Facing differences with an open mind: Openness to experience, salience of intra-group differences, and performance of diverse work groups

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ABSTRACT

This study examined how the performance of diverse teams is affected by member openness to experience and the extent to which team reward structure emphasized intra-group differences. Fifty-eight heterogeneous four-person teams engaged in an interactive task. Teams performed the worst when reward structure converged with diversity (i.e., faultline teams) compared to teams in which reward structure cut across differences between group members or pointed to a superordinate identity. High openness to experience positively influenced teams in which differences were salient (i.e., faultline and cross-categorized teams) but not teams with a superordinate identity. This effect was mediated by information elaboration.

When important decisions have to be made, organizations often turn to teams because teams are expected to have more and better informational resources than individuals (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). Teams in organizations have become more diverse in terms of their demographic composition over the years and will continue to become more diverse in years to come (Triandis, Kurowski, & Gelfand, 1994). As diversity has become a fact of organizational life, homogeneous teams are not only undesirable, but in many cases impossible to create. Because diversity has a pervasive impact on team functioning and performance (e.g., Guzzo & Dickson, 1996; van Knippenberg & Schippers, 2007), understanding the processes that underlie these effects - and managing them - has become a major challenge for organizational theory and practice.

Previous research on diversity has shown inconsistent results, which led Milliken and Martins (1996: 403) to dub diversity "a double-edged sword". On the one hand, diversity has potential value for teams because diverse teams generally possess more (diverse) information and knowledge, which may enhance team performance. On the other hand, diversity may also disrupt team processes and performance, because the potential emergence of subgroups may hinder the use of available information (van Knippenberg, De Dreu, & Homan, 2004; Williams & O'Reilly, 1998). Although existing models of diversity seem to be able to explain the effects of diversity as they occur, they are less able to predict *when* positive or negative effects will occur. Van Knippenberg et al. (2004) attribute this to the "main effects" approach that has characterized much of diversity research, and argue that it is impossible to understand the effects of diversity without taking moderators into account (see also Pelled, Eisenhardt, & Xin, 1999).

The main effects approach is incapable of fully explaining the effects of diversity in teams for two reasons. First, the focus on main effects cannot explain the inconsistent effects of diversity because it ignores moderating variables that determine whether diversity has positive or

negative effects. Second, and relatedly, the main effects approach fails to elucidate the underlying processes that are responsible for the effects of diversity on team performance, which may differ depending on characteristics of the situation. This lack of understanding is disturbing in light of the key role that diversity plays within organizations. In an attempt to enhance understanding of the consequences of team diversity we draw on the model put forward by van Knippenberg et al. (2004). Following their recommendations, we identify moderators that determine *when* and *why* diversity has positive or negative effects on performance. Specifically, we attempt to increase the understanding of diversity dynamics by exploring how team composition and structural aspects of the situation interact to influence the performance of diverse teams.

Although diversity is omnipresent in organizations, it may be more or less apparent to team members depending on situational characteristics such as spatial arrangements, task requirements, and reward structure (Van der Vegt & Van de Vliert, 2005). Accordingly, van Knippenberg et al. (2004) argued that it is important to consider the *salience* of diversity when trying to understand its effects on team functioning. The present study contributes to the understanding of diversity salience by using variations in reward structure to create three conditions of diversity salience: (a) salience of two distinct subgroups (i.e., a diversity faultline), (b) salience of differences per se, but lower salience of potential subgroups (i.e., "cross-categorization"), and (c) salience of the team as a whole (i.e., "superordinate identity"). In this way, we provide novel insights into the diversity-performance link by demonstrating that teams that are objectively identical in terms of diversity exhibit different levels of performance as a function of diversity salience. We focus on a demographic, visible diversity dimension (sex), because this dimension is often salient to people (Stangor, Lynch, Duan, & Glass, 1992) and is related to team functioning (Milliken & Martins, 1996).

Additionally, we will argue that the effects of diversity salience depend on the team's

personality composition. The impact of team personality composition on group functioning is an important area in the study of organizational behavior and one of the key topics of research on team functioning (Moynihan & Peterson, 2001). Team personality composition has important main effects on team outcomes (Barrick, Stewart, Neubert, & Mount, 1998; Bell, 2007; Kichuk & Wiesner, 1997). However, little is known about the possible moderating influence of team personality composition on the link between team diversity and performance. In this respect, it is important to note that organizations, teams, and individuals can differ in their attitudes and feelings towards working in diverse teams (Ely & Thomas, 2001). Indeed, in the best-established framework for understanding personality—the five factor model—the factor openness to experience is dedicated to the degree to which people are broad-minded, like novelty, and are not conservative (McCrae & Costa, 1987). We argue that teams with higher levels of openness to experience are more open to diversity than teams with lower levels of openness to experience. Incorporating openness to experience in research on diversity is an important contribution, because as we will show, the effect of diversity salience is contingent upon openness to experience.

Finally, although the importance of information elaboration as a mediator of the positive effects of diversity on team performance has been stressed in past theorizing, this variable has received little research attention. To fill this void, we examine information elaboration as the process leading to differential performance between diverse teams that differ in diversity salience and personality composition. Building on the theoretical model put forward by van Knippenberg et al. (2004), we propose that certain combinations of compositional and structural aspects of diverse teams are more conducive to information elaboration than others and show that these variations in information elaboration can account for differences in performance.

LITERATURE REVIEW AND HYPOTHESES

Work Group Diversity

Diversity may be seen as a characteristic of a social grouping (i.e., group, organization, society) that reflects the degree to which there are actual or perceived differences between people within the group (without presuming that group members are necessarily aware of actual differences or that perceived differences are strongly related to actual differences; van Knippenberg & Schippers, 2007). In a comprehensive review of the literature, Williams and O'Reilly (1998) discussed several theoretical viewpoints regarding the positive (information/ decision-making perspective) and negative (social-categorization perspective and similarity/attraction paradigm) effects of diversity.

According to the information/decision-making perspective, diversity can enhance the elaboration of task-relevant information and perspectives within the group—that is, the exchange, discussion, and integration of ideas, knowledge, and insights relevant to the group's task (van Knippenberg et al., 2004). The potential positive effect of diversity thus lies in the thorough and elaborate processing of diverse information, especially for tasks that require the combination and integration of different perspectives and ideas. Previous research found that diversity may indeed stimulate error detection (Davis, 1969), information processing (Phillips, Mannix, Neale, & Gruenfeld, 2004), group problem solving (Tjosvold & Poon, 1998), and group effectiveness (Gruenfeld, Mannix, Williams, & Neale, 1996). Thus, the existence of diverse perspectives within a work group can lead to enhanced team functioning through information elaboration.

On the other hand, from a social categorization perspective (Brewer & Brown, 1998) it can be expected that within demographically diverse teams, subgroup categorization creates "we-they" distinctions that may in turn lead to intergroup bias, such as in-group favoritism or prejudice. Along similar lines, similarity/attraction perspectives (e.g., Byrne, 1971) predict that people favor working with and are attracted to similar rather than dissimilar people. In support of

these ideas, a number of studies report *negative* effects of diversity on group functioning, such as interpersonal tensions and conflict (Chatman, Polzer, Barsade, & Neale, 1998; Pelled et al., 1999), stronger turnover intentions (Jackson, Brett, Sessa, Cooper, Julin, & Peyronnin, 1991), and lower group performance (Gruenfeld et al., 1996; Harrison, Price, Gavin, & Florey, 2002).

Clearly, the effects of diversity in teams are inconsistent and this poses a problem for theory development as well as for diversity management in organizations. Demographic differences have been found to be sometimes positively related (e.g., Cox, Lobel, & McLeod, 1991), sometimes negatively related (e.g., Gruenfeld et al., 1996), and sometimes unrelated (e.g., Jehn, Northcraft, & Neale, 1999) to group performance. The competing theoretical perspectives described above cannot account for these inconsistent effects. Integrating these perspectives, van Knippenberg et al. (2004) proposed that the performance of diverse teams is determined by the interplay between categorization processes and information elaboration. When subgroup categorization gives rise to intergroup bias, they argue, information elaboration is hindered, and group performance deteriorated. However, subgroup categorization and concomitant intergroup bias do not always occur within diverse groups. Whether diverse groups indeed experience subgroup categorization is determined by the salience of social categories within the group.

Salience of Intra-Group Differences

Diversity is more likely to negatively influence team functioning to the degree that work group members are aware of subgroups and dissimilarities within the group. Whether diverse groups experience subgroup categorization is determined, among other things, by the *salience* of subgroups (van Knippenberg et al., 2004). The salience of subgroups is influenced by the *comparative fit* of the subgroup categorization (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). Comparative fit reflects the extent to which a categorization results in clear between-group differences and within-group similarities. Comparative fit increases with smaller perceived

differences within groups and greater perceived differences between groups. The higher the comparative fit, the more likely subgroup categorization will occur, which may result in intergroup bias and deteriorated group functioning (Gaertner, Mann, Murrell, & Dovidio, 1989).

Inevitably, work group members differ on a variety of dimensions. These differences may be correlated to a greater or lesser degree (e.g., gender differences in a group may be independent of age differences, but gender and age may also co-vary). The more differences co-vary, the higher the comparative fit, and hence, the more people will perceive the group as consisting of subgroups (i.e., subgroup categorization; Hewstone, Rubin, & Willis, 2002). Recently, this notion of social category salience has received increasing research attention in the diversity literature (e.g., Earley & Mosakowski, 2000; Homan, van Knippenberg, Van Kleef, & De Dreu, 2007b; Lau & Murnighan, 1998; Thatcher, Jehn, & Zanuto, 2003). Extending this line of research, we argue that the salience of intra-group differences depends not only on correlations among diversity-related variables but also on aspects of the situation that are unrelated to diversity. Specifically, we suggest that one way in which organizations can influence the salience of diversity is through the reward structures adopted.

Within organizations, reward structures are important tools to influence team effectiveness (DeMatteo, Eby, & Sundstrom, 1998; Wageman, 1995). The design of reward systems can for example be based on the performance of individuals, parts of teams, or the team as a whole (Kerrin & Oliver, 2002). The effects of reward systems on team performance have been extensively studied (DeMatteo et al., 1998). For example, rewarding teams on the basis of team performance rather than individual performance can improve team functioning, depending on the degree of task interdependence, cultural values, and employee receptivity to team-based rewards (Kirkman & Shapiro, 2000; Wageman, 1995). Although reward structures are often used as a management tool to motivate people, they also have the potential to influence the salience of

intra-group differences (Gaertner et al., 1989). Rewarding a diverse team on the basis of team performance may decrease the salience of intra-group differences, because the team reward creates a commonality within the team that diverts attention away from differences between group members (Beersma, Hollenbeck, Humphrey, Moon, Conlon, & Ilgen, 2003; cf. Sherif, 1958). Conversely, rewards may be targeted at the performance of subgroups within the team, for instance when subgroups from different departments work together within a project team and the reward structure differentiates between subgroups by rewarding the subgroups from the different departments independently. Following this reasoning, reward structures may influence the salience of diversity and therefore performance of diverse teams in several ways. First, the reward structure can reinforce a division between subgroups by creating a diversity faultline. Second, rewards can cut across demographic differences, thus lowering the salience of subgroups. Third, reward structures can emphasize the superordinate identity of a team, thus lowering the salience of intra-group differences.

Faultlines. The comparative fit of potential subgroup categorizations increases when multiple diversity dimensions converge within a team (i.e., when the team has a diversity faultline; Lau & Murnighan, 1998). Under these conditions, teams may suffer from the detrimental effects of diversity. Gaertner et al. (1989) found that when subgroups were made salient by rewarding teams based on subgroup performance, inter-subgroup processes deteriorated (see also Homan et al., 2007b). Similarly, Lau and Murnighan (2005) showed that convergence of multiple diversity characteristics—in their study ethnicity and sex—increased the salience of subgroups, resulting in deteriorated group functioning. Thus, diversity can undermine group performance, and this is most likely to occur when several dimensions of diversity converge to activate diversity faultlines (Thatcher et al., 2003). Therefore, in line with faultline theory we propose that when diversity is reinforced by reward structure, team performance is

impeded. Below we propose a number of hypotheses comparing faultline teams with teams in which rewards either cross-cuts diversity or create a superordinate identity.

Cross-categorization. Cross-categorization refers to a situation in which group members differ on more than one dimension and differences are uncorrelated (i.e., they cross-cut each other). There are a number of reasons why cross-categorization has positive effects. First, cross-cutting categories makes social categorization more complex and decreases the distinction between in-group and out-group (i.e., it lowers comparative fit; Turner et al., 1987). Second, partially overlapping group memberships undermine the motivational bases that people have for intergroup comparison (Brewer & Brown, 1998). Because people are a member of multiple categories at the same time there is both less need and less opportunity to make a distinction based on category membership. Thus, by cross-categorizing multiple dimensions of diversity, perceptions of subgroup differences are reduced, making subgroup categorization less likely. That is, although cross-categorization does not reduce the differences between group members per se, the perceived salience of subgroups is reduced (Brewer, 1995).

Illustrative of this idea, a meta-analysis by Migdal, Hewstone, and Mullen (1998) showed that convergence of attributes (i.e., a diversity faultline) leads to an accentuation of the differences between and similarities within categories (i.e., high comparative fit), whereas the crossing of category dimensions accentuates similarities between the categories and differences within each category (i.e., low comparative fit). Migdal et al.'s analysis further showed that intergroup bias is reduced when diversity attributes are crossed, which reduces intragroup conflict and enhances information elaboration (Homan et al., 2007b). Finally, Marcus-Newhall, Miller, Holtz, and Brewer (1993) showed that crossing existing subgroups with role expectancies decreased intergroup bias compared to converging subgroups with roles. Thus, we predict:

Hypothesis 1. Diverse teams in which diversity is cross-cut by reward structure perform

better than diverse teams in which reward structure contributes to a diversity faultline.

Superordinate group identity. When situational/structural factors emphasize the group as a whole, within-group differences become less salient (Brown & Turner, 1981). The resulting superordinate identity creates a more inclusive identity which transforms potential "us-they" categorizations into a more inclusive "we" categorization (Brown & Turner, 1981; Sherif, 1958). As stated above, salient intra-group differences can lead to intergroup biases and deteriorated performance. Creating a superordinate identity, thereby obscuring differences and lowering comparative fit, should thus decrease the likelihood that negative effects of diversity occur.

In an experimental illustration of this principle, Gaertner et al. (1989) manipulated several factors such as spatial arrangement of the members, assignment of names, and the nature of interdependence among the group members. When these context factors emphasized the group as a whole (i.e., the superordinate identity) people reported significantly less intergroup bias than when the context emphasized the subgroups. Although Gaertner et al.'s work does not pertain to effects on team functioning and performance, we expect, based on these findings, that diverse teams perform better when reward structure makes the superordinate identity salient compared to teams in which reward structure enforces diversity faultlines.

Hypothesis 2. Diverse teams in which reward structure emphasizes a superordinate identity perform better than diverse teams in which reward structure contributes to a diversity faultline.

Above we introduced the idea that structural aspects of the situation can influence the salience of diversity, which in turn determines the performance of diverse teams. The next step in our analysis is to incorporate the nature of the diverse teams in terms of personality composition. Research has shown that people differ in their attitudes and beliefs toward working in diverse teams (Strauss, Connerley, & Ammermann, 2003; van Knippenberg & Haslam, 2003). Below we

develop the argument that attitudes towards diversity are rooted in individual differences in openness to experience, and that these differences moderate the relationship between diversity and team performance.

Openness to Experience

According to the social categorization and similarity/attraction perspectives, diversity may negatively affect teams because people tend to respond more favorably to similar rather than dissimilar others (Williams & O'Reilly, 1998). However, these perspectives do not take into account that people differ in their reactions to diversity in groups. Especially for task groups, personality characteristics of the team members may affect the favorability of responses to diversity. One of the most widely used taxonomies in personality research is the five factor model that describes five fundamental factors underlying personality—agreeableness, neuroticism, extraversion, conscientiousness, and openness to experience (McCrae & Costa, 1987). In addition to an impressive body of research in individual psychology, the five factor model has been widely used in studies on the personality composition of teams (e.g., Barrick & Mount, 1991).

Although several of the five personality factors are relevant to team functioning, openness to experience in particular is likely to be related to responses to team diversity. Openness to experience refers to an individual's willingness to explore, tolerate, and consider new and unfamiliar ideas and experiences (McCrae & Costa, 1987). Costa and McCrae (1992) distinguish six facets of openness to experience, three of which are important in terms of reactions to dissimilarities: ideas (e.g., intellectual curiosity and open-mindedness); actions (e.g., being adaptable, valuing experimentation, and liking novelty); and values (e.g., fluid political and religious beliefs). People high on openness to experience tend to be less dogmatic in their ideas, more willing to consider different opinions, more open to all kinds of situations, and less likely to deny conflicts than people low on openness to experience (Costa & McCrae, 1992; LePine, 2003;

McCrae, 1987). All these aspects of openness to experience are closely related to the essence of working in a diverse team, as members of diverse teams are more likely to have different viewpoints, attitudes and ideas (and therefore conflict) than members of homogeneous teams (Cox et al., 1991; van Knippenberg et al., 2004). Therefore, openness to experience should enable diverse teams to make better use of these differences and perform better.

Indirect evidence for the idea that openness to experience improves the functioning of diverse teams comes from several studies focusing on situational determinants of attitudes towards diversity. For instance, Ely and Thomas (2001) reported that when an organization's diversity perspective emphasized cultural diversity as a valuable resource for the organization, group members reported feeling more valued and respected, reported a higher quality of intergroup relations, and felt that they were more successful than when the organization's perspective was not focused on the potential value of diversity. Other work has shown that demographically diverse groups make better use of diverse information and perform better when they have value-in-diversity rather than value-in-similarity beliefs (Homan, van Knippenberg, Van Kleef, & De Dreu, 2007a). Moreover, pointing to the importance of openness to experience, Ekehammar and Akrami (2003) demonstrated that openness to experience, more than any of the other big five factors, is related to beliefs about and attitudes towards diversity. Similarly, Flynn (2005) showed that people who are high on openness to experience have more positive attitudes toward minority members than people low on openness to experience. Building on this research, we predict that diverse teams consisting of team members high on openness to experience are more likely to see the value in their differences, resulting in better performance.

Hypothesis 3. Diverse teams higher on openness to experience perform better than diverse teams lower on openness to experience.

Salience of Intra-Group Differences and Openness to Experience

Earlier we distinguished three conditions of diversity salience: faultline teams, cross-categorized teams, and superordinate identity teams. These different constellations of diversity render team diversity more or less salient to the group members (Brewer & Brown, 1998). Specifically, a reward structure that contributes to a diversity faultline increases the salience of diversity in general, and of subgroups in particular. Second, a reward structure that emphasizes the team as a whole decreases the salience of diversity and of subgroups. Third, a reward structure that cross-cuts diversity is associated with relatively high diversity salience but low subgroup salience (Brewer, 1995; Migdal et al., 1998). Because individuals with high levels of openness to experience are more open to differences and value these differences more, openness to experience can be expected to moderate the effects of diversity salience on team performance.

That is, when a team consists of strong subgroups, appreciating differences within the group may help to overcome the negative effects of subgroup categorization (Hornsey & Hogg, 2000). Similarly, when the salience of diversity within a team is highlighted by cross-categorization, being open to differences should have beneficial effects on team functioning. In contrast, however, when the salience of interpersonal differences is reduced by a superordinate identity, openness to experience should have a lesser impact on team performance. After all, if there are no salient differences to be open to, there should be less room for openness to experience to improve performance. Thus, we predict that:

Hypothesis 4. Diversity salience and openness to experience interact to predict team performance, such that relative to teams in which diversity salience is low (superordinate identity condition), teams in which diversity is salient (faultline and cross-categorization conditions) benefit from higher levels of openness to experience.

The Mediating Role of Information Elaboration

Finally, we argue that the positive effect of openness to experience in diverse teams is

mediated by information elaboration. Van Knippenberg et al. (2004) argue that diverse teams need to engage in information elaboration to mobilize the resources provided by their diversity of information, perspectives, and ideas (cf. Williams & O'Reilly, 1998). At the same time, however, salient differences between group members may disrupt information elaboration because individuals tend to be less willing to share ideas with, and are less open to communications of, diverse others (van Knippenberg et al., 2004). By engendering a more open-minded approach to dissimilar others, openness to experience thus fosters information elaboration in diverse groups. In accordance with this theorizing, Homan et al. (2007a) showed that information elaboration mediated the positive effects of diversity beliefs on the performance of diverse teams. Accordingly, we predict that the positive effect of openness to experience on performance in diverse teams is mediated by information elaboration.

Hypothesis 5a. Information elaboration mediates the impact of openness to experience on performance of diverse teams.

Extending this line of reasoning, we also propose that the mediating effect of information elaboration is more evident in teams in which diversity is more salient (i.e., under faultline and cross-categorization conditions as compared to superordinate identity conditions). Whereas salient diversity may draw attention to diverging perspectives that require elaboration, it is also likely to disrupt elaboration, because the more differences are salient, the greater the likelihood that information elaboration is disrupted by subgroup categorization (van Knippenberg et al., 2004). Accordingly, openness to experience may be especially important in fostering information elaboration in teams in which diversity is salient. Therefore, we predict that:

Hypothesis 5b. The stronger effect of openness to experience on performance under conditions of diversity salience is mediated by information elaboration.

METHODS

Sample

Research participants were 232 business students from a large Midwestern university who were arrayed into 58 four-person teams. Their mean age was 20.91 (s.d. = 1.26), and 80.6% indicated to be Caucasian. In exchange for their participation, participants earned class credit and were eligible for cash prizes ($10 per student) based upon their performance (see "manipulation of reward structure"). The teams were randomly assigned to one of the experimental conditions. The teams were composed such that all teams were sex diverse (i.e., two males, two females) and were thus exactly alike in terms of sex diversity. We used sex to create diverse teams because sex is often used as a basis for categorization (Stangor et al., 1992) and there is ample research indicating that sex diversity influences team functioning (e.g., Chatman et al., 1998).

Procedure

Participants entered a computer laboratory in groups of four to twelve people. In the laboratory space there was exactly enough room available to train two teams at the same time. Depending on the number of participants, one or two four-person groups were created and the remaining participants performed an individual task. Participants were randomly assigned to conditions and to teams. The participants took place behind a computer screen and filled out a number of questionnaires. After a training session, the participants performed a 30-minute task. After the task, the participants filled out a number of electronic questionnaires.

Task

The participants engaged in a modified version of the Distributed Dynamic Decision-Making (DDD) simulation (see Miller, Young, Kleinman, & Serfaty, 1998), which was originally developed for the Department of Defense for research and training. The DDD is an interactive team task using a dynamic command-and-control simulation. The task requires coordination and interaction between team members, as they are highly interdependent to perform well on the task.

The specific variant used in the present experiment requires little or no military experience and involves skills that emphasize vigilance and monitoring.[1] The object of the networked computer task is to monitor and defend a restricted airspace within a geographic region against an invasion from unfriendly ground or air targets. A depiction of the computer screen and a comprehensive description of the task appears in Beersma et al. (2003).

Four decision makers (DMs) are responsible for defending the geographic region by identifying and attacking unfriendly targets. They have to work as a team to coordinate their actions. The geographic region was divided in four quadrants of equal size and each area was assigned to one of the team members (i.e., DM1 through DM4), with DM2 being localized in the northwest, DM4 in the northeast, DM3 in the southwest, and DM1 in the southeast. The region was divided into three zones: a highly restricted zone, a restricted zone, and a neutral zone. The object of the task was to monitor and defend the restricted zones, by identifying and attacking unfriendly forces moving into these zones, while allowing friendly forces to move in and out of the areas freely. If an unfriendly force entered the restricted zones, the team began to lose points. Twice as many points per second were lost for unfriendly forces located in the highly restricted zone than in the restricted zone. Points were also lost for attacking forces in the neutral space and attacking friendly forces. Cash prizes were awarded to teams who lost the least points.

Each team member's location was indicated by a base that had a detection ring and an identification ring, which were used to monitor the air space around the base. Within the detection ring, DMs could detect forces, and within the identification ring, DMs could discern the nature of the forces (i.e., friendly or unfriendly). Any force outside the detection ring was

[1] To examine whether the task was gender biased, we analyzed the individual level performance data. This analysis showed no difference in performance between men and women on the task, suggesting that the task is not gender-related ($F[1, 226] = 1.66$, *ns*, $\eta^2 = .01$). Additionally, we asked all participants how much experience they had in using computers and handling a computer mouse. Analyses of these questions showed that there were no differences between men and women in their self-reported computer skills ($F[1, 226] = 3.07$, *ns*, $\eta^2 = .01$), nor in their self-reported mouse skills ($F[1, 226] = 0.001$, *ns*, $\eta^2 = .00$).

invisible to the DMs from their base. To see and identify forces outside of the detection and identification ring around the base, each DM could launch vehicles and move them near forces anywhere on the screen. Assigned to each base were four vehicles that could be used to identify forces and defend the space. As each individual team member thus only had limited information available, they needed to ask the other team members for information and assistance. Teams were allowed to talk during the task at all times and all teams made use of this possibility.

Before working on the task, all participants received extensive training. First, team members were introduced to the task by means of a standardized PowerPoint presentation, which lasted approximately 20 minutes. In the presentation, the theoretical aspects of the task were explained in words, pictures of the task, and by a voice-over. Second, the participants received a hands-on training of the simulation, which lasted approximately 60 minutes. In this hands-on part of the training the participants learned the basic mouse movements and operations, how to identify and engage forces, and how to move and use vehicles. After the training, teams engaged in the experimental task, which lasted for 30 minutes and was exactly the same in all conditions.

Performance scores were kept on three different levels: individual, pair, and group. The individual score was based on the amount of points lost and gained in each DMs individual quadrant. The geographical pair score was based on the amount of points gained and lost in the southern quadrants (DM1 and DM3) and northern quadrants (DM2 and DM4). Finally, the group score was based on the amount of points gained and lost in all four quadrants (the restricted zone). Each DM could see his or her individual score, his or her pair score, and the group score.

Manipulations and Measures

Group personality composition: Openness to experience. Prior to the experimental task, openness to experience was measured with a 12-item scale taken from the Revised NEO Personality Inventory-short form. This is one of the most widely used operationalizations of the

five-factor model, and Costa and McCrae (1992) provide ample evidence on the reliability and construct validity of this questionnaire. Some example questions are "Once I find the right way to do something, I stick to it (reverse coded)," "I believe letting students hear controversial speakers can only confuse and mislead them (reverse coded)," and "I often try new and foreign foods." The coefficient alpha estimate of reliability for the 12 items was .70.

For present purposes, we focus on openness to experience at the team level. There is ample research indicating that the theoretically appropriate operationalization of personality variables depends on the team task (e.g., Barrick et al., 1998; LePine, 2003; Moynihan & Peterson, 2001). Following these authors' recommendations, we examined the nature of the task to determine how openness to experience was to be aggregated to the group level. This aggregation procedure is rooted in the theoretical works of Steiner (1972), who distinguished among disjunctive, conjunctive, and additive tasks. Of Steiner's three categories, the additive model best represents the team task used in the present study. Each member could access a certain set of information common to all the team members; however, he or she also had knowledge of certain aspects of the task that were specific to his or her post. That is, each team member had an equal level of responsibility and an equal share of input into the team's output. This is fundamentally different from a disjunctive task (e.g., problem solving) where the team's best member determines the output of the team. This is also different from a conjunctive task (e.g., mountain climbing), where the team's weakest member determines the team's output. Summarizing, if the team wanted to perform at a high level, all team members had to interact with each other to exchange information, thereby increasing the team's knowledge base. Thus, in light of the additive nature of the task, we used the average of the team member's scores to represent openness to experience at the team level (mean = 3.26, s.d. = 0.26; see e.g., Barrick et al., 1998).

Reward structure: Faultline, cross-categorization, and superordinate reward. All groups

were heterogeneous on sex and always consisted of two males and two females. Diversity salience was manipulated using reward structures to create (a) faultline groups, (b) cross-categorization groups, or (c) superordinate identity groups.

To create the faultline and cross-categorization conditions, teams were broken down into two sub-teams, one that managed the Northern Region (the "Northern sub-team"; i.e., the participants in the NW and the NE quadrants) and one that managed the Southern Region (the "Southern sub-team" i.e., the participants in the SW and the SE quadrants). The performance of these sub-teams could be assessed independently, and financial awards in the faultline and cross-categorization conditions were based upon the performance of these sub-teams such that the highest performing sub-team would receive an award of $20. To prevent competition between sub-teams within one team, we created a situation in which the Northern sub-teams competed with the other Northern sub-teams and the Southern sub-teams competed with the other Southern sub-teams. This distinction based on geographic sub-teams, which is an existing characteristic of the task, was necessary to converge or cross-cut reward structure with sex diversity. In the *faultline* condition, the Northern sub-team was managed by two men and the Southern sub-team was managed by two women (or vice versa) thus reinforcing the sex difference. In the *cross-categorization* condition, the Northern sub-team and Southern sub-team were composed of a mixed sex sub-team, thus de-emphasizing the salience of the sex diversity.

To create a *superordinate* reward condition, we provided teams with a team-level reward by informing them that the top performing teams would receive a reward of $40. In these teams the sex composition within either region should not make any difference. Still, in order to control for unanticipated differences, we ran half of the teams in the superordinate condition with mixed sex Northern/Southern sub-teams and half with same sex Northern/Southern sub-teams. We expected that members of these teams would not be aware of Northern/Southern distinctions.

Results indeed showed no difference in performance between the two superordinate reward conditions ($F[1, 26] = 0.89$, *ns*), nor did they reveal differential effects of openness to experience in these conditions (ß = .19, $t[23] = 0.74$, *ns*). We therefore chose to simplify the presentation and conserve degrees of freedom by combining these conditions into one superordinate condition.

To check the composition manipulation, we asked participants whether the sex of the team-member who was based next to them (i.e., in the Northern of Southern sub-team) during the game was similar or dissimilar to their own sex. To check the adequacy of the reward structure manipulation, we asked participants how they would be rewarded: "on the basis of the performance of my team" or "on the basis of the performance of my geographic pair."

Measures

Performance. Each team started the simulation with 50,000 points and lost 1 point for each second that any unfriendly force was in the restricted zone and 2 points per second for each force in the highly restricted zone. The teams also lost 300 points for disabling any friendly force. The same calculation of team performance was used by Hollenbeck et al. (2002) and Moon et al. (2004). Average performance across teams was 41400.33 (s.d. = 3520.36).

Information Elaboration. After the experiment, we assessed information elaboration using a three item self-report measure and aggregated this to the group level using the mean (mean = 3.64, s.d.= .65, α = .85). This measure is based on the definition of information elaboration as provided by van Knippenberg et al. (2004).[2] It was adapted for this specific task from the questionnaire used by Homan et al. (2007b). The items were "The group members contributed a lot of information during the group-task," "The group members contributed unique information during the group-task," and "During the task, we tried to use all available information." To

[2] Based on the same definition of information elaboration, Homan et al. (2007a) coded information elaboration from videotapes. In both studies (Homan et al., 2007a; 2007b), information elaboration was found to be similarly affected by diversity and information elaboration showed comparable effects on team functioning.

control whether aggregation to the group level was appropriate, we computed ICC(1), ICC(2), and r_{wg} (Bliese, 2000). All three measures were acceptable, supporting aggregation to the group level: ICC(1) value .39, $F[58, 179] = 3.53$, $p < .01$; ICC(2) = .72; $r_{wg} = .87$ (Glick, 1985).

Control Variables. We use an additive measure of openness to experience at the group level to see whether teams high on openness to experience are less negatively affected by diversity. Authors have argued that it is important to control for dispersion effects of the personality trait when using mean scores of personality (Klein & Kozlowksi, 2000). We therefore used the standard deviation of openness as a control variable in our analyses.[3]

Although we had no theoretical rationale to include the other four traits of the Big Five, we did measure them using the short-form of the Revised NEO Personality Inventory (Costa & McCrae, 1992). Considering the importance of the other Big Five personality traits, we felt that it was important to control for their effects in this study. Supporting our claim that openness was theoretically most interesting in relation to diversity, we found—in separate analyses—that none of the other personality traits significantly predicted performance (neither alone nor in interaction with the salience manipulation). Additionally, the original effects did not change when controlling for the other personality traits simultaneously or separately (using mean levels as well as standard deviations). Since none of the dimensions had any effect on team performance, we proceeded to test our hypotheses without these dimensions in order to preserve degrees of freedom and to minimize the chances for a Type I error.

Finally, because participants were randomly assigned to conditions and to teams, we would

[3] Additionally, we wanted to check whether heterogeneity in openness to experience could serve as a sole predictor in our model. We therefore repeated our analysis with the variance in openness to experience as a predictor. We found no main effect (ß = .25, $t[55] = 1.93$, *ns*) or interaction effects between variance in openness to experience and our dummy variables representing the cross-categorization and the superordinate identity conditions (cross-categorization: ß = -.17, $t[51] = -1.14$, *ns*; superordinate identity: ß = -.28, $t[51] = -1.67$, *ns*) on team performance. This analysis bolsters our belief that it is the mean level of openness rather than heterogeneity on openness that creates the effects.

not expect any effects of age and race composition. Still, as an additional check, we controlled for heterogeneity in age (using standard deviation) and ethnic diversity (using Blau's index; Blau, 1977; also see Harrison & Klein, 2007). Neither of these variables had main effects (ß = .13, t[53] = 0.94, *ns* for age; ß = -.20, t[53] = 1.99, *ns* for ethnic diversity) on performance, nor did their inclusion change the results concerning our hypotheses. Again, to minimize the probability of Type 1 errors, we chose to not incorporate these variables in the results below.

RESULTS

All questionnaires were filled out electronically. Some participants experienced technical problems, which resulted in a crash of the last webpage that contained the manipulation checks, whereas others just overlooked these questions, which resulted in some non-response (n = 37 for the reward structure check and n = 36 for the sex composition check). Because the non-response was evenly distributed across conditions and groups, non-response does not seem to be an issue.[4] Manipulation checks were analyzed individually, but team level analysis rendered similar results.

Table 1 presents the means, standard deviations, and correlations for the variables of interest. The results were analyzed using hierarchical linear regression. The dependent variable—performance—was standardized. We centered information elaboration and openness to experience and created two dummy variables comprising the three conditions. The comparison condition (i.e., the condition that scored a zero on all dummies) was the condition in which same-sex sub-teams were aligned with a pair reward: the *faultline* condition. This condition was

[4] To examine whether the non-response on the manipulation check questions was influenced by our manipulations, we performed Chi-square tests. Results indicated that non-response on the sex composition manipulation check was not affected by the sex composition manipulation (χ^2[1, n = 232] = 0.13, *ns*; 17 missing values in the mixed-sex subgroup condition vs. 19 in the same-sex subgroup condition), nor by the reward manipulation (χ^2[1, n = 232] = 0.52, *ns*; 20 missing values in the team reward condition vs. 16 in the subgroup reward condition). Likewise, non-response on the reward structure manipulation check was unaffected by the reward structure manipulation (χ^2[1, n = 232] = 1.57, *ns*; 15 missing values in the team reward condition vs. 22 in the subgroup reward condition) and the sex manipulation (χ^2[1, n = 232] = .29, *ns*; 17 missing values in the mixed-sex subgroup condition vs. 20 in the same-sex subgroup condition).

compared to the condition with a pair reward for mixed-sex sub-teams (*cross-categorization* condition; dummy 1), and to the combined *superordinate* condition in which mixed-sex and same-sex sub-teams were rewarded based on their team performance (dummy 2). To test the effects of openness to experience combined with the different reward structure conditions, we calculated the product of openness to experience and the two dummy variables.[5]

Insert Table 1 about here

Manipulation Checks

The manipulation of sex composition of the subgroups was checked by performing a Pearson Chi-square test, which indicated that participants were aware of the sex of the other person in their geographical pair ($\chi^2[1, n = 196] = 169.02, p < .01$). Participants that were in a same-sex sub-team correctly indicated that the sex of the person in their sub-team was the same as their own. Participants in a mixed-sex sub-team indicated that the sex of their sub-team member was different from their own. The perceived sex composition of the team was not affected by the manipulation of reward structure ($\chi^2[1, n = 195] = 0.00$, *ns*).

A Pearson Chi-square test showed that the manipulation of reward structure was also successful ($\chi^2[1, n = 195] = 36.88, p < .01$). Participants in the team reward condition thought that the chances to obtain the reward were dependent on the performance of the team as a whole, and participants in the pair reward condition thought that the chances to obtain the reward were dependent on the performance of their sub-team. This manipulation was not affected by the sex

[5] As per a reviewer's suggestion, we re-analyzed the data using a 2 (reward structure: sub-team vs. team) by 2 (gender seating: gender and region aligned vs. gender and region crossed) by openness to experience design. The analysis results in similar conclusions concerning our hypotheses. However, the gender seating dummy is meaningless without the reward structure dummy and by running this analysis we incorporate an extra main effect and an interaction effect in our regression analysis of which we did not expect nor find any effects. We therefore decided not to report this analysis in the paper, as it would not provide the most parsimonious or straightforward test of our hypotheses. Results of this test are available from the first author.

composition of the sub-teams ($\chi^2[1, n = 196] = 0.74$, *ns*).

Test of Hypotheses

Insert Table 2 about here

Control: Dispersion of Openness to Experience. Table 2 shows the results of the hierarchical regression used to test our hypotheses. In step 1, we entered the standard deviation of openness to experience as a control variable and we found that it did not predict performance.

Hypothesis 1 and 2. In Step 2, we regressed team performance on the two dummy variables representing the superordinate reward and cross-categorization conditions. Consistent with Hypothesis 1, we found that groups in the cross-categorization condition performed significantly better than groups in the faultline condition. In line with Hypothesis 2, groups with a superordinate reward also performed better than faultline groups. The main effect of reward structure, which explained an incremental 18% of the variance beyond heterogeneity in openness to experience, is graphically depicted in Figure 1.

Insert Figure 1 about here

Hypothesis 3. In step 3 we entered openness to experience. Supporting Hypothesis 3, groups with a higher level of openness performed better than groups with a lower level of openness. Openness to experience explained an additional 8% of the variance in performance.

Hypothesis 4. In Step 4 of the hierarchical regression, we examined the interaction between group composition and reward structure by adding the products of openness to experience and both of the dummy variables. This revealed a significant interaction between openness to experience and reward structure on team performance (see Step 4 in Table 2), which accounted for 16% of the incremental variance in performance beyond the main effects. To

understand this interaction, we plotted the effect of openness to experience for each of the three levels of reward structure. As can be seen in Figure 2, openness to experience was more positively related to performance in the faultline condition and the cross-categorization condition compared to the superordinate identity condition (to compute the latter contrast we recoded the dummy variables in such a way that the cross-categorization condition was represented by a 0).

There was no differential effect of openness to experience between the faultline condition and the cross-categorization condition. That is, consistent with Hypothesis 4, in both conditions where differences were made relatively salient by reward structure, high openness to experience equally promoted team performance compared to the condition in which differences were obscured. Consistent with our theorizing, and as apparent from Figure 2, the worst performance occurred within faultline teams that were low in openness to experience, and the best performance within cross-categorized teams that were high in openness to experience.

Insert Figure 2 about here

Hypotheses 5a and b. To test whether the positive effect of openness to experience in diverse teams was mediated by information elaboration (*Hypothesis 5a*), we followed the procedure suggested by Baron and Kenny (1986). We already established that openness to experience affects performance (see Table 2). Second, we found that openness to experience increased information elaboration ($\beta = .27$, $p < .05$) and that more information elaboration inspired greater performance ($\beta = .44$, $p < .01$). Third, when we added information elaboration into the regression equation ($\beta = .35$, $p < .01$), the originally significant effect of openness to experience on performance was reduced to non-significance ($\beta = .19$, $p = .17$), and this reduction itself was significant according to a Sobel test ($z = 1.88$, $p < .05$ [one-tailed]).

Finally, we examined whether information elaboration mediated the interaction between

openness to experience and the salience of intra-group differences on team performance. The interaction between openness and reward structure showed that in the faultline and cross-categorization conditions higher levels of openness led to higher performance, but that openness did not affect performance in the superordinate identity condition (see *Hypothesis 4*). As elaborated above, this is because diversity is less salient in the superordinate identity condition, which makes it more difficult to harvest the value in diversity. In other words, as differences are salient in the faultline and cross-categorization conditions, information elaboration is likely to act as a mediator in these conditions, but not in the superordinate identity condition.

In this respect, it has been suggested that it is possible that the proposed mediator is more strongly related to the dependent variable under some conditions than others (Hull, Tedlie, & Lehn, 1992; also see Muller, Judd, & Yzerbyt, 2005). In this case, simply entering the mediator as a covariate violates the statistical assumption of homogeneity of regression slopes (i.e., the assumption that the slopes of the regression lines are the same in each group). Inclusion of the "covariate interaction" (i.e., the interaction between an independent variable and the proposed mediator) then yields a more appropriate test of mediation than an analysis that only includes the "main effect" of the proposed mediator (Hull et al., 1992; Muller et al., 2005).

To test our mediational model, we included the covariate interaction between information elaboration and our dummies representing the reward structure conditions. In the first step, we showed a significant interaction between reward structure and openness to experience on performance (*Hypothesis 4*). In the second step, openness to experience was found to predict information elaboration (*Hypothesis 5a*). In the final step, the interactions between the reward structure dummies and openness to experience (including the main effects) and the covariate interactions between the reward structure dummies and information elaboration (including the main effect of information elaboration) were simultaneously entered into the equation to predict

performance. This analysis produced a significant effect of the covariate interaction (β = -1.54, $p < .05$) and the originally significant interaction between the dummy representing the superordinate identity condition and openness was reduced to non-significance (β = -.38, *ns*), and this reduction itself was significant (Sobel's $z = 1.75$, $p < .05$ [one-tailed]).

DISCUSSION

As a result of an increasingly diverse workforce, work groups are inevitably composed of members with different demographic backgrounds, values, expertise, and perspectives. As previous research on the effects of diversity in teams has shown inconsistent results, we set out to broaden our understanding of diversity by taking important moderators into account. Perhaps our most compelling finding is that in both the highest and lowest performing teams diversity was salient, but in the highest performing teams reward structure cross-cut sex diversity and members were high in openness, whereas the worst performing teams had a diversity faultline and were low in openness. We now consider theoretical and practical implications of these findings, discuss strengths and limitations of our approach, and outline avenues for future research.

Theoretical Implications and Contributions

Past inconsistent findings regarding diversity have been attributed to the "main effects" approach that has characterized a lot of diversity research (van Knippenberg et al., 2004). In line with this idea, our findings support the notion that in teams that are identical in terms of sex diversity, performance differs depending on structural aspects of the situation and the team's personality composition. As outlined in the Introduction, prevailing theories in diversity research are very well capable of explaining why positive or negative effects of diversity occur. Positive effects of diversity are assumed to be caused by information/decision-making processes, whereas the negative effects of diversity are assumed to result from disruptive social categorization processes (Williams & O'Reilly, 1998). However, these perspectives are less able to predict *when*

positive or negative effects of diversity will occur. That is, given a certain level of diversity, it is difficult to forecast, on the basis of these theories, what the performance of the team will be. Using the framework developed by van Knippenberg et al. (2004), we showed that the outcomes of diversity are contingent upon the salience of the diversity as well as upon how people feel about diversity. These findings contribute to the literature in several ways.

First, our findings point to the importance of diversity salience. Comparing three conditions of salience, we showed that within sex-diverse teams, increasing the salience of sex-based subgroups by aligning sex with reward structure leads to lower levels of performance, whereas cross-cutting sex with reward structure or providing a superordinate identity leads to higher levels of performance. These findings represent an important qualification of the social categorization perspective because they indicate that teams with similar levels of diversity do not necessarily experience similar social categorization processes and exhibit similar performance. This suggests that the relation between diversity and performance is more complex than is assumed by the social categorization perspective, as diversity does not necessarily hamper group processes and consequential group performance. Our findings also speak to the information/ decision-making perspective, which holds that diversity stimulates the use of information and thereby enhances performance. The present study indicates that such positive effects of diversity are likely to occur when the salience of subgroups within the team is reduced, but not when subgroup salience is reinforced. Our findings thus help to integrate these divergent perspectives by specifying when diversity will have positive effects and when it will have negative effects.

Second, we show that there are differences in how teams experience their diversity. We are the first to explicitly show that diverse teams that are high in openness to experience perform better than diverse teams that are low in this characteristic. We also show that when differences within the team are salient, openness to experience helps teams to capitalize upon their

differences. This again is an important qualification of the aforementioned theories, as it suggests that one should take people's ideas about diversity into account when examining diversity effects.

Third, our study qualifies and extends the similarity/attraction paradigm, superordinate identity models, and faultline theory. Whereas the similarity/attraction paradigm predicts that people will be more attracted to similar than dissimilar others, our results show that there are individual differences in people's reactions to dissimilar others. One can therefore not simply predict that within diverse teams, people will be more attracted to their "ingroup" than to the "outgroup"; rather, this depends on people's openness to experience. As to the superordinate identity model, our findings show that installing a superordinate identity can help to overcome some of the negative consequences of diversity (Chatman et al., 1998), even when groups are low in openness to experience. Finally, regarding faultline theory, our results indicate that the positive effects of openness to experience were quite manifest under faultline conditions, which have been shown in previous work to be detrimental to group functioning (Thatcher et al., 2003). This not only sheds new light on faultline theory (Lau & Murnighan, 1998), but also gives us a more positive outlook on diversity in teams (also see Gibson & Vermeulen, 2003)—diversity faultlines need not disrupt team processes as long as team members are high on openness to experience.

Fourth, the present study adds to the diversity literature by showing that information elaboration is an important process by which diverse teams can improve their performance. Although it has been proposed that effective use of information is vital for the functioning of diverse teams (van Knippenberg et al., 2004), little research has examined underlying processes driving diversity effects. Our findings are in line with previous work showing that the extent to which teams attempt to be inclusive in making and integrating strategic decisions partially mediates the effects of diversity on team functioning (Simons, Pelled, & Smith, 1999). Moreover, the fact that openness to experience engendered elaboration in groups in which differences were

salient corroborates our proposition that positive attitudes towards diversity enable group members to capitalize on their diversity.

Fifth, the finding that openness to experience is positively related to the performance of diverse teams represents a substantial contribution to existing theory on the personality composition of teams, because we show that an individual difference variable has important implications for the functioning of diverse teams. Our study was built upon the idea that particular personality characteristics are related to beliefs and attitudes about diversity (Flynn, 2005). However, although several authors have argued that individual differences are important determinants of attitudes toward differences in teams (e.g., Strauss et al., 2003), previous studies have focused mainly on how personality characteristics predict stereotyping and intergroup bias at the *individual* level. Consistent with previous suggestions that it is important to consider group personality composition when examining group functioning (e.g., Humphrey, Hollenbeck, Meyer, & Ilgen, 2007), the present study showed that a group's composition in terms of openness to experience also affects performance and the way diversity is dealt with at the *group* level.

Sixth, we focused on openness to experience as a moderator of diversity effects in teams, as this variable seems most closely related to attitudes and feelings towards working in diverse teams. Of all the Big Five traits, openness to experience has received the least research attention, and numerous authors have pointed to the complicated definition and inconsistent effects of this trait (e.g., Barrick & Mount, 1991). Many recent studies examining the Big Five traits have therefore chosen to exclude openness to experience as a predictor or to only examine it in an exploratory fashion (e.g., Barrick et al., 1998; Kichuk & Wiesner, 1997). The fact that we find a positive and significant effect of openness to experience could mean a revival for this trait. Our findings indicate that openness to experience might be extremely valuable, especially if teams or individuals are faced with something that requires an open mind. That is, our findings indicate

that the effects of openness to experience might be contingent upon situational factors, which may account for null effects that have been found in previous research.

Practical Implications

The present findings suggest several possible diversity management strategies. First, selecting team members who are high in openness to experience might help teams to make use of the value in diversity. Second, when diverse teams contain low openness members, a solution would be to advocate pro-diversity beliefs in order to stimulate information elaboration and team performance (Homan et al., 2007a; van Knippenberg, Haslam, & Platow, 2007). Third, another practical solution for managing diverse teams low on openness to experience would be to install a superordinate identity so as to decrease diversity salience and prevent subgroup categorization. One way in which management may accomplish this is by using reward structures that emphasize a teams' superordinate identity (cf. Li & Hambrick, 2005). Finally, in high openness teams, reward structures may be used to create a cross-categorized identity that highlights diversity but reduces the salience of subgroups.

Although a strong focus on superordinate identity can result in better performance compared to a faultline group (cf. Chatman et al., 1998), it might also decrease the positive effects of openness to experience. Polzer, Milton, and Swann (2002) argued that in order for diverse teams to capitalize on their differences, people should feel that their self- and social views are verified. Emphasizing a superordinate identity could cause group members to replace their personalized self-conception with a cognitive representation of themselves as embodiments of the work group prototype (Polzer et al., 2002). Creating a strong superordinate identity alone may therefore not always be the best decision, especially when groups are potentially better off when elaborating on their diverse perspectives and ideas. In contrast, it might be more fruitful to create cross-categorized teams in which the focus is on interpersonal rather than inter-subgroup

differences, or, alternatively, instigate a dual identity focusing on the superordinate identity as well as on subgroup identities within the superordinate group (Gaertner & Dovidio, 2000).

Limitations and Future Directions

Although the main aim of experimental studies is not to obtain external validity (Berkowitz & Donnerstein, 1982), reports of experimental research tend to elicit questions of external validity. Obviously, then, confidence in the conclusions advanced here can be strengthened when the current results are replicated in a study of teams in actual organizations, and this would indeed seem an important avenue for future research. On the other hand, the highly controlled nature of the present research context promoted internal validity, and the ability to randomly assign teams to conditions and obtain objective measures of performance provides a stronger base from which to draw causal inferences (Ilgen et al., 2005). Additionally, prior research using this task has shown that participants are motivated to perform well to increase their chances of a bonus (Beersma et al., 2003). Thus, we believe that our task had considerable psychological realism. Moreover, from a theory testing perspective, there is no indication within existing theories of faultlines or cross-categorization that these theories would not hold in an experimental context.

Our reward structure manipulation created either a strong faultline or no faultline at all. Previous work has distinguished between differences in faultline strength (Gibson & Vermeulen, 2003, Lau & Murnighan, 2005), stating that faultlines especially have detrimental effects when they are strong—that is, when the faultline creates very distinct subgroups. Our study does not speak to this issue in that we compared a condition with a strong faultline with conditions in which there was no active faultline. As predicted on the basis of faultline theory, we found more positive outcomes under no faultline conditions. From this we should not conclude, however, that the relationship between faultline strength and outcomes is linear. It is possible that weak to

moderate faultlines yield outcomes that are comparable to no faultline conditions. Future research could study this issue in more detail by incorporating distinct manipulations of faultline strength.

Finally, because we wanted to examine the contingencies of the performance of diverse teams, we studied only heterogeneous teams. This means that we must be careful not to conclude that the present findings pertain to differences between sex homogeneous and heterogeneous teams. Furthermore, it is important to note that sex is not the only dimension on which team members may differ. Teams differ on numerous dimensions ranging from highly visible characteristics such as race and age to more invisible characteristics like perspectives, functional backgrounds, and values. Our sample was relatively homogeneous with regard to these other factors. Future research could focus on other diversity dimensions. Whether the effects of other types of diversity are the same may depend, among other things, on the salience of the diversity dimension. Van Knippenberg et al. (2004) proposed that all types of diversity can possibly result in salient subgroups within teams. Therefore, besides incorporating other diversity characteristics than sex, future research should determine the salience of the diversity dimensions of interest.

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TABLE 1

Means, Standard Deviations, and Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6
1. Openness to Experience s.d.	0.45	0.20						
2. Openness to Experience mean	3.26	0.26	.32*					
3. Dummy Cross-Categorization	0.25	0.44	-.24	-.19				
4. Dummy Superordinate Reward	0.49	0.50	.14	.05	-.57***			
5. Dummy Faultline	0.25	0.44	.09	.14	-.34**	-.57***		
6. Performance	41400.33	3520.36	.25	.34	-.03	.34**	-.37**	
7. Information Elaboration	3.64	0.65	.28*	.33*	.02	.11	-.14	.44**

[a] $n = 58$; the three dummy variables representing the experimental conditions are incorporated in the table for sake of comprehensiveness. For each dummy variable the name indicates which condition was given a 1 (i.e., for dummy cross-categorization, the cross-categorization condition scored a 1 and the other two conditions [faultline and superordinate] scored a 0). Please note that correlations among the three dummy variables are redundant as they share similar groups (i.e., faultline teams are represented by a 0 in the cross-categorization dummy as well as in the superordinate dummy). Additionally, the correlations between the three dummy variables and performance do not take the full design into account, leading to slightly different results than the regression analysis.

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 2

Team Performance as a Function of Reward Structure and Openness to Experience[a]

	Performance							
	1		2		3		4	
Step 1								
Openness to Experience Standard Deviation (*Control*)	.25	(0.64)	.28*	(0.66)	.18	(0.61)	.08	(0.58)
Step 2 - Contrasts between reward structure conditions								
Cross-Categorization vs. Faultline (*Hypothesis 1*)			.34*	(0.34)	.38*	(0.33)	.47**	(0.31)
Superordinate Reward vs. Faultline (*Hypothesis 2*)			.51**	(0.29)	.52**	(0.28)	.57***	(0.26)
(Superordinate Reward vs. Cross-Categorization)[b]			.13	(0.30)	.10	(0.28)	.03	(0.27)
Step 3								
Openness to Experience Mean (*Hypothesis 3*)					.31*	(0.47)	.73**	(0.85)
Step 4 - Two-way interactions; *Hypothesis 4*								
Cross-Categorization vs. Faultline x Openness							.12	(1.46)
Superordinate Reward vs. Faultline x Openness							-.53**	(0.98)
(Superordinate Reward vs. Cross-Categorization x Openness)[b]							-.79**	(1.33)
Total R^2	.06		.24**		.32*		.46**	
ΔR^2			.17**		.08*		.14**	

[a] $n = 58$; standardized coefficients (ß) are reported in Models 1-3; Standard errors are reported in parentheses. Unless otherwise indicated, the faultline condition was the reference group (dummy-coded as 0).

[b] For the sake of completeness, we reran the analysis with the cross-categorization condition as the reference group (i.e., the cross-categorization condition was dummy-coded as 0). Because the contrast between the faultline condition and the cross-categorization condition in this additional analysis is similar to the contrast between the faultline and cross-categorization conditions in the central analysis pertaining to our hypothesis tests, we only report the contrast between the superordinate reward and cross-categorization conditions that is unique to the additional analysis.

* $p < .05$
** $p < .01$
*** $p < .001$

FIGURE 1

The Effects of Reward Structure on Performance in Diverse Team (Hypotheses 1 and 2).

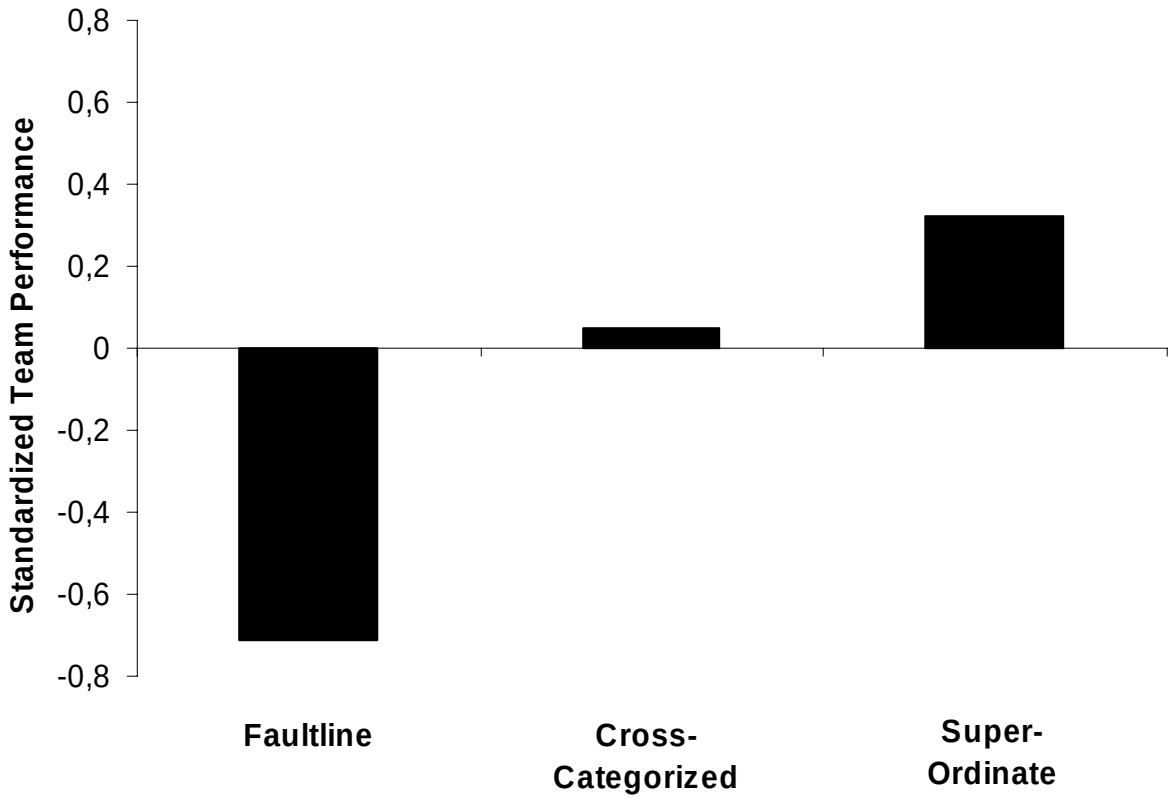
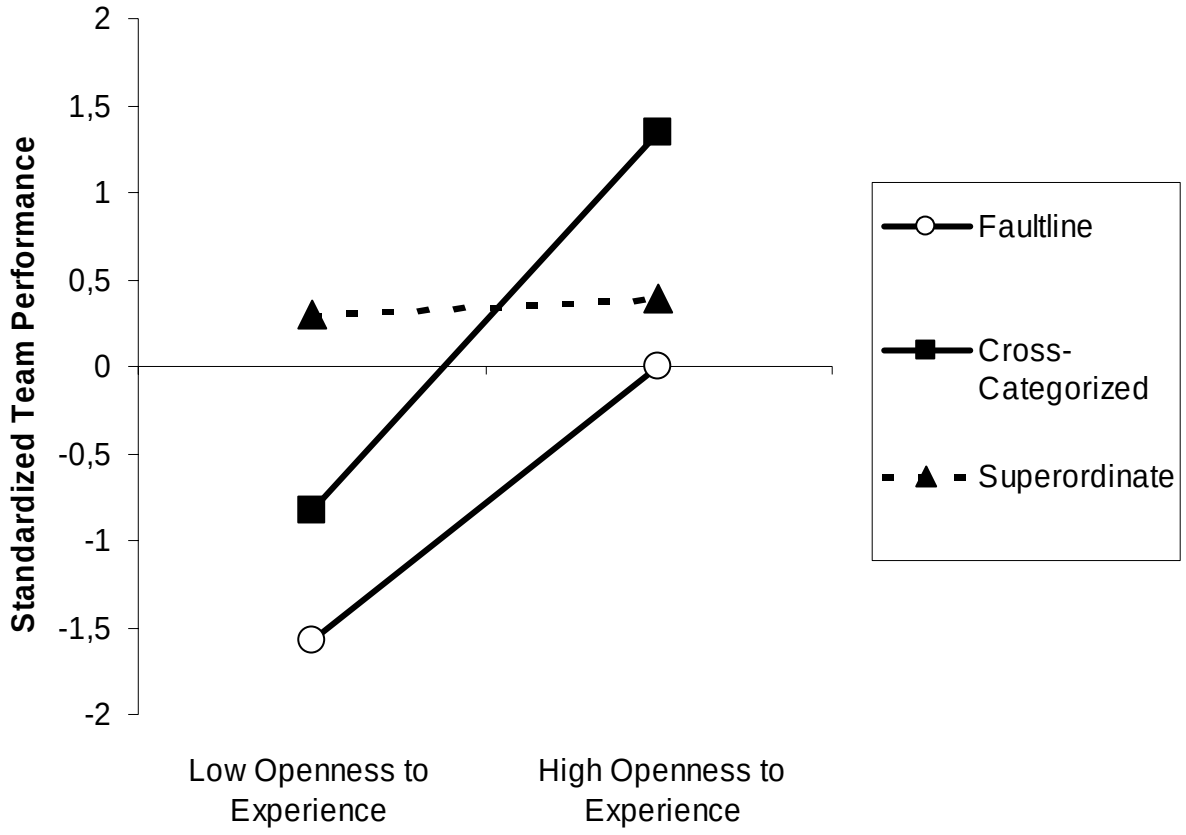


FIGURE 2

The Interactive Effects of Openness to Experience and Reward Structure on Performance in Diverse Teams (Hypothesis 4).



Biographical Sketches

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