

## **When Accuracy Isn't Everything: The Value of Demographic Differences to Information Elaboration in Teams**

### Abstract

Information elaboration is the mechanism through which diverse group members share unique knowledge and perspectives to form better and more creative responses to tasks. However, little is known about the conditions under which group members will be willing and motivated to engage in information elaboration. This paper presents a field study conducted in an energy company to investigate this issue. Regression analysis of survey responses suggests that group members who have deep, underlying differences in perspective from the group engage in less information elaboration, particularly if they perceive themselves as similar to the group. Recognizing deep level differences is helpful, however, when an individual also differs from the group in surface level characteristics, because those differences improve information elaboration. This finding suggests that surface level diversity prompts group members to understand and appreciate their deep level differences.

Keywords: diversity, group processes, information elaboration

Teams composed of diverse individuals are increasingly relied upon to make critical decisions, adapt to dynamic environments, and innovate (Hollenbeck, Beersma, & Schouten, 2012; Post, 2012). In order to make good decisions and generate new ideas, groups must be able to uncover the unique knowledge held by individual group members and integrate that knowledge into a solution or decision (Kooij-de Bode, van Knippenberg, & van Ginkel, 2010; Stasser & Titus, 1985). Those are information elaboration processes and they underlie performance in diverse teams working in complex and changing environments (Homan, Van Knippenberg, Van Kleef, & De Dreu, 2007; van Knippenberg, De Dreu, & Homan, 2004). Understanding the drivers of information elaboration in diverse groups is, therefore, a critical task for researchers.

Research to date has been based on the assumption that groups with deep level diversity—that is, groups in which members hold a variety of different perspectives that influence their priorities and criteria for judging success on a group task (Harrison, Price, & Bell, 1998; Phillips & Loyd, 2006)—should have an advantage at information elaboration, because they possess more unique and diverse information that can stimulate discussion and debate. However, the effects of deep level diversity on group performance cannot be reliably predicted (van Knippenberg et al., 2004; van Knippenberg & Schippers, 2007). One reason for the empirically equivocal results is that deep level diversity may be accompanied by surface level differences in salient demographic characteristics, such as gender, nationality, or age. Diversity in surface level characteristics is associated with social categorization processes that reduce communication and trust between group members (Hogg & Terry, 1998; Williams & O'Reilly, 1998). From this perspective, deep level diversity should stimulate information elaboration, but surface level diversity may interfere with that process.

To facilitate and improve information elaboration, research has suggested that group members should develop an understanding of their deep level differences (Hollingshead, 2001; Lewis, 2004; Peltokorpi, 2008). For example, previous research finds that making the knowledge structure of the group transparent by instructing members to uncover unshared information (Brodbeck, 2003) or by providing group members with a map of who knows what (Stewart & Stasser, 1992) improves the sharing of information that is distributed throughout the group. Based on those insights, research attention has focused on identifying the circumstances under which group members come to be aware of their underlying differences in knowledge and perspectives and helping groups to coordinate around those differences (Hollingshead, 2001; Lewis, 2004; Peltokorpi, 2008).

In the present paper, I propose a different explanation for the problems encountered by groups with deep level diversity and, in doing so, challenge the notions that (a) awareness of underlying differences is always beneficial for information elaboration in diverse groups and (b) that surface level differences are necessarily harmful for deep level diversity. Specifically, I argue that whereas exposure to other group members' different perspectives may help individual group members to elaborate on their own information (which I describe as the individual aspects of information elaboration), it can also impede individuals' ability and motivation to engage with and integrate other members' information and ideas (which I describe as the group level aspects of information elaboration). That implies that awareness of differences can also be harmful for information elaboration in groups. When individuals believe that they differ in salient ways from their group mates, they have less positive attitudes towards and attraction for the groups, which reduces communication (Byrne, 1971; Riordan & Shore, 1997; Shore, Cleveland, & Goldberg, 2003; Tsui & O'Reilly, 1989). Thus, making differences between members salient may also reduce motivation to work with others. However, surface level differences can reduce the motivational problems caused by

the awareness of members' differences by helping group members to explain and understand their deep level differences.

The purpose of the present paper is to examine how accurately recognizing underlying deep level differences from one's group influences information elaboration. Further, I will consider how the relationship between deep level diversity and information elaboration is influenced by one's surface level demographic similarity to the group. The study will shed light onto the limitations and boundary conditions of deep level diversity for improving group outcomes (Baruah & Paulus, 2011; Cronin & Weingart, 2007; Harvey, 2013) by suggesting that deep level diversity can be harmful to groups when members appear to share surface level characteristics. Previous research has demonstrated those limitations in groups faced with informational diversity (e.g., Phillips, 2003); the present research extends those findings to deeply held perspectives, priorities, and values. In addition, the study builds on research that demonstrates how in some cases, surface level diversity can improve group decision making and performance (Phillips & Loyd, 2006; Rink & Ellemers, 2007), by expanding the benefits of surface level diversity for members who differ from the group in deep underlying ways. Whereas previous research demonstrates that surface diversity helps group members to process their own information more deeply (Loyd, Wang, Phillips, & Lount, 2013), the present study extends the benefit of surface level diversity to enabling members to see value in and integrate their own information with that of other group members. Finally, the study contributes to research on the perception of differences in perspectives and information between group members (e.g., Brandon & Hollingshead, 2004) by articulating one situation in which accuracy may harm information elaboration.

### **Information Elaboration**

The mediating mechanism expected to account for the benefits of deep level diversity is information elaboration. Elaborating on and integrating information and ideas are

necessary to uncover the best decisions (Larson, Christiensen, Franz, & Abbott, 1996; Stasser & Titus, 1985) and generate new ideas (Hargadon & Sutton, 1997; Mumford & Gustafson, 1988). Elaborating on information has been found to improve group performance on complex or dynamic tasks, particularly those requiring innovation (Homan, Hollenbeck, Humphrey, Van Knippenberg, Ilgen, & Van Keef, 2008; Homan et al., 2007; Stasser & Titus, 1985). Information elaboration may be less beneficial on more routine tasks like production work.

Information elaboration involves several stages of collective cognition (Gibson, 2001; Hinsz, Tindale, & Vollrath, 1997). First, information elaboration requires that members share information and perspectives and process information and perspectives individually (Homan et al., 2007; Kooij-de Bode, Van Knippenberg, & Van Ginkel, 2008; van Knippenberg, De Dreu, & Homan, 2004). To do this, group members must become aware of the information they uniquely hold that others are not privy to and share that information with one another (Stasser & Titus, 1985). Second, information elaboration involves integrating the implications of different members' information and perspectives. For this to occur, members must discuss and evaluate one another's information to make judgements about its validity and appropriateness to the group task (Gibson, 2001). Finally, group members must integrate their own information with that of others by considering the implications of other members' information and how each member's perspective affects the group task (Stasser & Titus, 1985; van Knippenberg et al., 2004). Information elaboration, therefore, involves both individual level processing of group information and ideas, such as when group members judge the credibility of another's suggestion or consider how to persuade others of their ideas (i.e., individual level aspects of information elaboration) and group level processing, such as when group members integrate multiple items of information (i.e., group level aspects of information elaboration).

### **Deep Level Diversity and Information Elaboration**

Deep level diversity is expected to improve information elaboration because group members with different perspectives will have different values, priorities, information, and criteria for evaluating tasks, so that when those perspectives are combined, the group processes the focal task more broadly and more comprehensively. Empirical results, however, have not provided strong support for that expectation—diverse groups often fail to live up to their potential (Jackson, Joshi, & Erhardt, 2003; Milliken & Martins, 1996; van der Vegt & Bunderson, 2005; van Knippenberg & Schippers, 2007; Williams & O'Reilly, 1998).

One response to the mixed empirical results of the effects of diversity on group performance has been to refine the measurement of diversity so that measures more closely replicate the mechanisms expected to produce effects. Specifically, research using that approach attempts to measure deep level diversity, defined as differences in underlying values that provide individuals with their perspective on the task (Harrison et al., 1998; Harrison, Price, Gavin, & Florey, 2002; Phillips & Loyd, 2006; Post, 2012). Deep level diversity should provide a greater opportunity for information elaboration. This conceptualization of deep level diversity, however, is broader than simple differences in information between group members (Stasser & Titus, 1985).

Moreover, even this research provides a mixed picture of diversity's effects. Functionally diverse teams, who are assumed to have deep level diversity, do not always produce more innovations than homogeneous teams (Bantel & Jackson, 1987). For example, functional diversity has been found to negatively affect performance in product development teams (Ancona & Caldwell, 1992). Jehn, Northcraft, and Neale (1999) measured underlying diversity in values directly and found that it impaired group performance. Thus, while a robust stream of literature demonstrates that deep level diversity aids individual processing of ideas and information because exposure to different perspectives makes individual thinking processes more divergent and rigorous in considering alternatives (Brodbeck, Kirschreiter,

Mojzisch, Fry, & Schulz-Hardt, 2002; Nemeth, 1986; Nemeth & Watchler, 1974), these effects do not always hold at the group level.

I suggest that deep level diversity does not always produce positive effects on group outcomes because, while deep level diversity provides the opportunity for information elaboration, it also makes the group level aspects of information elaboration more difficult. Elaborating information requires that group members empathize with others' perspectives and connect those perspectives to their own (Homan et al., 2007). The more different those perspectives, however, the more difficult it is likely to be to understand and empathize. Deep level diversity in underlying perspectives is difficult to detect (Bunderson, 2003; Dougherty, 1992), so group members may not recognize that they hold different perspectives or that they need to adjust their communication to overcome their different perspectives. Perspective taking has been identified as a moderator of the relationship between deep level diversity and team creativity (Hoever, van Knippenberg, van Ginkel, & Barkema, 2012), suggesting that not all members of diverse groups automatically empathize with one another's perspective. Without the ability to understand others' perspectives, it will be difficult to effectively identify the implications of new information and to combine it with one's own. Consistent with that assertion, a recent study found that teams with deep level diversity tended to engage in less building on and integrating ideas than more homogenous groups (Harvey, 2013). Essentially, deep level diversity is expected to make communication between group members more difficult and less effective (Bunderson & Sutcliffe, 2002; Dougherty, 1992; Jehn et al., 1999). The more an individual group member differs from the group, the more difficult communication may become, and that difficulty will lessen group members' ability to empathize with and use one another's perspectives for information elaboration.

*Hypothesis 1: Group members will engage in less information elaboration when they have deep level differences in perspective from the group*

### **Perceptions of Deep Level Diversity**

Another reason why deep level diversity can produce negative effects on group outcomes is that perceiving oneself as different from the group may also reduce one's motivation to engage in the group aspects of information elaboration. Research demonstrates how awareness of salient differences between group members reduces communication and trust by creating social divisions within the group (Hogg & Terry, 1998; Pelled, Eisenhardt & Xin, 1999; Williams & O'Reilly, 1998; Zenger & Lawrence, 1989). The disagreement stimulated by deep level diversity is psychologically uncomfortable for individuals (Matz & Wood, 2005). When a group member is aware that she differs from others in the group in salient ways, she has less positive attitudes and lower psychological attraction and attachment to the group (Byrne, 1971; Hobman et al., 2004; Riordan & Shore, 1997; Shore et al., 2003; Tsui & O'Reilly, 1989; Tsui, Egan, & O'Reilly, 1992). That less positive relationship with the group reduces commitment to the group (Tsui, Egan, & O'Reilly, 1992) and can impact performance outcomes such as evaluations of individual effectiveness (Tsui & O'Reilly, 1989). Although those processes are usually conceptualized as resulting from visible and salient demographic differences, recognizing how one differs in deeper level characteristics from one's teammates could also makes those deeper characteristics visible and salient. For example, deep level dissimilarity with one's group members has been associated with lower social integration with the group (Guillaume, Brodbeck, & Riketta, 2012). Moreover, deep level differences are more likely to be based on core aspects of an individual's self-image, such as personality or educational background. Those characteristics may be more important to one's identity and, therefore, more likely to be a basis for self-categorization. Thus, perceived deep level differences from the rest of the group are expected to be associated with lower motivation to communicate and elaborate on information.



*Hypothesis 2: Group members will engage in less information elaboration when they have perceived differences in underlying perspectives from the group*

### **Accuracy of Perceptions of Differences**

The preceding two hypotheses pose a dilemma for groups. When an individual perceives that he or she is different from the group in deep level ways, information elaboration may be low due to a lack of commitment to the group and low motivation to share information with other group members. However, without that awareness, deep level differences make it difficult to elaborate on information. When people recognize that they hold a different perspective as compared to others, they adjust their communication to make up for this gap and to help others understand their point (Clark, 1996; Krauss & Fussell, 1991). Similarly, when the knowledge structure of a group is made transparent, for example, by instructing members to uncover unshared information (Brodbeck, 2003) or by providing group members with a map of who knows what (Stewart & Stasser, 1992), teams tend to share more of their uniquely held information with one another. For this reason, researchers often advocate that group members should recognize and accept one another's differences in perspective as a way to improve group performance (Ely & Thomas, 2001). Doing so requires perceiving the dissimilarity in the group (Hobman, Bordia, & Gallois, 2004). In general, it is important for group members to have an accurate representation of the knowledge structure of the group in order to access, understand, and build on one another's information (Brandon & Hollingshead, 2004; Bunderson, 2003). Knowledge transfer and building are particularly difficult to achieve in situations where individuals fail to recognize relevant differences between group members—that is, where people are unaware that knowledge needs to be transferred. Having an understanding of who knows what in the group enables group members to allocate work effectively and to coordinate their expertise (Faraj & Sproull, 2000; Wegner, 1987), leading to an increase in group performance (Hinsz e. al.,

1997; Stewart & Stasser, 1992). Thus, when differences are perceived, it makes communication easier, but reduces motivation to engage in that communication.

I propose that when deep level diversity is low, there will be little opportunity for information elaboration, so it is better to accurately perceive oneself as similar in deep level ways from the group so that motivation to elaborate is higher. However, when deep level diversity is high, I expect that the benefits of making information easier to elaborate will be balanced with the negative effect on motivation to elaborate. In sum, I expect deep level diversity to interact with perceived differences, such that being accurate about one's deep level differences from the team improves information elaboration. Specifically, information elaboration should be highest when members have low deep level differences from the team and they perceive themselves as similar to the team (low perceived differences), or when members have high deep level differences from the team and they perceive this difference (high perceived differences).

*Hypothesis 3: There will be a two-way interaction between deep level differences and perceived differences in underlying perspectives, such that when group members perceive themselves as different from the group, information elaboration will be increased by deep level differences (i.e., when group members are accurate about having deep level differences), but when they perceive themselves as similar to the group, information elaboration will be decreased by the presence of deep level differences (i.e., when they are inaccurate about having deep level differences).*

### **Surface Level Diversity**

The theorizing to this point has not considered how surface level diversity may influence information elaboration in groups. Surface level diversity is the difference between group members based on salient demographic characteristics such as age, gender, nationality, or ethnicity (Jehn et al., 1999; van Knippenberg & Schippers, 2007). Diversity in those

characteristics can make interpersonal relations in groups challenging, reducing group communication, cohesion, and trust (Williams & O'Reilly, 1998), without necessarily providing the differences in information and perspectives that should aid decision making and creativity.

An emerging stream of research, however, suggests that surface level diversity can benefit group information elaboration. Surface level differences can be a signal that deep level differences between team members exist, creating an expectation that there will be differences of information or opinion (Phillips, Mannix, Neale, & Gruefeld, 2004). That expectation provides team members with a sense of congruence about interpersonal relations in the team (Phillips, 2003; Rink & Ellemers, 2006). People expect others who are similar to themselves on the surface to share their perspectives and opinions; they may react negatively when similar others disagree with them (Phillips, 2003; Phillips & Loyd, 2006; Rink & Ellemers, 2007). When a group member appears to be similar to others in terms of surface characteristics, he or she will expect to share underlying perspectives with those group members and will find it psychologically uncomfortable when he or she discovers that his or her underlying views differ from those of the group (Rink & Ellemers, 2007). Motivation to elaborate on information will be low in that instance, because making one's own differences clear to the group will be psychologically uncomfortable (Phillips, 2003; Phillips & Loyd, 2006). In contrast, when surface level diversity is also present, individuals are more likely to offer dissenting opinions and to elaborate on information before interacting with other group members (Loyd et al., 2013; Phillips & Loyd, 2006). Similarly, groups have been found to be better at integrating information when they have multiple forms of deep level diversity because the presence of one form of deep level diversity signals that team members may differ in other ways (Rink & Ellemers, 2010). Surface level diversity can enable individuals

to focus less on perceived problematic interpersonal relations in the group, and more on the task at hand (Lloyd et al., 2013).

Extending this reason to the arguments above suggests that surface level diversity can attenuate the motivational problems caused by perceived deep level differences from the group. Surface level differences provide members with an expectation that they will have different opinions, making their disagreement more comprehensible and less psychologically uncomfortable. In contrast, when there is no surface level diversity, perceiving that one differs from the group, even when deep underlying differences do exist, will negatively affect information elaboration, because it is difficult for one to explain to oneself why those differences exist. In this situation, therefore, being accurate about the underlying structure of the group is problematic.

I, therefore, expect a three-way interaction between deep level differences, perceived differences, and surface level differences, such that the interaction between deep level differences and the perception of deep level difference from the group holds for group members who differ in surface level ways from the rest of the group. However, when surface level diversity is low, this relationship will be reversed, such that perceiving oneself as different from the group and having deep level differences will be associated with lower information elaboration.

*Hypothesis 4: There will be a three-way interaction between deep level differences, perceived differences, and surface level differences, such that the interaction between deep level differences and perceived differences will be reversed when surface level difference is low. Specifically, when surface level difference is high, deep level differences will be associated with increased information elaboration when group members perceive themselves as different from the group and decreased information elaboration when group members perceive themselves as similar to the group.*

*However, when surface level difference is low, deep level differences will be associated with increased information elaboration when group members perceive themselves as similar to the group and decreased information elaboration when group members perceive themselves as different to the group.*

## **Method**

### **Research Site and Design**

The present study took place in the renewable energy division of an international energy company. The division was responsible for developing ideas for and producing alternative energy sources such as hydrogen fuel and solar panel systems for housing. These goals required knowledge generation and innovation and, consequently, individual employees needed to generate and transfer knowledge within their unit. This meant that teams in the division could benefit from information elaboration (although the link to performance outcomes is beyond the scope of the present study). There were 1900 employees in the renewable energy division at the time of this study, located in seven different countries. Those employees worked in a variety of functions, including research, business development and strategy, finance, manufacturing, and administration.

**Sample.** All 104 members of three units within the renewable energy group were administered an electronic survey distributed by the communications department of the company. Employees were given 2 weeks to respond to the survey and were sent three reminders over this period.

For the purposes of assessing an individual's degree of difference from the rest of his or her workgroup, respondents were asked to answer questions with reference to all those people in a given geographic location (office) working in their unit. The company determined that this was the best way to categorize members of a workgroup. The survey was distributed

to eight offices. The workgroups were diverse in terms of nationality, age, gender, tenure, educational background, and job function.

Of the 104 members, 73 people responded, for a response rate of 70%. Respondents were only included in the sample if 60% of their team had also responded, to ensure that an accurate measure of their differences from other team members could be calculated. For this reason, one team from which five individuals, representing 45% of the team, responded was excluded. In addition, four individual respondents were the only members of their team to respond, so were not included in the analysis. The resulting final sample was 65 individuals, representing seven teams. Average team size was eight individuals, ranging from 2 to 16. The average response rate within teams was 79%.

## Measures

**Information elaboration.** To measure the degree to which individuals engaged in information elaboration, respondents were asked to indicate the extent to which they exchanged, discussed, and integrated ideas and knowledge with their team, on a scale from 1 to 7, where 7 represented a high degree of information elaboration. Four items were included in this scale— “While talking to other members of my team, ideas often develop that none of us had thought of before”, “ ”My team members are a major source of information for my job”; “Other members of this team often come up with good ideas that will help the team to do our job”, “Our team often generates new ideas.”.” These items had a Cronbach’s alpha of 0.73, indicating a high level of reliability. The items were based on and are similar to those used in other studies (e.g., Faraj & Sproull, 2000; Homan et. al., 2008), but adjusted based on feedback from the communication director of the company about how to make them relevant and clear to this particular sample.

**Deep level differences.** The deep level perspectives that employees brought to the group task were measured by seven survey items in which respondents were asked to indicate

the extent to which they considered each of seven criteria (one item per criterion) when making decisions about or evaluating new ideas at work. The criteria were: the importance of the financial return on an idea, the extent to which the idea would affect team morale, the extent to which the idea was new or unusual, how easy it would be to implement the idea, the extent to which customers would benefit from the idea, the extent to which the idea supported the firm's health and safety policy, and the impact of the idea on the community and environment. Each criterion was evaluated with a single measure on a 1-7 Likert-type scale, with 1 = *not at all important* and 7 = *very important*. These criteria were developed in conjunction with several members of the organization and were based broadly on the corporate values of the organization. They were determined by the company to represent the core factors that individuals should view as important to their work.

To assess the extent to which an individual's deep level perspective on the task differed from that of others members of his or her team, a dissimilarity measure was calculated for each criterion, for each individual, using the formula  $[(1/n) \sum (S_i - S_j)^2]^{(1/2)}$  (O'Reilly, Caldwell, & Barnett, 1989; Tsui, Egan, & O'Reilly, 1992; Tsui & O'Reilly, 1989), where  $S_i$  is the focal individual's rating on the criterion and  $S_j$  is another team members' rating on the criterion. The grand mean of these values across the seven criteria provides an index of the extent to which team members share a common understanding of the task. In other words, the dissimilarity measure indicates how differently a given individual rated each of the seven criteria versus the average ratings of his or her team members. This method has been used to calculate the demographic dissimilarity of individuals from others on their team. Cooke, Salas, Cannon-Bowers, and Stout (2000) also recommend a similar method for calculating inter-group agreement to measure shared representations between group members, where having a shared representation indicates a low degree of difference in perspectives on the group task.

**Perception of deep level differences.** To measure the extent to which individuals believed that other members of their team shared the same set of priorities as they held, after completing the previous question evaluating their priorities, participants were asked to indicate the extent to which they believed that other members of their team would agree with the ratings they gave to the seven criteria. Their agreement was captured on a Likert-type scale from 1 to 7, in which 1 = *strongly disagree that other members of the team would agree with my ratings* and 7 = *strongly agree that other members of the team would agree with my ratings*. Perception of deep level diversity was a single item.

Participants were also asked to indicate the extent to which they believed others in the group shared their own perspective on the group task. When this item is combined with the previous item, the Cronbach's alpha is 0.55. Given the relatively low reliability and the fact that the first question is directly related to the deep level diversity measure, this question was not used in the main analysis. However, analyses were also performed with a variable that combined the two questions. That analysis produced the same relationships with similar levels of significance for hypotheses 2 and 4. Hypothesis 3 no longer produced significant results when the second question was included in the measure.

**Surface level demography.** Relational demography measures the difference between a focal individual and others in his or her workgroup on a variety of demographic characteristics (Chatman & Spataro, 2005). A significant amount of research has demonstrated that a variety of demographic characteristics have important consequences for individuals and their relationships with their team, including gender and nationality (e.g., Chatman & Spataro, 2005; Pelled, 1996), tenure (Jackson, Brett, Jessa, Cooper, Julin, & Peyronin, 1991), age (Shore et al., 2003), and job function and educational background (Bantel & Jackson, 1987). Since the goal of the present research is to understand an individual's experience of being different from his or her colleagues, all of these variables



were used to measure demography. I followed the approach of previous studies to develop this measure (e.g., Chatman & Spataro, 2005; Jackson et. al., 1991; Tsui, Egan, & O'Reilly, 1992). First, a Euclidean distance measure was calculated for each individual demographic characteristic, according to the formula  $[(1/n)\sum (x_i-x_j)^2]^{1/2}$ , where  $x_i$  is a focal individual's score on the characteristic,  $x_j$  is each other team member's score on that characteristic, and  $n$  is the number of people in the team. The distance of an individual from his or her team was calculated separately for each of gender, nationality, job function, age, tenure, and level of education. Second, the distance measures based on the six demographic variables were averaged across all six variables to create an overall surface level demography score. For gender, the distance measure was based on a dichotomous variable in which an individual either did or did not belong to the category (*male* = 1, *female* = 0). For nationality and job function, the distance measure was an average of an individual's difference from all other team members across a set of categories representing the characteristic, in which an individual either did or did not belong to each specific category (e.g. *job function admin* = 1, *job function admin* = 0; *job function business development* = 1, *job function business development* = 0, etc.). For age, tenure, and level of education, this measure was based on employees' survey responses. For age, employees categorized themselves as falling within one of five age categories (1 = *under 21*, 2 = *21-30*, 3 = *31-40*, 4 = *41-50*, and 5 = *over 50*); the distance measure was based on the values 1 to 5, so that an employee under 21 would be the farthest from an employee over 50 and vice versa. The measure, therefore, reflects the assumption that, for example, having an age two levels higher than that of another creates more of a difference than having an age only one level higher<sup>1</sup>. Similarly, for tenure, employees categorized themselves as falling within one of four lengths of service (1 = *less*

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<sup>1</sup> Using a dichotomous coding scheme of 1 for same category of education/age/tenure and 0 for different category, as for the other variables, generates the same relationships, but with a non-significant 3 way interaction term.

than 1 year; 2 = 1-5 years; 3 = 6-10 years; 4 = more than 10 years), and for education, employees placed themselves in one of three categories of highest level of education attained (1 = primary/secondary school; 2 = college/technical education; 3 = university/higher degree). Categories for each demographic characteristic were developed with the assistance of representatives of the research site to ensure that they were appropriate for the setting and meaningful to employees. Most employees had at least college or technical level education, so lower levels of education were not broken down into more detail.

**Control variables.** Individual level control variables were included for gender, job role, and age. Specifically, a dummy variable for gender, with *male = 1*; a dummy variable distinguishing administrative and support jobs (1) from core business functions; and a dummy variable for age, with *over 40 = 1*, were included in the analyses.

Team level factors were controlled for by using a fixed effects model in the analysis. This approach is discussed in more detail in the results section.

## Results

Descriptive statistics and correlations for the variables can be found in Table 1.

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Insert Table 1 about here  
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Hypotheses were tested with a series of ordinary least squares (OLS) regression models, with information elaboration as the dependent variable (see Tables 2 and 3). Standard statistical analyses that assume independence of observations are not appropriate when testing the hypotheses, because the data involve multiple individuals drawn from the same set of teams, creating dependence between individual responses. I accounted for the lack of independence by estimating parameters using a team level fixed-effects model. The model will account for any team level characteristics that may drive differences in

information elaboration and diversity or recognition of diversity between individuals that are not measured explicitly in the study (for example, the psychological climate of the team or the team's tenure; Dahlin, Weingart, & Hinds, 2005).

The base model in Table 3 reveals that the individual level control variables for gender, job function, and age had no effect on information elaboration. Table 3 includes the results for all hypothesis testing including the control variables. Due to the relatively small sample size of this study, however, significance levels are reduced by including the controls. Given that they were not significant, and their inclusion does not qualitatively alter the results of the study, the subsequent discussion of results focuses on analyses without those control variables, which are contained in Table 2. Team level fixed effects were used for both sets of analyses (i.e., those in Table 2 and Table 3).

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Insert Tables 2 and 3 about here  
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To test hypothesis 1, that the more a group member differs from the rest of the team in terms of underlying perspectives, the less he or she would elaborate information, information elaboration was regressed on deep level diversity. As seen in Model 1 (Table 2), deep level diversity had a significant negative effect on information elaboration ( $b = -1.14, p < 0.05$ ). This supports hypothesis 1.

To test hypothesis 2, a regression was conducted with an individual's perception of similarity to the workgroup in terms of underlying perspective as the independent variable and information elaboration as the dependent variable (Model 2, Table 2). Results suggest that perceiving oneself as different from the team is associated with less information elaboration ( $b = -0.31, p < 0.05$ ). This supports hypothesis 2. When both the existence of

deep level differences and the perception of differences were included in the model, they were no longer statistically significant ( $p < 0.10$ ).

To test hypothesis 3, an interaction between deep level diversity and perception of differences was added to Model 3 (Table 2). Both variables were centered before calculating the interaction term. Model 4 (Table 2) indicates that hypothesis 3 was supported ( $b = 0.74$ ,  $p < 0.05$ ). Further simple slope analysis (using the spreadsheet designed by DeCoster & Iselin, 2009) revealed that deep level diversity had a negative effect on information elaboration when team members perceived themselves as similar to the team (when perception of differences has a value of -1, slope = -2.26,  $p < 0.01$ ). When team members perceived themselves as different, however, deep level diversity had no effect (when perceived difference has a value of 1, slope = - 0.78,  $p < 0.32$ ). These findings are illustrated in Figure 1. Thus, when team members perceive themselves as similar to the team, it is better for them to be accurate in that perception than to have deep level diversity; deep level diversity is associated with lower information elaboration. This finding provides partial support for hypothesis 3.

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Insert Figure 1 about here  
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To test hypothesis 4, a three-way interaction between deep level differences, perception that differences exist, and surface level differences was conducted. The three variables, and all of their possible interactions, were included in an OLS model with fixed effects for team (Model 5, Table 2). All variables were centered before the interaction terms were calculated. Model 5 suggests that hypothesis 4 was supported; a three way interaction between the three variables was significant ( $b = 8.37$ ,  $p < 0.05$ ). Further analysis reveals the nature of this interaction. As predicted, the interaction between deep level diversity and

perception of underlying differences holds when surface level diversity is high (Figure 2a). In that situation, when one perceives oneself as different from the team, deep level diversity has a positive effect on information elaboration (slope = 11.80,  $p < 0.01$ ), whereas when one perceives oneself as similar to the team, deep level diversity has no effect on information elaboration (slope = -6.69,  $p < 0.07$ ). However, when surface level diversity was low, the interaction was reversed (Figure 2b). In that situation, when one perceives him or herself as different from the team, deep level diversity has a negative effect on information elaboration (slope = -12.85,  $p < 0.01$ ). When one perceives him or herself as similar to the team, the effect of deep level diversity is not significant.

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Insert Figures 2a and 2b about here  
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### **Discussion**

Previous research has distinguished surface level from deep level differences between team members and argued that deep level diversity facilitates group performance and creativity by enabling information elaboration. Underlying differences in perspective form a basis on which group members can develop new ideas and integrate information to come up with something substantially new.

The present paper extends this research in several ways. First, it suggests that groups do not automatically engage in information elaboration when deep level diversity in perspectives exists. Deep level differences actually led to less information elaboration in the present study. When deep level differences are not explicitly recognized by an individual, he or she may fail to account for them when communicating with others. In contrast, when a group member perceives herself as similar to others in her group, she actually has a higher level of information elaboration. The study, therefore, suggests that limits exist to the benefits

of deep level diversity for improving group decision making and creativity. Group members must be able to both recognize that those deep level differences exist, so that they can adjust their communication accordingly, and they must be able to comprehend and appreciate why they exist, so that they are motivated to engage with other group members' ideas.

Second, this paper examines the interaction between surface level and deep level differences to suggest that surface level diversity plays a significant role in shaping the expectations of group members. Accurately perceiving one's perspective relative to others in the group did not lead to information elaboration in all cases; in particular, when one accurately perceives that he or she has deep level differences from the group, but that difference is not based on differences in any surface level characteristics. Surface level diversity actually benefits information elaboration in that case. Previous literature has advised groups to generate a common identity and focus on what makes members similar to one another (Chatman, Polzer, Barsade, & Neale, 1998). In contrast, the present findings suggest that demographically different individuals may be more motivated to elaborate on information, consistent with a growing stream of research that demonstrates the importance of surface level diversity for team performance (Phillips, Liljenquist, & Neale, 2009; Phillips & Loyd, 2006; Polzer, Milton, & Swann, 2002; Rink & Ellemers, 2007). To date, research has demonstrated that surface level diversity improves attitudes toward the group in teams with deep level diversity and helps individual members to process and express information. The present study extends that line of research by also showing that surface diversity can make group members more willing to build on others' information and ideas and integrate their ideas with those of others. It, therefore, helps not only the individual component of information elaboration, but also the collective aspects through which information is transformed into group output.

This paper also contributes to literature that examines the ability of groups to recognize the knowledge and expertise of group members. It is necessary for group members to have an accurate representation of the knowledge structure of the group in order to access, understand, and build on one another's information (Faraj & Sproull, 2000; Stasser & Titus, 1985; Stewart & Stasser, 1992; Wegner, 1987). The present paper suggests, however, that merely recognizing differences is insufficient for knowledge transfer to occur. One expectation of the study that was not supported was that overall, deep level differences would improve information elaboration when one perceived him or herself as different from the group. That effect only occurred when surface level differences were high. It may be that group members must both perceive and understand the bases for their differences in order to make sense of others' information and be willing to put forth effort to do so.

There are several limitations to the research presented here. Individuals in the study were drawn from only seven different teams and the sample size was relatively small. Despite the small sample size, using a fixed effects methodology still produced significant results. A second limitation of the study is that the data is drawn from a single survey, which may create single source bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). That concern, however, is reduced by the fact that the results support the existence of significant two- and three-way interactions, which are likely to be difficult for individual survey respondents to reason through in a way that produces consistent results. Further, several of the variables were calculated by combining data from multiple individuals (i.e., difference measures), over which a single individual has no control. A third limitation is that the study measures deep level diversity based on group members' values and criteria for evaluating the group task. Although that operationalization matches the theoretical arguments developed in the paper, other ways of conceptualizing deep level diversity may produce different results. For example, members with different information who shared values and priorities for the task

may find it easier to elaborate on information. However, in organizational settings, differences in information may often be derived from experiences and backgrounds that also produce differences in values and priorities, so understanding how information elaboration occurs in those contexts is an important practical issue. A final limitation of the study is that it does not test the intervening processes of motivation and ease of communicating with the group, nor can it examine the association between information elaboration and performance outcomes. Future research should delve into those processes in greater detail. Despite these limitations, this research helps to illuminate the complexities of performance in groups in which group members differ in both surface level and deep level ways.

### **Practical Implications**

Disentangling the effects of deep level diversity, perceptions of differences, and surface diversity has implications for managing team diversity in organizations. The present research emphasizes the need for managers to carefully consider how best to compose teams. In particular, helping team members to develop expectations that their ideas and opinions will differ from the group may improve the elaboration of information between team members, particularly in terms of building on and integrating information. For example, composing teams with members representing different organizational affiliations with historically different views may help to signal a likely difference of opinion.

Alternatively, social differences may provide effective signals as to the underlying knowledge structure of the group. That possibility suggests a need to revise the advice to help teams overcome their social differences by developing a unifying social identity. That strategy is likely to improve social and interpersonal relationships between team members. However, the present research shows that it may also stifle discussion. Instead, managers may try to maintain social differences in order to promote information elaboration. In that case, it



is also important that the group has deep level differences based on, for example, educational or functional backgrounds and that members recognize their differences.

Finally, this study emphasizes the need for managers to focus on the collective aspects of information elaboration, specifically building on and integrating ideas. Simply getting employees to think about information more deeply may not be sufficient to ensure that they are willing to use one another's information to improve their decisions because of the motivational implications of stimulating information elaboration in individual team members. Managers should consider the purpose of and need for the team in different organizational contexts. In some situations, thoughtful and vigilant individuals may be able to make effective decisions. In those situations, it is important to expose individuals to dissent, but the motivational consequences are less important and deep level diversity may be sufficient. In other situations, however, it may be that good decisions can only be reached by integrating information from multiple individuals. In those situations, the willingness of team members to use one another's information is critical and a combination of deep and surface level diversity may be more effective than deep level diversity alone.

## **Conclusion**

As organizations become increasingly diverse and complex, understanding how diversity influences team members' willingness and ability to use and build on one another's information and ideas is critical. The present study provides new insights into the limits of deep level diversity for those group level aspects of information elaboration and advances surface level diversity as one solution for overcoming the challenges posed by deep level diversity.

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Table 1

*Descriptive Statistics*

	M	SD	Job Role	Age	Surface Level Difference	Deep Level Difference	Perception of Difference	Information Elaboration
Gender (male) <sup>1</sup>	0.59	0.50	-0.33**	0.17	0.01	-0.07	0.05	0.01
Job Role (admin / support) <sup>1</sup>	0.25	0.44		-0.04	0.20	-0.06	-0.01	-0.13
Age (over 40) <sup>1</sup>	0.41	0.50			0.27*	0.18	0.11	-0.09
Surface Level Differences	0.46	0.12				0.09	-0.02	-0.10
Deep Level Differences	1.56	0.29					0.18	-0.30*
Perception of Difference	4.45	0.89						-0.31*
Information Elaboration	5.03	0.98						

<sup>1</sup> Categorical variables where category in brackets = 1

\*\*p < 0.01

\* p < 0.05

Table 2

*Effect of Demography on Information Elaboration, Fixed Effects for Team*

DV	Information Elaboration				
	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	5.02**	5.03**	5.02**	4.97**	5.10**
Deep Level Difference	-1.14*		-0.92+	-1.52*	-1.39*
Perception of Deep Level Difference		-0.31*	-0.25+	-0.34*	-0.44**
Deep Level Difference x Perception of Deep Level Difference				0.73*	0.87*
Surface Level Difference					-5.78**
Deep Level Difference x Surface Level Difference					3.98
Perception of Deep Level Difference x Surface Level Difference					1.29
Deep Level Difference x Perception x Surface Level Difference					8.38*
R <sup>2</sup>	0.09*	0.10*	0.15*	0.19**	0.23**

\*\* p < 0.01

\* p < 0.05

+ p < 0.10

Table 3

*Effect of Demography on Information Elaboration, Fixed Effects for Team (Including Individual Control Variables)*

DV	Information Elaboration					
	Base Model	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	5.22**	5.23**	5.18**	5.20**	5.19**	5.30**
Individual Control Variables:						
Gender (male)	0.01	-0.07	0.03	-0.04	-0.05	0.10
Job role (admin / support)	-0.40	-0.36	-0.36	-0.33	-0.40	-0.32
Age (over 40)	-0.17	-0.10	-0.15	-0.10	-0.16	-0.48+
Deep Level Difference		-1.11*		-0.93+	-1.50*	-1.41*
Perception of Deep Level Difference			-0.25+	-0.19	-0.29+	-0.49**
Deep Level Difference x Perception of Deep Level Difference					0.74*	1.05**
Surface Level Difference						-5.26**
Deep Level Difference x Surface Level Difference						-2.19
Perception of Deep Level Difference x Surface Level Difference						2.43
Deep Level Difference x Perception x Surface Level Difference						7.92*
R <sup>2</sup>	0.02	0.13	0.10	0.17	0.21+	0.23**

\*\* p<0.01

\* p<0.05

+ p<0.10

Figure 1

*Illustration of interaction between deep level differences and perceived difference on information elaboration*

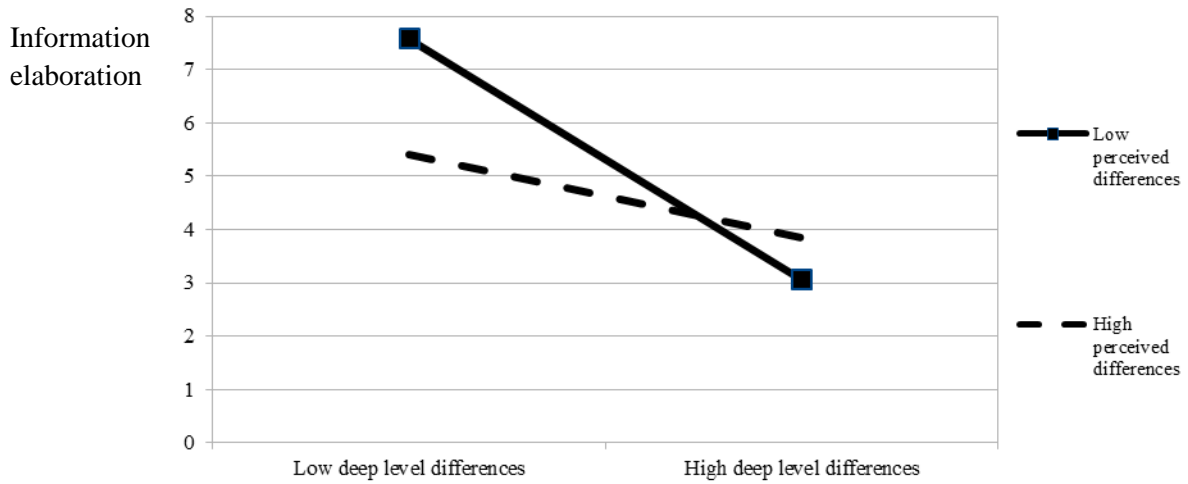


Figure 2a

*Illustration of interaction between deep level differences and perceived difference when surface diversity is high*

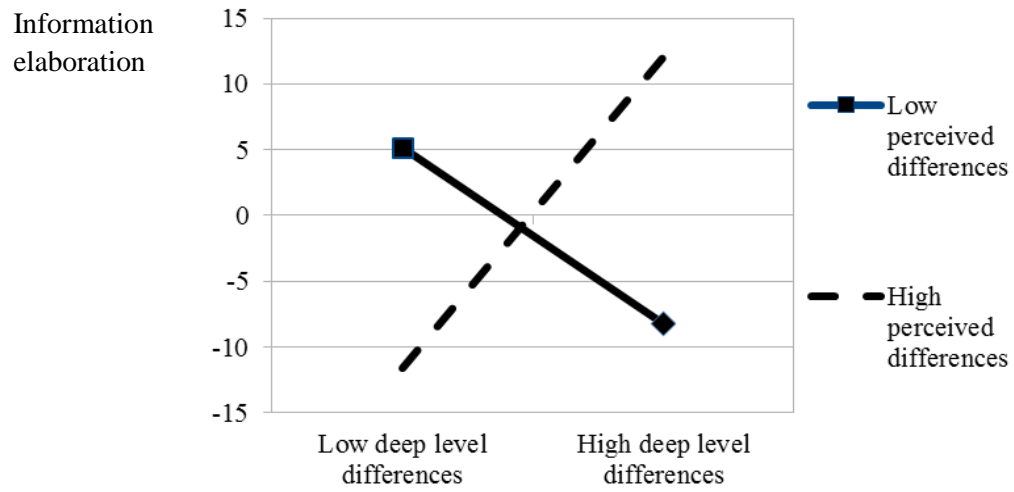


Figure 2b

*Illustration of interaction between deep level differences and perceived differences when surface diversity is low*

