# Fusing Creativity: Cultural Metacognition and Teamwork in Multicultural Teams

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## Abstract

This study elaborates theoretically and tests empirically a model linking fusion teamwork to creativity in multicultural teams (Janssens & Brett, 2006). The study also introduces cultural metacognition, a dimension of cultural intelligence (Earley & Ang, 2003), as an antecedent of fusion teamwork and creativity. Data were from 246 members of 37 multicultural teams. Results generated from a multilevel modeling analysis were consistent with hypotheses: Across teams, when team members were more highly culturally metacognitive, fusion teamwork and creativity were more likely. All analyses were controlled for generalized affect toward the team to reduce threats to validity of common method bias and affect. The results suggest the value of fusion teamwork for generating creativity in multicultural teams and the importance of having members of multicultural teams who have high versus low levels of cultural metacognition.

## Introduction

Although multicultural teams are acknowledged to be creative (Stahl, Maznevski, Voight, & Jonsen, 2010) and the financial benefits of creative organizations are widely recognized (Breitzman, 2001), we know little about what behaviors and processes within a multicultural team produce creativity. This study addresses that challenge, examining whether a particular form of teamwork process, called fusion (Janssens & Brett, 2006), is capable of utilizing the inherent creative capacity of multicultural teams.

Despite the pragmatic appeal of a direct focus on teamwork—the processes by which a team transforms its resources (inputs) into its products (outcomes)—the existing research on multicultural teams tends to focus on relationships between diversity of


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inputs and outcomes and infer what is going on in terms of teamwork. For example, some research examines how varying levels of cultural diversity within teams impact performance (e.g., Earley & Mosakowski, 2000; Gibson & Gibbs, 2006; Gibson & Vermuelen, 2003). Other research compares performance of culturally homogenous and culturally heterogeneous teams (e.g., Elron, 1997; Watson, Kumar, & Michaelsen, 1993). Hackman and Morris (1975) long ago identified the general dearth of process-oriented studies of research in teamwork, yet subsequent research has paid little attention to teamwork process. Most recently, Stahl et al. (2010) concluded after a meta-analysis of 108 multicultural teams that, ''with one exception (team tenure), all moderators examined in this study were structural rather than process oriented: consequently, they capture only static aspects of teams (705).'' In contrast, this study focuses on the process of fusion teamwork (Janssens & Brett, 2006) and develops and tests an input–process–outcome model linking team members' cultural metacognition to fusion teamwork to team creativity outcomes. We propose that fusion teamwork has the potential to facilitate creativity in multicultural teams and that multicultural teams are more likely to develop fusion teamwork when team members have high versus low levels of cultural metacognition.

In introducing the concept of fusion teamwork, Janssens and Brett (2006) described it as teamwork that recognizes and respects cultural differences among team members in their approaches to working on teams. Fusion teamwork, like fusion cuisine, they argued, should be able to facilitate the production of creative outcomes by encouraging team members to combine cultural differences in unique ways that reflect their underlying cultural values and perspectives. In this article, we elaborate Janssens and Brett's (2006) theoretical conceptualization of fusion teamwork, describe how it is different from other conceptualizations of teamwork, and propose a theoretical model that links cultural metacognition—cultural consciousness and awareness during social interaction (Earley & Ang, 2003)—to fusion teamwork and team creativity. We test our hypotheses with a multilevel model using data from 246 members of 37 multicultural teams sampled from 11 global companies.

This study makes several contributions to multicultural teams' literature. First of all, this work focuses on fusion teamwork as a process facilitating creativity in multicultural teams. In addition, the model identifies an antecedent of fusion teamwork in the individual difference measure of cultural metacognition. Further, we propose a cross-level contextual effect—level of cultural metacognition in the team. Finally, the model predicts that the relationship between team members' cultural metacognition and fusion teamwork will be stronger when the overall team experiences a higher level of cultural metacognition.

The next sections of the article develop theory and hypotheses based on a review of the literatures on creativity and on teamwork. We conclude from this review that the diversity of ideas and approaches that should be available owing to the team being multicultural should increase creativity, if the teamwork process is one in that respects cultural differences in teamwork and encourages team members to provides a context in which multicultural members are comfortable to share their ideas. This proposition, backed by a variety of research, provides critical insight into understanding how fusion

teamwork should operate to facilitate creativity in multicultural teams and why other models of multicultural teamwork, like dominance by a subgroup, may not.

## Theory and Hypotheses

### Culture and Creative Teamwork in Multicultural Teams

Teams are creative when teamwork promotes divergent thinking and sharing unique information (Nemeth & Kwan, 1985, 1987; Nemeth, Personnaz, Personnaz, & Goncalo, 2004; Nemeth & Wachtler, 1983). The inherent diversity within multicultural teams should provide them with the raw material for creativity. Culture affects how members understand and conceptualize teams, including their roles, scope of responsibilities, and objectives (Gibson & Zellmer-Bruhn, 2001, 2002). For example, team members from different cultures are quite likely to have different normative ways to make decisions, manage conflict, and even what constitutes a work day (Behfar, Kern, & Brett, 2006; Gibson & Zellmer-Bruhn, 2001, 2002). Culture, after all, is a functional solution to problems of social interaction (Smith, Dugan, & Trompenaars, 1996), and not all cultural solutions to the same problem of social interaction are identical.

### Fusion Teamwork and Creativity in Multicultural Teams

Multicultural teams should have the raw material to be creative, but to use that raw material effectively they need a teamwork process that supports the preservation of cultural differences. Janssens and Brett (2006) suggested that fusion is such a teamwork model. They reasoned that fusion teamwork would enhance creativity because it consists of two interrelated processes, co-existence and meaningful participation, which respect cultural diversity, encourage divergent thinking, and promote team members' participation.

The conceptual origin of co-existence is in social and political theorizing about pluralistic societies (Benhabib, 1996; Giddens, 1999). Coordinative theorists argue that social and ethnic groups need to work together to make their different viewpoints compatible (de Ruijter, 1995, 2002). The fusion concept of co-existence is a team-level reflection of the coordinative theorists' societal-level argument. The concept of co-existence is that team members' different approaches to teamwork and different ways of thinking about the task should be respected in order to preserve the raw materials for creativity. The key idea taken from coordinative theory is that differences can be compatible and teams members with different approaches can learn to let those different approaches co-exist.

The conceptual origin of meaningful participation is in the group decision making and diversity literature (Janssens & Brett, 1997). Meaningful participation refers to a dialogue that team members enter into when they believe they have unique information to contribute to the team's discussion (Janssens & Brett, 1997). Meaningful participation legitimizes that it is the responsibility of all members to contribute ideas to the group. Research shows that greater participation enhances the probability that minority

opinions and unshared information, both helpful for creativity, will become part of the group discussion. However, what is different about meaningful participation from other discussions of participation in the groups literature is that Janssens and Brett (1997) qualified participation by the term *meaningful*. *Meaningful* participation means that not all team members are expected to participate all the time, but rather to participate only when they have a unique or different perspective to share. Meaningful participation should help ensure that multicultural teams realize the creative benefits of the cultural diversity inherent in their teams. Diverse ideas and perspectives are of no value if they remain embedded in the minds of team members. Meaningful participation should encourage team members to offer divergent opinions and therefore should facilitate discussion and debate, which the creativity literature indicates is critical to creativity in teams.

The theorizing underlying the conceptualization of fusion argues that meaningful participation and co-existence are both necessary to produce creative outcomes as these processes work together synergistically to help multicultural teams maintain diverse approaches to problems, to encourage divergent thinking, and to increase discussion and debate. Respect for cultural differences that is an element of co-existence should encourage team members to search for and share ideas that worked locally in their own cultural environment. Respecting cultural differences also should facilitate sharing of ideas because a climate of respect provides a safe environment for proposing divergent ideas. Meaningful participation, too, should encourage the sharing of ideas. Thus, the two elements of fusion, co-existence and meaningful participation teamwork, should be interdependent and synergistic. Therefore, we propose:

***Hypothesis 1:*** Across teams, fusion teamwork will be positively related to creativity.

An example of fusion teamwork comes from a team experience in a financial services call center. All the team members spoke fluent Spanish, but some were North Americans and some were Latin Americans. Team performance, measured by calls answered per hour, was lagging. One Latin American was taking twice as long with her calls as the rest of the team because although she was answering her caller's questions as dictated, she was also chatting with them after the questions were answered. When her teammates confronted her for being a free rider (they resented having to make up for her low call rate), she immediately acknowledged the problem, admitting that she did not know how to end the call politely—chitchat being normal in her culture. They rallied to help her: Using their technology, they would break into any of her calls that went overtime, excusing themselves to the customer, offering to take over the call, and saying that this employee was urgently needed to help out on a different call. In the long run, she did not need this solution as she became better at ending her own calls, but this fusion solution worked in the interim.

Before we move on to develop our theorizing about cultural metacognition as an antecedent of fusion teamwork and creativity, it is appropriate to discuss how the concept of fusion teamwork differs from other teamwork processes. Several different models of multicultural teamwork have been described in the literature, some of which are more and others less conducive to fostering creativity. After analyzing over 50 real-world multicultural teams, Canney Davison (1996) described four models: polite standoff in

which team members hide their differences; subgroup dominance, whereby one faction dominates the team's work; exclusion, when some team members are left out of teamwork, either intentionally or unintentionally; and synergy, where teams fully utilize all their members' skills. In a qualitative field study of five multicultural teams, Earley and Mosakowski (2000) identified a hybrid model of teamwork leading to effective (though not necessarily creative) outcomes. The "hybrid" model was an emergent and simplified set of norms that "individuals within a team develop, share, and enact after mutual interactions" (Earley & Mosakowski, 2000: 27). In hybrid teamwork, team members would set aside their own cultural practices in exchange for a set of universal practices adopted by all members of the team. In contrast, subgroup dominance and hybrid models may increase the rigidity of teamwork processes and reduce participation. Subgroup dominance requires team members to follow the teamwork practices of the majority limiting the scope of new approaches to those of the dominant subgroup and the involvement of those not in the subgroup. Hybrid models create new processes, which also may increase rigidity—as team members are supposed to approach the task following the new teamwork norms. Hybrid models may also limit the involvement of members who are unfamiliar or uncomfortable with the teams' adopted norms. In contrast, fusion should minimize teamwork rigidity and maximize participation. Thus, other models of multicultural teamwork do not have the characteristics that fusion does for promoting creativity.

## Cultural Metacognition: An Antecedent of Fusion Teamwork and Creativity

We propose that cultural metacognition acts as an antecedent for both the development of fusion teamwork and creativity in multicultural teams. Cultural metacognition is an individual difference and is a state rather than trait of individuals (Earley & Ang, 2003). Its operationalization reflects individuals' reports of their thoughts and behaviors. Cultural metacognition refers to cultural consciousness and awareness during social interaction (Earley & Ang, 2003). It is one of the four constructs of cultural intelligence (CQ; Earley & Ang, 2003). The others are behavioral (what people do in multicultural situations), motivational (what people are interested in doing in multicultural situations), and cognitive (what people know about norms and practices in different cultures). We chose cultural metacognition for our model because of the four dimensions of CQ, cultural metacognition is most closely related conceptually to fusion and creativity.

Metacognitive skills are viewed as "crucial elements of creative thinking and production" (Feldhusen & Goh, 1995: 243). In an analysis combining a model presented in Wallas's *The Art of Thought* (1926) and firsthand accounts of the creative process from creative individuals, Armbruster (1989) concluded that metacognition is involved in every aspect of the creative process and that creative individuals may in part be more creative because of their metacognitive abilities. In Pesut's (1990) model, creative thinking is conceptualized as a self-regulatory metacognitive process whereby actions and metacognitive strategies improve creativity through self-regulation of the cognitive process. Therefore, theory links general metacognitive ability to creativity. Research on cultural intelligence shows that highly culturally metacognitive people also score high on general indicators of metacognitive ability like judgment, problem solving, and decision

making (Ang et al., 2007). Thus, we predict that team members who are more culturally metacognitive should be better able to contribute to team creativity than team members who are less culturally metacognitive.

***Hypothesis 2:*** Across teams, team members' cultural metacognition will be related to creativity.

Metacognition is also a self-regulatory process. It is thinking about thinking. People who are highly metacognitive monitor their progress as they learn, make changes, and adapt their strategies if they perceive they are not doing so well (Winn & Snyder, 1996). This self-regulatory element of metacognition should, when focused on cultural differences in multicultural teams, facilitate fusion teamwork. Team members who are highly metacognitive about culture should be able to monitor their cultural environments, make changes, and adapt their strategies to meet challenges of participating in multicultural teams better than team members who are less metacognitive about culture. The cultural intelligence research supports this prediction. People who are highly culturally metacognitive see cultural differences, appreciate them, work with them, and have confidence in their ability to tolerate and adapt to cultural differences (Ang et al., 2007). Highly culturally metacognitive people also question personal assumptions, suspend judgment, and use a nonevaluative approach to interpret behavior. Expatriates who act in a more rather than less culturally metacognitive manner have a higher rate of success in new environments (Mendenhall & Oddou, 1985).

The self-regulatory element of cultural metacognition is consistent with fusion's underlying processes of co-existence of differences and meaningful participation. Team members who are high versus low on cultural metacognition should favor and advocate teamwork that preserves, rather than ignores cultural differences, because they are tolerant of those differences and motivated to understand and work with cultural differences. Thus, we predict that team members who are high versus low on cultural metacognition should be more open to fusion teamwork in multicultural teams.

***Hypothesis 3:*** Across teams, team members' cultural metacognition will be related to fusion.

Although cultural metacognition is an individual characteristic of team members, aggregated across team members, cultural metacognition may provide a context effect that facilitates fusion and creativity in multicultural teams. Team members who are high versus low on cultural metacognition should be better able to contribute to fusion teamwork and creativity when other team members are also high on cultural metacognition. That is, the team's overall level of cultural metacognition should facilitate fusion and creativity by providing an environment of tolerance for cultural differences. This environment in turn should promote both creative approaches to teamwork, that is, fusion, and creative approaches to the team's task.

The prediction that a team context of high cultural metacognition should promote fusion and creativity is consistent with prior research on team decision making. For example, teams make better quality decisions when a team member with the correct answer is supported by others (Laughlin & Ellis, 1986). Research even more directly relevant to our prediction shows that teams are more creative when team members

support each other for thinking creatively (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Carter & West, 1998; Madjar, Oldham, & Pratt, 2002; Scott & Bruce, 1994; Shin & Zhou, 2003; West & Anderson, 1996). Thus, we predict a cross-level interaction (Klein & Kozlowski, 2000): the relationships between cultural metacognition and creativity and cultural metacognition and fusion will be stronger for teams that have a higher overall average of cultural metacognition than for teams that have a lower overall average of cultural metacognition.

***Hypothesis 4:*** Team-level cultural metacognition will moderate the relationship between individual-level cultural metacognition and creativity, such that the relationship will be stronger in teams with a higher average level of cultural metacognition than in teams with a lower average level of cultural metacognition.

***Hypothesis 5:*** Team-level cultural metacognition will moderate the relationship between cultural metacognition and fusion teamwork, such that the relationship will be stronger in teams with a higher average level of cultural metacognition than in teams with a lower average level of cultural metacognition.

## Cultural Metacognition, Fusion, and Creativity in Multicultural Teams

The multilevel model in Figure 1 summarizes our theorizing linking cultural metacognition at the individual and at the team level to both fusion teamwork and creativity. Our model also includes a control variable, affect toward the team. This variable is included to control for two types of bias: self-report response bias and the bias of generalized

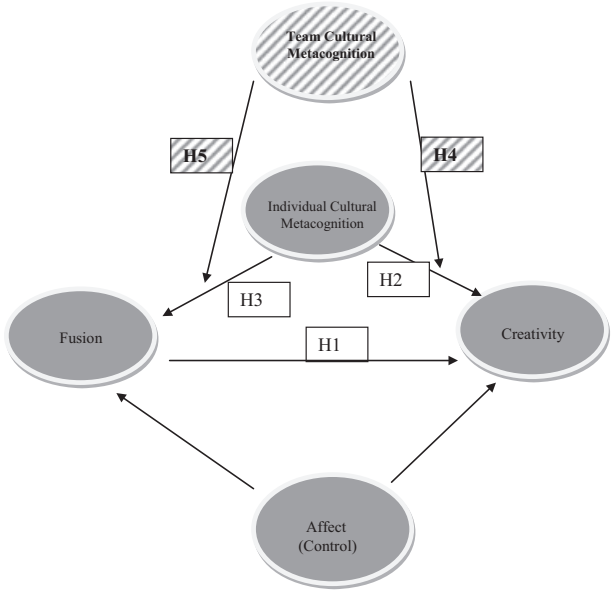


*Figure 1.* Relationships between metacognition, fusion, and creativity in multicultural teams.

affect toward the team. Our data were collected at the individual level from multiple key informant members of 37 multicultural teams, but our hypotheses predict and our multilevel analysis tests relationships across the teams in which our key informants are embedded (Raudenbush & Bryk, 2001).

# Methods

## Design

Human resource executives identified multicultural teams to participate in the study. We defined a multicultural team as a group consisting of "three or more people who have different nationalities." Thus, the smallest team eligible would have three members, and the smallest number of cultures in that team of three would be three. We limited teams to 20 or fewer members. Teams could be multifunctional, but this was not a requirement for participation in the study. We also required that teams meet face-to-face at least three times a year. Our reasoning for these requirements was that such teams would be more motivated to confront their cultural differences than larger or purely virtual teams.

The study used web survey technology. The survey was anonymous at the individual level but identified the team and organization to which the respondent belonged. Team members had several weeks to complete the survey. We produced an executive summary of the results that allowed HR managers to compare their company's team(s) with other teams in the study. HR managers were encouraged to share the summary report with team members, but we had no control over whether or not this was done.

### *Choice of a Multilevel Model*

Research on groups poses significant level-of-analysis problems (Klein & Kozlowski, 2000). If the data are analyzed at the individual level ignoring the nesting of individuals into groups, "the estimated SE will be too small and the risk of type I error inflated" (Raudenbush & Bryk, 2001: 102). Alternatively, if the data are aggregated using the means of the individual responses, "inefficient and biased results can result" primarily because different group sizes are not taken into consideration (Raudenbush & Bryk, 2001: 102). Group size affects reliability and reliability limits validity. In addition, aggregation results in overweighting extreme groups since each group is treated independently. Multilevel modeling (MLM) avoids both of these threats to validity by using data collected from group members to estimate group effects. To facilitate the understanding of MLM, Appendix A explains the application of MLM to this study using equations. In simplest terms, MLM uses individual-level data to estimate group effects taking group membership and group differences into account. MLM analysis generates two parameters in testing each hypothesis. The first parameter, $\beta_{0j}$ is the intercept. It indicates whether there are significant group differences on the dependent variable. The second parameter, $\beta_{1j,}$ is the slope of the relationship between independent and dependent variables averaged across groups (Raudenbush & Bryk, 2001). Our Hypotheses 4 and 5 are cross-level or moderator hypotheses and make typical moderator predictions

that depending on the value of a third variable, there will be stronger relationships between independent and dependent variables in some groups than in others.

To control for common method bias associated with self-reports, and generalized affect toward the team, we included affect toward the team in all models. The variables in our model were operationalized at the individual level and measured in a survey format. Including a variable measured similarly that is not of theoretical interest can control for self-report response bias. There was also a risk that our model could be compromised by a general positive halo. Team members may just like teamwork that values participation (fusion) and teams that are creative. Including a variable measuring general affect also controls for this potential bias. By including affect as a control, we ensure that the relationships among the variables in our theoretical model are significant over and above team members' general positive satisfaction with their team experience and common measurement bias.

## Sample

Study participants were 246 members of 37 multicultural teams from 11 large multinational corporations. Ten of the 11 companies had U.S. headquarters. Four companies had one team participating in the study; the other seven companies contributed multiple teams to the study. Teams averaged 10.7 members; most teams in the study had nine to 15 members. Teams represented various functional areas. Teams were in information technology (42%), human resources (33%), business development (12%), marketing/sales (6%), accounting/finance (5%), and compliance (3%). Members had full-time team appointments and were responsible for their functional areas. The majority of team members reported that English was their primary language, but 32% of team members had a primary language other than English. Team members reported 29 different nationalities: United States, 48%; India, 10%; England, 7%; Germany, 6%; Canada, 2%; Australia, 3.2%; Philippines, 1.2%; and China, 2%. There were slightly more male than female team members (56% versus 44%).

The average within-team response rate was 63%. The overall response rate not taking account of team membership was 51%. These rates are well within the acceptable range for organizational survey research. Baruch (1999) reports average response rates in five top management journals for the years 1975, 1985, and 1995, as 55.6% (SD 19.7). Our response rate likely reflects our multiple contacts with corporate HR managers and the study's endorsement by the top management to which the team reported (Simsek & Veiga, 2001).

## Measures

### *Creativity*

Our creativity measure was based in part on one used by Chatman, Polzer, Barsade, and Neale (1998) to measure the students' perceptions of their solutions to the same total quality management (TQM) task. They asked a single question: ''How creative are your quality applications?'' We followed Chatman et al. (1998) lead in asking team members

to report on their team's creativity. However, we specifically asked about both novelty and usefulness of team solutions separately, since theory indicates both are necessary for creativity (Amabile et al., 1996). Our questions were as follows: (a) my team has developed novel solutions to problems and (b) my team's ideas will be useful to the organization. We used a five-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5). Following Zhou and Oldham (2001) operationalization of creativity consisting of these two elements, we then multiplied the values of the two variables.

### *Teamwork*

Since fusion teamwork is a new construct, prior to starting this field study, we developed two measures of teamwork, fusion and subgroup dominance, using MBA students. The context for measurement development was a class exercise on multiculturalism. Participants were assigned to groups of 10 or 12, learned their culture's (manipulated) teamwork norms for problem solving, participation, and decision making, and then engaged in a creativity task. After this task was completed, two members from each group rotated into a different group such that each newly constituted group had at least six old (a potentially dominant subgroup) and four new members. The newly constituted group engaged in a second and different creativity task. At the end of the second creativity task, participants answered questions about their second group's teamwork. We used Likert style items to measure fusion and subgroup dominance. We also collected data on the CQ scale measuring cultural metacognition (Earley & Ang, 2003). The scree plot from an exploratory factor analysis showed that three factors accounted for 53% of the common variance among the items. Based on the results of this exploratory analysis, we edited the fusion and subgroup dominance items for use in this field study.

Fusion refers to teamwork that encourages meaningful participation and co-existence. We used eight items (see Appendix B) and a five-point Likert-type scale to measure fusion. The alpha reliability was .74.

Subgroup dominance refers to teamwork that is controlled by a minority or small group of team members. We used 10 items (see Appendix B) and a five-point Likert-type scale to measure subgroup dominance. The alpha reliability was .78.

### *Cultural Metacognition*

Cultural metacognition refers to cultural consciousness and awareness during social interaction (Earley & Ang, 2003). We used Earley and Ang's (2003) measure of cultural metacognition. The questions appear in Appendix B. The alpha reliability was .90.

Team-level cultural metacognition was the average of the team members' cultural metacognition. This team-level characteristic provided an indicator of the context in which individual team members were acting. Because team-level cultural metacognition is a compilation variable, not a consensus variable (LeBreton & Senter, 2008), we do not report an inter-rater agreement coefficient.

### *Control Variable*

Our scaled measure of affect consisted of three questions with an alpha reliability of .85: "I am satisfied with being a member of my team; I look forward to team meetings;

I like being a member of this team.'' Our questions are somewhat similar to the Gladstein (1984) scale modified by Van der Vegt, Emans, and Van de Vliert (2001) and others. We selected items that focused on general feelings about the team rather than limiting our measure to team satisfaction alone.

We tested several other control variables at both individual and team levels: age, sex, team size, percentage of the team with English as first language, face-to-face meeting frequency, type of manager (peer or superior), and functional area of the team. None was correlated with any variable in the model; thus, these variables do not appear in the final model.

## Data Analyses Demonstrating Convergent and Discriminant Validity of Constructs

We ran a series of analyses to determine the convergent and discriminant validity of our measures of cultural metacognition, fusion teamwork, and creativity prior to testing our hypotheses. These analyses indicated good convergent validity of the items measuring the new construct fusion, and discriminant validity of fusion with subgroup dominance and with the other major constructs in our model, cultural metacognition, and creativity.

### *Fusion Convergent and Discriminant Validity*

To establish convergent and discriminant validity (Nunnally, 1967) of the fusion construct with respect to subgroup dominance, we conducted confirmatory factor analysis (CFA) in Lisrel 8.8 using weighted least squares (WLS) with the polychoric correlation matrix (Joreskog, 1994; Joreskog & Sorbom, 2006) for minimizing bias in parameter estimates with ordinal data. The two-factor solution was superior to the one-factor solution and fit the data. The chi-square test comparing the difference between the one-factor model ($\chi$ = 1314.95, $df$ = 135) and the two-factor model ($\chi$ = 496.19, $df$ = 134) was 818.76 ($df$ = 1) with a $p$-value <.001. In addition, the one-factor model had a RMSEA of .19, compared with the .10 for the two-factor model. Both the comparative fit index (CFI) (.81) and GFI (.88) for the one-factor model showed a poor fit compared with a .94 CFI and a .95 GFI for the two-factor model. The chi-square statistic for the two-factor solution was significant, with a $p$-value of 0.00, also not a good fit. However, given this statistic's sensitivity to sample size, several other fit indices may be used (Stevens, 1996). Both the CFI and the goodness of fit index (GFI) returned values greater than .94, which is just on the margin of the .95 standard for a good fit (Medsker, Williams, & Holahan, 1994). In contrast, the root mean square index RMSEA, value of .10 indicates a marginal fit (Browne & Cudek, 1992). Together, these analyses show adequate convergent and discriminant validity for our measure of fusion.

### *Confirmatory Factor Analysis Including Cultural Metacognition, Fusion, and Creativity*

We performed a confirmatory factor analysis (CFA) in Lisrel 8.8 using weighted least squares (WLS) with the polychoric correlation matrix (Joreskog & Sorbom, 2006) to

Table 1
*Factor Loadings, Confirmatory Factor Analysis, Cultural Metacognition, Fusion, and Creativity*

| | Cul. Met. | Fusion | Creativity |
|---|---|---|---|
| I test my cultural knowledge to ensure it is correct in cross-cultural interactions | .90 (.03) | | |
| I check the accuracy of my cultural knowledge as I interact with people from different cultures | .99 (.02) | | |
| I adjust my cultural knowledge as I interact with people from different cultures that are unfamiliar to me | 1.02 (.02) | | |
| I work hard to understand the perspectives of people from other cultures | .95 (.02) | | |
| I am conscious of the cultural knowledge I use when interacting with people from other cultures | .98 (.02) | | |
| The team uses a combination of norms or practices from different members' cultures | | .87 (.02) | |
| The team tolerates members following their own cultural norms and practices | | .86 (.04) | |
| The team accepts that members from different cultures have different ways of expressing themselves | | .94 (.03) | |
| The team's norms and practices are a cultural hybrid, that is, a mixture of different cultural practices of its members | | .90 (.03) | |
| The team uses some norms and practices from some members and some from others | | .81 (.03) | |
| Team members participate in team discussions openly and freely | | .91 (.02) | |
| Each team member participates in decision making. | | .87 (.03) | |
| All team members are encouraged to participate in team discussions. | | .68 (.05) | |
| The team has developed novel solutions to problems. | | | .86 (.03) |
| The team's ideas will be useful for the organization. | | | 1.00 (.03) |

demonstrate discriminant validity among the variables in our model: fusion, cultural metacognition, and creativity. The three-factor model indicated a very good fit, with a CFI of .96, a GFI of .97, and an RMSEA statistic of .08. In addition, all factor loadings were above .70 with $p$ values less than .05; most factor loadings were greater than .85. The full results appear in Table 1.

## Analyses to Test Hypotheses

We analyzed the data using hierarchical linear modeling (HLM) to allow partitioning of variance into group- and individual-level effects (Raudenbush & Bryk, 2001). In this study, the fusion and cultural metacognition variables were individual-level variables and group-mean-centered. Team-level cultural metacognition was grand-mean-centered. The creativity variable was not centered.

To justify using HLM, data must have a group structure. We tested the group structure of our data with HLM using the random intercepts model and also by calculating

$r_{wg}$. As the first step in our HLM analysis, we ran separate random intercepts models for fusion and creativity, controlling for affect. Both analyses indicated group differences existed with a $p$-value of <.00. These results demonstrated within-team interdependence both with respect to team members' reports of fusion and creativity; these analyses justify our subsequent use of HLM. The random intercepts model tests the null hypothesis that there are no differences between teams on the dependent variable. If the $p$-value is less than .05, indicating significance, as it was in both instances here, then one may proceed with the analysis (Raudenbush & Bryk, 2001). The calculation of $r_{wg}$ also supported the group structure of our data. The $r_{wg}$ for fusion was .93 and for creativity .91.

We used robust SE for the final estimation of fixed effects, because 37 teams represent a moderate to large number of groups (Raudenbush & Bryk, 2001). We ran separate models first with creativity and then with fusion as the dependent variable. We used the method suggested by Bauer, Preacher, and Gil (2006) to test whether fusion mediated the relationship between cultural metacognition and creativity.

## Results

The hypotheses predicting relationships between cultural metacognition, fusion teamwork, and creativity were generally supported by the HLM analysis reported in Table 2. The model with fusion and metacognition fit the creativity data significantly better than the random intercepts model with only affect as a predictor. This is shown by a chi-square analysis of the deviance statistic comparing the model in Figure 1 with the random intercepts model with only affect as a predictor ($\chi = 71.96$, $df = 9$, $p < .00$). This significant chi-square indicates that the theoretical model with cultural metacognition and fusion fit the data better than the random intercepts model controlling for affect.

Table 2
*Hierarchical Linear Model Predicting Reports of Creativity*

| Fixed Effect (level 2) | Coefficient | $p$ |
|---|---|---|
| Intercept $\beta_0$, $\gamma_{00}$ | 14.77 | <.01** |
| Cultural Metacognition, $\beta_1$, $\gamma_{10}$ | .60 | 0.24 |
| Team Cultural Metacognition, $\gamma_{11}$ | 2.55 | 0.01** |
| Affect, $\beta_2$, $\gamma_{20}$ | 2.16 | <. 01** |
| Fusion, $\beta_3$, $\gamma_{30}$ | 2.10 | <. 01** |
| **Random Effect** | **Variance Comp.** | **$p$** |
| Intercept, $U_0$ | 3.16 | <. 01** |
| Cultural metacognition slOpe | 2.04 | 0.12* |
| Affect Slope | 1.28 | >.500 |
| Fusion Slope | 2.01 | >.500 |
| Level 1, $R$ | 3.46 | |

*$p \leq .05$; **$p \leq .01$.

Table 2 shows the results relevant to the predictions of Hypotheses 1, 2, and 4 predicting creativity. In support of Hypothesis 1, the coefficient ($\beta_3 = 2.10$, $p < .01$) relating fusion to creativity across teams was significant. This indicates that across teams, when team members reported higher levels of fusion, they also reported higher levels of creativity. This result supports the predictive validity of the fusion teamwork construct. Hypothesis 2 predicting a relationship between team member cultural metacognition and creativity was not supported ($\beta_1 = .60$, NS). However, Hypothesis 3 predicting that team-level cultural metacognition would moderate this relationship explains why. This moderated relationship was significant ($\gamma_{11} = .2.55$, $p < .01$). It indicates a cross-level effect which means that the relationship between cultural metacognition and creativity varied depending on the overall level of cultural metacognition in the team. Thus, when there was a high average level of cultural metacognition in a team, the relationship between cultural metacognition and creativity was stronger than when there was a low average level of cultural metacognition in the team. Thus, across teams, there were slope differences. Those teams with a higher average level of cultural metacognition had a stronger relationship (steeper slope) between cultural metacognition and creativity. Those teams with a lower average level of cultural metacognition had a weaker relationship (flatter slope) between cultural metacognition and creativity. It should be noted that these results, too, were controlled for general affect (coefficient 2.16 $p < .01$), which was also a significant predictor of creativity.

The variance components in Table 2 for cultural metacognition, affect, and fusion were not significant. This indicates that these effects did not vary randomly (Nezlek, 2007), which means that the overall model reflects similar underlying processes for the 37 teams in the sample.

## The Fusion Model

The HLM analysis reported in Table 3 shows results consistent with Hypotheses 3 and 5 predicting relationships between cultural metacognition and fusion. The model predicting fusion with metacognition fit the data better than the random intercepts model with affect. This is shown by the significance of the chi-square analysis of the deviance statistic comparing the theoretical model with the random intercepts model with only affect as a predictor ($\chi$ (df 3) = 11.54, $p < .01$).

The results in Table 3 supported Hypothesis 3, predicting a relationship between cultural metacognition and fusion teamwork ($\beta_1 = .15$, $p < .04$). However, consistent with Hypothesis 5, this main effect was moderated by average team-level cultural metacognition ($\gamma_{11} = .37$, $p < .01$). The interpretation of this cross-level interaction is that the level of cultural metacognition within the team made a difference in the relationship between cultural metacognition and fusion. Those teams with a higher average level of cultural metacognition had a stronger relationship (steeper slope) between cultural metacognition and fusion. Those teams with a lower average level of cultural metacognition had a weaker relationship (flatter slope) between cultural metacognition and fusion. Once again context mattered, the average level of cultural metacognition in a team affects the slope of the relationship between cultural metacognition and fusion. When

Table 3
*Hierarchical Linear Model Predicting Reports of Fusion*

| Fixed Effect (level 2) | Coefficient | *p* |
|---|---|---|
| Intercept $\beta_0$, $\gamma_{00}$ | 3.73 | <. 01** |
| Team Cultural Metacognition, $\gamma_{01}$ | .20 | .01** |
| Cultural Metacognition, $\beta_1$, $\gamma_{10}$ | .15 | .04** |
| Team Cultural Metacognition, $\gamma_{11}$ | .37 | .01** |
| Affect, $\beta_2$, $\gamma_{20}$ | .30 | .00** |
| **Random Effect** | **Variance Comp.** | ***p*** |
| Intercept, $U_0$ | .01 | .013* |
| Cultural Metacognition Slope | .03 | .09 |
| Affect Slope | .03 | .07 |
| Level 1, *R* | .13 | |

*$p \leq .05$; **$p \leq .01$.

teams had a high level of cultural metacognition, team members' cultural metacognition was more strongly related to fusion teamwork. When teams had a low level of cultural metacognition, team members' cultural metacognition was less predictive of fusion teamwork. As the team's level of cultural metacognition increased, so did the positive relationship between members' cultural metacognition and fusion. In addition, Table 3 shows that the teams' level of cultural metacognition itself predicted fusion ($\gamma_{01} = .20$, $p$=.01). The interpretation of this coefficient is that teams with a higher average level of cultural metacognition were more likely to engage in fusion teamwork, over and above the support such teams gave to their highly culturally metacognitive members. The variance components in Table 3 for cultural metacognition and affect were not significant, indicating that these effects did not vary randomly (Nezlek, 2007).

We also explored whether the results of our study could be interpreted statistically as an example of moderated mediation. Bauer et al. (2006: 148) suggest an approach to test moderated mediation within an HLM model with a single level 1 equation through the use of selection (or indicator) variables. This analysis applied to our data was inconclusive. The parameters for the path for fusion to creativity and cultural metacognition to fusion in this expanded model were of similar magnitude to those reported in our creativity and fusion models. However, adding in the two interaction terms increased the degrees of freedom and dispersed the variance across main and interaction effects rendering all parameters except that linking metacognition to fusion as nonsignificant.

## Discussion

This research makes important contributions to the understanding of teamwork processes that promote creativity in multicultural teams. Building on Janssens and

Brett's (2006) conceptualization of fusion teamwork, we proposed and tested a model that focused on understanding the significance of team members' cultural metacognition for the emergence of fusion teamwork and creativity in multicultural teams. We developed and validated a measure of fusion teamwork and demonstrated that it was a valid predictor of creativity in 37 real-world teams. We also demonstrated that team members who were high on the cultural intelligence dimension of cultural metacognition, especially when embedded in a team of like-minded others, were better able to produce fusion teamwork and creativity than team members who were less culturally metacognitive. These findings offer key theoretical and empirical insights into creativity in multicultural teams and begin to address the dearth of process-oriented research in multicultural teams noted by Stahl et al. (2010).

## Theoretical Contributions

This study departs from prior research on multicultural teams by studying a newly conceptualized teamwork process— fusion (Janssens & Brett, 2006). The study elaborates Janssens and Brett's (2006) conceptualization of the link between fusion teamwork and creativity in several ways: First, we propose a detailed theoretical justification for why fusion should facilitate creativity. Second, we hypothesize that team members' cultural metacognition—a dimension of cultural intelligence (Earley & Ang, 2003)—and the team context of cultural metacognition will facilitate fusion and creativity. Finally, we integrate our theorizing by proposing a cross-level input (cultural metacognition), process (fusion), and output (creativity) model. Our focus on process represents a departure from previous research in multicultural teams (Stahl et al., 2010) and begins to answer calls to fill gaps in the literature in this area.

Fusion teamwork relies on two subprocesses that we propose work together synergistically to promote creativity. Co-existence refers to the preservation of multicultural team members' different approaches to teamwork and different ways of thinking. The key idea underlying co-existence is that cultural differences can be compatible and team members with different approaches can learn to let those different approaches co-exist in order to preserve the raw materials for creativity. Meaningful participation refers to a dialogue that team members enter into when they believe they have unique information to contribute to the team's discussion (Janssens & Brett, 1997). Meaningful participation legitimizes that it is the responsibility of all members to contribute ideas to the group. We proposed that co-existence and meaningful participation work together synergistically to help multicultural teams maintain diverse approaches to problems, to encourage divergent thinking, and to increase discussion and debate. This is because respect for cultural differences that is an element of co-existence should encourage team members to search for and share ideas that worked locally in their own cultural environment. Respect for cultural differences also should facilitate sharing of ideas because a climate of respect provides a safe environment for proposing divergent ideas. Meaningful participation, too, should encourage the sharing of ideas.

We also proposed cultural metacognition as a theoretical precursor to fusion and creativity in multicultural teams. Cultural metacognition is a dimension of cultural

intelligence (Earley & Ang, 2003). Cultural metacognition should contribute to creativity because metacognitive skills are ''crucial elements of creative thinking and production'' (Feldhusen & Goh, 1995: 243). Cultural metacognition should contribute to fusion because people who are metacognitive self-regulate. Those who are culturally metacognitive suspend judgment and use a nonevaluative approach to interpret behavior (Ang et al., 2007). However, we also proposed that the level of cultural metacognition in the team would provide a context effect that would facilitate the efforts of culturally metacognitive team members to produce fusion teamwork and creativity. We reasoned that like in other group decision-making contexts, that being embedded in a context of like-minded culturally metacognitive individuals would enhance effects on fusion and creativity.

## Empirical Contributions and Generalizability

These theoretical predictions were strongly supported by a cross-level model testing relationships between individual cultural metacognition, the group context of cultural metacognition, fusion, and creativity. The multilevel modeling and the nature of the sample provide a sound basis for generalization.

Multilevel modeling (MLM) uses data from individuals nested in groups to test hypotheses about group differences. Our study modeled two endogenous variables: fusion and creativity, measured by survey questions that asked individual group members to describe their multicultural teams. Although endogenous variables in MLM studies need to be measured, as ours were, at the lowest level of analysis in the study, the beta coefficients resulting from an MLM analysis correspond to the average intercept and the average slope across groups. Significant coefficients for intercepts indicated that there were mean differences between the multicultural teams in our study in terms of levels of fusion and creativity. Significant coefficients for slopes indicated that there was a relationship between fusion and creativity. The significant interactions indicated that the cultural metacognition–fusion and the cultural metacognition–creativity relationships were enhanced when there was a group context of cultural metacognition. Thus, when teams were high on cultural metacognition, the model produced a stronger fit.

In modeling fusion and creativity, we also demonstrated that the metacognition–fusion and the fusion–creativity relationships were not just the result of general affect toward the multicultural team, or bias owing to survey measurement. In each of our models, we included a reliable measure of satisfaction with the team. Not surprisingly, this affect measure was related to fusion and to creativity, but importantly the theoretical relationships that we proposed were significant when controlled for affect toward the team. Thus, the fusion process explains differences in multicultural teams that are not tied to general affect.

Finally, in modeling the fusion–creativity relationship, we demonstrated that fusion teamwork is distinct from teamwork dominated by a subgroup. We developed a measure of subgroup dominance along with our measure of fusion. We tested the discriminant validity of items measuring fusion and subgroup dominance and demonstrated that subgroup dominance was unrelated to creativity.

The nature of the sample also provides a strong basis for generalizability. The model was tested with an unusual sample of 37 functionally heterogeneous teams from eleven different global organizations. Each team had members from at least three different national cultures. Given that these teams were so culturally heterogeneous, the empirical evidence for the fusion model means that the fusion–creativity relationship is not limited to any specific set of cultural values or configurations—but rather that fusion is a theory about process that explains creativity across many combinations of cultures.

## Contributions to Practice

The results of this study indicate that some multicultural teams are more creative than others and that creativity in multicultural teams is associated with fusion teamwork. How, then might a manager encourage fusion teamwork? Our study suggests: populate the team with people who are high rather than low on cultural metacognition! Doing so should give the team a good chance of generating fusion teamwork and creativity. Our study is less directly helpful if team membership is a given. However, Bauer et al. (2006) discuss a number of interventions that are familiar from the teams' literature that might be adapted. For example, the team leader could serve as a role model for fusion; team members could suggest a fusion-type solution to a procedural conflict; team leaders and members could set norms for meaningful participation and co-existence and reinforce the team when members engage in such behaviors.

## Future Research and Limitations

There is certainly opportunity for future research on how teams can develop and sustain fusion teamwork. Of importance would be qualitative studies to determine how long it takes for fusion to develop in a real-world, permanent teams and whether short-term project teams or student teams can develop fusion processes. We would like to know whether fusion facilitates team performance when the task is not a creative one. We would like to know what proportion of team members need to be high on cultural metacognition for a team to generate fusion teamwork. There probably are antecedents to fusion teamwork besides cultural metacognition. Future research might determine whether the other dimensions of cultural intelligence are related to fusion teamwork in the same way as cultural metacognition. Future research might also attempt to link fusion teamwork to the level of cultural diversity in the team. Fusion was not related to the proportion of English-as-a-second-language members of teams in our study, but that is only one way to measure cultural diversity. In addition, there are numerous opportunities to study the team context in which fusion develops. In particular, one could look at other indices beyond the team average for operationalizing the context of cultural metacognition in a team.

Several opportunities for future research stem from questions that cannot be answered by our study. For example, will fusion teamwork also be related to other dependent variables, like group productivity and effectiveness, when the team is multicultural? We think that the relationship might not be as strong as with creativity.

However, it the team's task calls for utilizing diverse inputs that are potentially available because of the nature of cultural differences among team members, co-existence and meaningful participation should facilitate team effectiveness. Another question is whether fusion will benefit a team that is diverse on demographics other than culture, for example age, race, gender. Such a team should benefit from the way fusion encourages meaningful participation. However, with the possible exception of gender differences, demographic differences are less likely to be associated with distinctly different procedural approaches to problem solving and decision making as is the case with diversity associated with cultural differences. Therefore, fusion teamwork is probably better suited for multicultural than simply demographically diverse teams. Culture is distinct from other diversity characteristics because culture carries functional solutions to problems of social interaction (Trompenaars, 1996) that demographic differences do not.

## Limitations

Although this study makes several new and important contributions to the literature on multicultural teams, it is not without limitations. For the number of variables tested, the sample size was rather small; thus, future studies should confirm these findings in samples involving more teams. However, given the well-documented relationship between sample size, statistical significance, and power, the fact that we found stable results with a relatively small sample affords confidence in the findings.

It would also be desirable to confirm the results using different methods of measurement of the key constructs. However, there is always a trade-off between using objective measures of team output which require teams that are all engaged in a similar task and having a highly diverse set of teams engaged in a wide assortment of tasks. Although the use of questionnaire measures raises concerns about common method bias and the accuracy of team members as informants, we minimized those risks in this study by controlling statistically for common method bias and general affect. Our results cannot be attributed to the self-report nature of our data or to generalized affect. Our theoretical models were significantly more powerful than were the models testing group differences with only affect as a multipurpose control variable. Our results also suggest that team members were discriminating key informants when it came to describing their teams. The evidence for this is that there were significant group differences in creativity before entering fusion and cultural metacognition into our models. This suggests that team members were consistent key informants and had similar views of the team on the variables we sought to measure.

It is important for those concerned with making fusion happen in multicultural teams to keep in mind that the teams we studied were permanent teams with ongoing functional responsibility in their organizations. These were teams that remained in operation even as members moved out to take new jobs and new members moved in. These were neither student nor managerial teams constituted for short-term projects. The implications of the permanent nature of the teams we studied suggest that fusion is sustainable through time and inevitable changes in team membership. However, it leaves open the

question of whether teams constituted for a short-term project will engage in fusion teamwork.

## Conclusion

This study offers important insights into teamwork in multicultural teams. In particular, it shows that a newly conceptualized teamwork process, fusion, is related to creativity across a diverse set of multicultural teams. It also shows that teams whose multicultural members are more culturally metacognitive are better at realizing fusion teamwork and creativity than teams whose members are less culturally metacognitive. Fusion teamwork offers the potential for utilizing the potential inherent in the cultural diversity that members bring to multicultural teams.

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## Appendix A

Multilevel modeling (MLM) uses data from individuals nested in groups to test hypotheses about group differences. The endogenous variables in MLM designs must be conceptualized and measured at the lowest level of analysis. In our study, there were two endogenous variables: creativity and fusion. Both were measured by survey questions that asked individual group members to describe their perceptions of their teams.

To illustrate how MLM uses data from individuals nested in groups to test hypotheses about group differences, it is helpful to review the MLM equations from Raudenbush and Bryk (2001: 25) associated with the one-way ANCOVA with random-effects model. This model is the prototype for our analysis.

$$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{ij} - M_x\cdot) + r_{ij}$$

where $Y_{ij}$ is observed; in our study, it is the individual's perception of the group's creativity. Note that in the subscript both the individual (i) and the individual's group (j) are noted.

$\beta_{0j}$ is the mean of creativity for the jth group.

$\beta_{1j}$ is the average slope for the jth group linking in our study fusion and creativity.

$X_{ij}$–$M_x$ *is* the grand-mean-centered individual fusion perception.

$r_{ij}$ is the error term associated with individual (i) in group (j).

Returning to our equation, $Y_{ij} = \beta_{0j} + \beta_{1j}(X_{ij} - M_x\cdot) + r_{ij}$,it now becomes clearer the way MLM treats data. In our study, the individual's perception of the group's creativity ($Y_{ij}$) is modeled with $\beta_{0j}$ the mean of creativity for the individual's group plus the slope or relationship between perceptions of the group's fusion and perceptions of the group's creativity for that individuals' group. That is, the model uses both individual-level and group-level data in generating results. Although MLM data analysis programs actually test all parameters in a model simultaneously, keeping track of what group an individual is a member of, it is sometimes helpful to think about MLM as though a regression equation was fit to each group in a study separately. For example in our study, the regression analysis predicting creativity fit to each group separately would generate an intercept for each group and a beta or slope coefficient linking creativity to fusion for each group. Averaging the resulting intercepts across groups and the resulting betas across groups is akin to generating the MLM $\beta$ coefficients in Table 2. The level 1 beta coefficients in MLM correspond to the average intercept and the average slope across groups. This means that a significant level 1 intercept in a MLM model means that

there are group differences on the dependent variable. A significant level 1 slope coefficient means that there is a relationship between x and y across groups. Thus, MLM analysis can tell us a great deal about groups: whether there are mean differences between groups and whether there is a significant relationship between exogenous and endogenous variables across groups.

Level 2 equations in MLM then can be used to try to account for group differences in intercepts, for example, the $\beta_{0j}$ and test whether there are differences between groups in the slope $\beta_{1j}$ of the relationship between exogenous and endogenous variables.

## Appendix B

| Variable | Questions | Alpha Reliability |
|---|---|---|
| Cultural Metacognition | 1. I test my cultural knowledge to ensure it is correct in cross-cultural interactions.<br>2. I check the accuracy of my cultural knowledge as I interact with people from different cultures.<br>3. I adjust my cultural knowledge as I interact with people from different cultures that are unfamiliar to me.<br>4. I work hard to understand the perspectives of people from other cultures.<br>5. I am conscious of the cultural knowledge I used when interacting with people from other cultures. | .90 |
| Fusion | 1. The team uses a combination of norms and practices from different members' cultures.<br>2. The team tolerates members following their own cultural norms and practices.<br>3. The team accepts that members from different cultures have different ways of expressing themselves.<br>4. The team's norms and practices are a cultural hybrid, that is, a mix of the different cultural practices of its members.<br>5. The team uses some norms and practices from some members and some norms and practices from others.<br>6. Team members participate in team discussions openly and freely.<br>7. Each team members participates in decision making.<br>8. All team members are encouraged to participate in team discussions. | .74 |
| Subgroup dominance | 1. The team uses the norms and practices of a dominant subgroup of members.<br>2. Team members are expected to give up their own cultural norms and practices and follow those of the dominant subgroup.<br>3. The team is intolerant of multiple approaches to decision making and problem solving.<br>4. The team's norms and practices were given to the team by the manager.<br>5. Some dominant team members decide on the norms and practices of the team. | .78 |

6. The team follows the approach that is used by some dominant team members.
7. The team tolerates some members not speaking very much in meetings.
8. A few team members dominate the discussions.
9. Not all team members have a chance to express their opinions.
10. Some team members find it difficult to express their opinions in meetings.

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