-0.01	-0.10*	0.00	0.02	0.08*	-0.05
13. Cultural diversity in network	0.36	0.19	0	0.78	-0.03	-0.08*	-0.06*	0.13*	0.19*	-0.02	-0.01	0.03	0.03
14. Network size	21.79	4.10	4	24	0.15*	0.10*	0.14*	-0.06*	0.02	-0.04	0.01	0.04	0.12*
15. Alter is higher rank	0.42	0.49	0	1	-0.03	-0.11*	0.02	-0.06*	0.00	-0.03	0.15*	0.26*	0.05
16. Alter is lower rank	0.19	0.39	0	1	-0.01	0.02	-0.07	0.01	0.03	0.04	-0.10*	-0.28*	-0.03

	10	11	12	13	14	15	16
10. Friendship tie	1.00						
11. Interaction frequency	0.06*	1.00					
12. Relationship duration	0.24*	-0.05*	1.00				
13. Cultural diversity in network	-0.02	-0.03	0.04	1.00			
14. Network size	0.06*	-0.05	0.05	-0.18*	1.00		
15. Alter is higher rank	-0.20*	-0.14*	0.00	0.04	0.00	1.00	
16. Alter is lower rank	0.02	0.19*	-0.02	-0.03	-0.05	-0.40*	1.00

*p<0.05

TABLE 4: STUDY 2—HIERARCHICAL LINEAR MODEL REGRESSION

| | Dependent Variable | | Mediators | | | |
| | Likelihood to Share New Insights | | Affect-based Trust | | Cognition-based Trust | |
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Key Predictors						
Participant's Cultural metacognition	0.05 (0.11)	-0.03 (0.11)	0.06 (0.09)	-0.03 (0.10)	0.00 (0.08)	0.02 (0.08)
Alter is of different culture than Participant	- 0.07 (0.07)	- 0.10 (0.07)	-0.05 (0.07)	-0.09 (0.07)	0.01 (0.05)	0.01 (0.05)
Participant's cultural metacognition X Participant-Alter of different culture interaction	-	0.21** (0.07)	-	0.26** (0.07)	-	-0.05 (0.06)
Control Variables						
Cognition-based trust	-	-	0.35** (0.04)	0.34** (0.04)	-	-
Affect-based trust	-	-	-	-	0.20** (0.02)	0.21** (0.02)
<u>Structural Attributes</u>						
Network size	0.06** (0.02)	0.06** (0.02)	0.01 (0.02)	0.01 (0.02)	0.04** (0.01)	0.04** (0.01)
Cultural diversity in network	0.25 (0.46)	0.29 (0.47)	-0.45 (0.42)	-0.47 (0.42)	0.08 (0.35)	0.08 (0.35)
Alter's embeddedness	0.08 (0.16)	0.08 (0.16)	0.04 (0.16)	0.04 (0.16)	-0.15 (0.13)	-0.15 (0.13)
<u>Relational Attributes</u>						
Economic-resource tie	0.07 (0.07)	0.08 (0.07)	0.01 (0.07)	0.01 (0.07)	0.08 (0.06)	0.08 (0.06)
Career-guidance tie	0.33** (0.06)	0.33** (0.06)	0.22** (0.06)	0.21** (0.06)	0.13** (0.05)	0.13** (0.05)
Task-advice tie	0.35** (0.06)	0.35** (0.06)	0.17** (0.06)	0.16** (0.06)	0.17** (0.05)	0.17** (0.05)
Friendship tie	0.67** (0.07)	0.67** (0.07)	1.00** (0.07)	1.00** (0.07)	0.07 (0.06)	0.07 (0.06)

	Dependent Variable		Mediators			
	Likelihood to Share New Insights		Affect-based Trust		Cognition-based Trust	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Interaction frequency	0.30**	0.30**	0.13**	0.13**	0.09**	0.09**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
Relationship duration	0.02**	0.02**	0.04**	0.04**	-0.01*	-0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Alter is of higher rank	-0.03	-0.03	-0.20**	-0.19**	0.13**	0.13**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)
Alter is of lower rank	-0.06	-0.05	0.04	0.04	0.06	0.05
	(0.08)	(0.08)	(0.08)	(0.08)	(0.06)	(0.06)
Intercept	1.01	1.03	0.02	0.04	2.56	2.55
	(0.81)	(0.82)	(0.72)	(0.72)	(0.59)	(0.59)
Number of dyadic observations	1170	1170	1127	1127	1127	1127
Overall R-square	0.274	0.281	0.419	0.426	0.233	0.236
Chi-square change [a]	437.21**	11.97**	774.67**	19.62**	236.29**	0.35

[a] Chi-square change for models 1, 3, and 5 are with respect to a constant-only model. Chi-square change

for models 2, 4, and 6 are with respect to the previous model.

Notes:

1. *Above analyses also control for participant's job function. These variables are not presented due to space constraints (seven dummy indicators were used to denote 8 job function categories).*

2. *The cultural metacognition variable is mean-centered*

3. *Numbers in brackets are standard errors.*

3. *$** p <0.01$ $* p<0.05$*

TABLE 5: DESCRIPTIVE STATISTICS AND CORRELATIONS (STUDY 3)

Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7
1. Affect-based trust (dyad average)	3.29	0.88	1.33	6.00	1.00						
2. Cognition-based trust (dyad average)	4.83	0.80	2.33	7.00	0.57*	1.00					
3. Cultural metacognition (higher in dyad)	5.61	0.93	2.17	7.00	0.17+	0.07	1.00				
4. Perception of partner for creative collaboration	5.05	0.87	2.83	6.83	0.35*	0.29*	0.17+	1.00			
5. Idea and information sharing in dyad	5.43	0.71	3.50	7.00	0.31*	0.18*	0.10	0.66*	1.00		
6. Joint creativity performance	4.09	0.67	1.90	6.40	0.21	-0.06	0.17+	0.22*	0.29*	1.00	
7. Individual creativity performance (higher in dyad)	4.42	0.60	3.05	6.50	-0.12	-0.04	0.00	-0.09	0.00	0.23*	1.00

N=118 dyads; + p<0.10; *p<0.05;

TABLE 6: STUDY 3—MULTIVARIATE REGRESSIONS (N=118 DYADS)

Dependent Variables	Independent Variables	Model 1	Model 2	Model 3
Joint creativity performance	Intercept	4.04** (0.09)	3.22** (0.40)	2.10** (0.56)
	Affect-based trust manipulation	0.11 (0.12)	0.16 (0.12)	2.09** (0.75)
	Cultural metacognition (higher in dyad)	-	0.14* (0.07)	-0.01 (0.09)
	Interaction: cultural metacognition x affect-based trust manipulation	-	-	0.34** (0.13)
	R-Square	0.01	0.04	0.10
Perception of other as effective partners for creative work	Intercept	5.12** (0.11)	4.25** (0.51)	2.99** (0.76)
	Affect-based trust manipulation	-0.16 (0.16)	-0.11 (0.16)	2.06* (0.99)
	Cultural metacognition (higher in dyad)	-	0.15 (0.09)	-0.02 (0.11)
	Interaction: cultural metacognition x affect-based trust manipulation	-	-	0.39* (0.17)
	R-Squared	0.01	0.03	0.08
Idea and information sharing in dyad	Intercept	5.50** (0.09)	5.13** (0.43)	4.07** (0.63)
	Affect-based trust manipulation	-0.15 (0.13)	-0.13 (0.13)	1.71* (0.82)
	Cultural metacognition (higher in dyad)	-	0.06 (0.07)	-0.08 (0.10)
	Interaction: cultural metacognition x affect-based trust manipulation	-	-	0.33* (0.14)
	R-Squared	0.01	0.02	0.06

*$p < 0.05$; ** $p < 0.01$*

Coefficients are unstandardized. Numbers in parenthesis are standard errors

FIGURE 1: MEDIATION ANALYSES (STUDY 1)

Affect-based Trust as Mediator

Full Mediation (marginally significant)

Indirect Effect: bias corrected 90% confidence interval = 0.02 to 0.28

Indirect Effect: bias corrected 95% confidence interval = - 0.07 to 0.30

FIGURE 2A:

INTERACTION EFFECT BETWEEN CULTURAL METACOGNITION AND
PARTICIPANT-ALTER CULTURAL DIFFERENCE ON PARTICIPANT'S TENDENCY TO
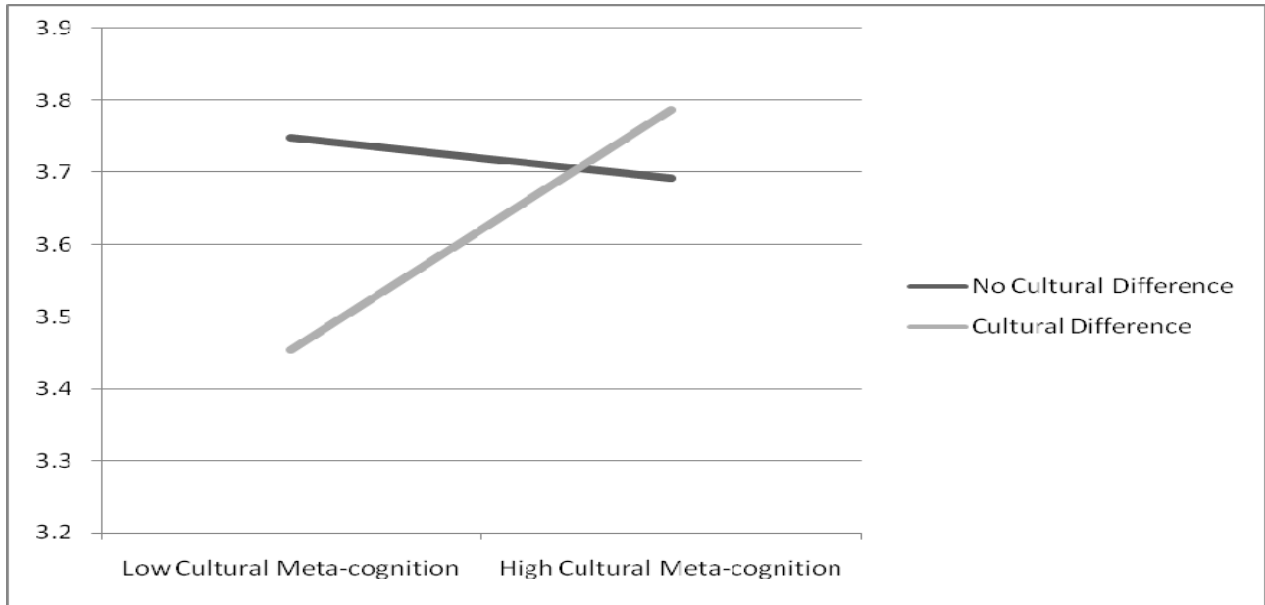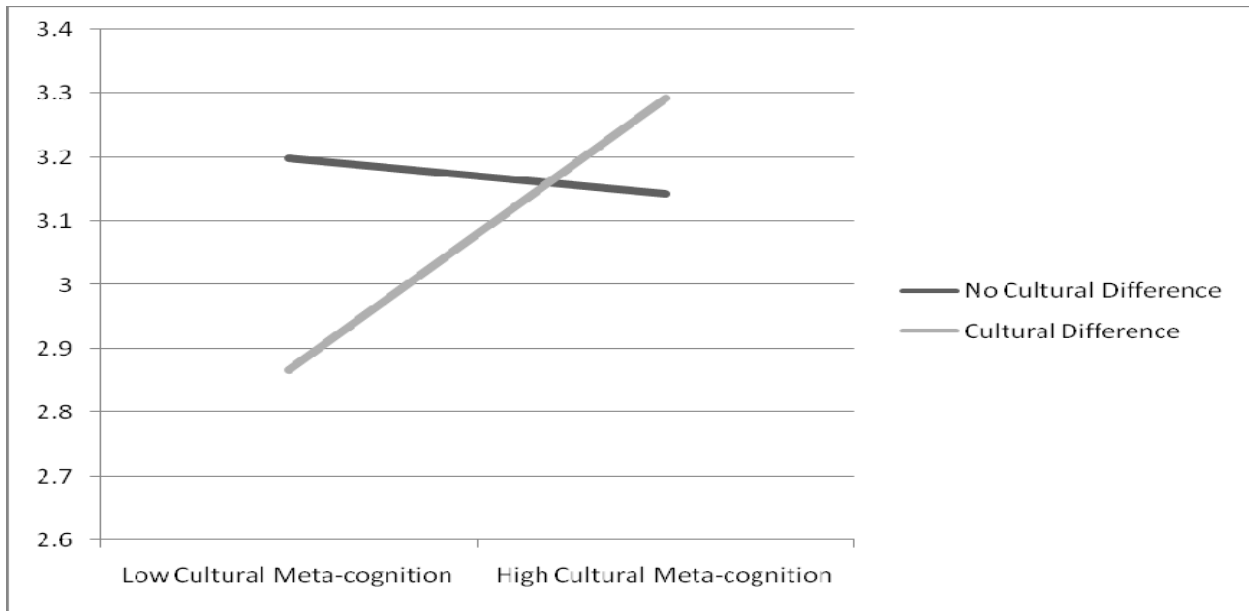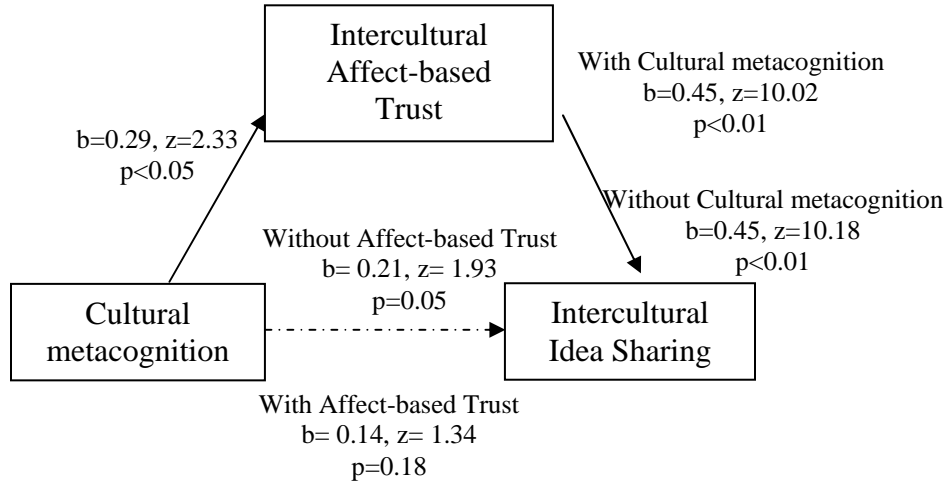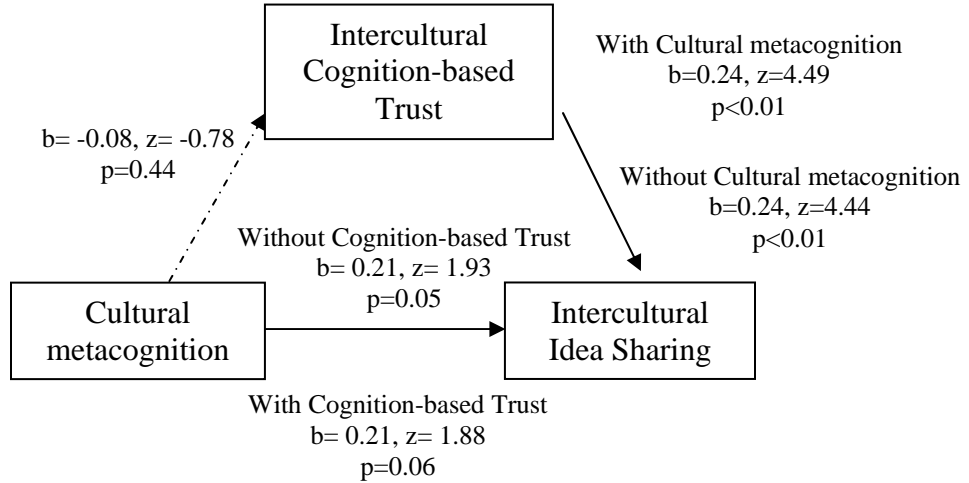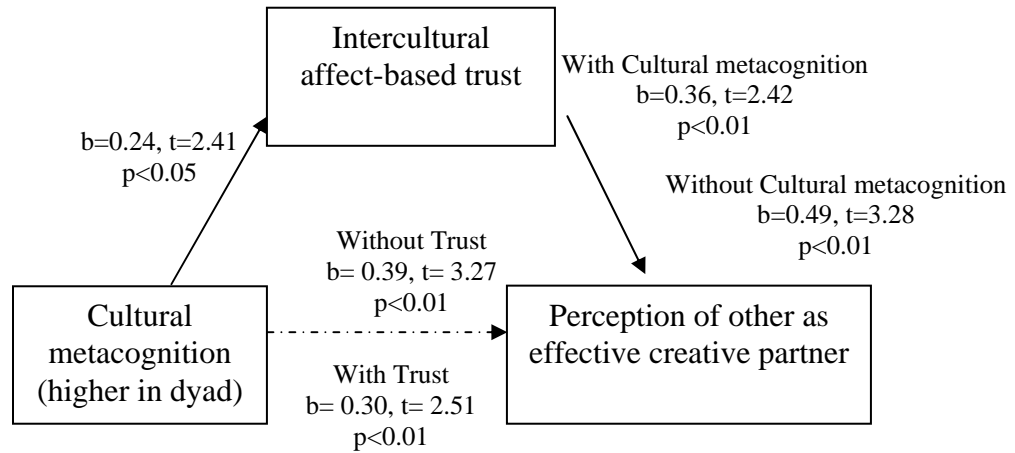SHARE NEW INSIGHTS AND INFORMATION WITH ALTER (STUDY 2)

FIGURE 2B:

INTERACTION EFFECT BETWEEN CULTURAL METACOGNITION AND
PARTICIPANT-ALTER CULTURAL DIFFERENCE ON PARTICIPANT'S AFFECT-BASED
TRUST IN ALTER (STUDY 2)

FIGURE 3: MEDIATION ANALYSES (STUDY 2)

Affect-based Trust as Mediator

Full Mediation [Indirect Effect: bias corrected 95% confidence interval = 0.01 to 0.17]

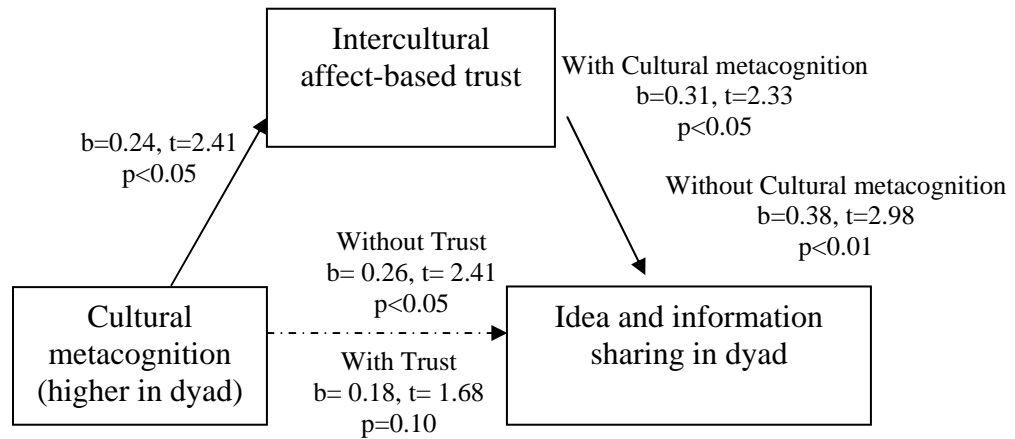## Cognition-based Trust as Mediator

Indirect Effect: bias corrected 95% confidence interval = - 0.10 to 0.01
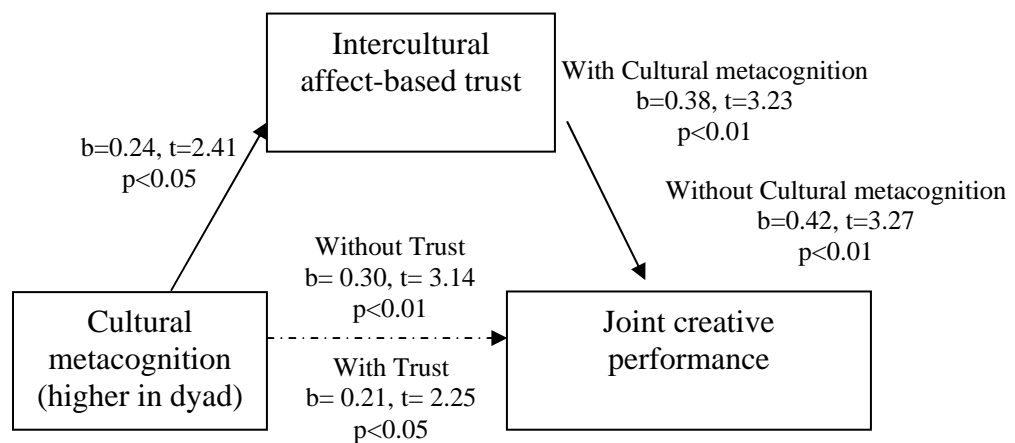
FIGURE 4: MEDIATION ANALYSES (STUDY 3)

Partial mediation [Indirect Effect: bias corrected 95% confidence interval = 0.01 to 0.23]

Full mediation [Indirect Effect: bias corrected 95% confidence interval = 0.01 to 0.20]

Partial mediation [Indirect Effect: bias corrected 95% confidence interval = 0.02 to 0.24]