

# Managing Diversity and Enhancing Team Outcomes: The Promise of Transformational Leadership

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In a sample of 62 research and development (R&D) teams, the authors examined transformational leadership as a moderator of the relationship of age, nationality, and educational background diversity with team outcomes. When levels of transformational leadership were high, nationality and educational diversity were positively related to team leaders' longitudinal ratings of team performance. These relationships were nonsignificant when transformational leadership was low. Age diversity was not related to team performance when transformational leadership was high, and it was negatively related to team performance when transformational leadership was low. Two mediated moderation effects help explain these findings. Transformational leadership moderated the relationship of the 3 examined diversity dimensions with the elaboration of task-relevant information, which in turn was positively associated with team performance. Moreover, transformational leadership moderated the relationship of the 3 diversity types with collective team identification, which in turn was positively related to the elaboration of task-relevant information. The authors discuss the theoretical and practical implications of these results. Overall, this study suggests that transformational leadership can foster the utilization of the potential, but frequently untapped, benefits entailed by both demographic and informational/cognitive team diversity.

*Keywords:* diversity, transformational leadership, elaboration of task-relevant information, collective team identification, team performance

What can ensure that the positive effects of team diversity outweigh the drawbacks frequently found to be associated with heterogeneity? We address this question by examining the role that transformational leadership can play in managing teams that are demographically and informationally/cognitively diverse. Since 1990, more studies have been conducted on transformational and charismatic leadership than on all other popular theories of leadership combined (Judge & Piccolo, 2004). The literature is replete with studies documenting the positive effects of transformational leadership on numerous outcomes such as follower motivation, satisfaction, and performance, as well as—with respect to these criteria—the superiority of transformational leadership over transactional or laissez-faire leadership styles in most situations (Judge & Piccolo, 2004; Lowe, Kroeck, & Sivasubramaniam, 1996). Transformational leadership has been described as being particu-

larly important given recent developments such as fast-paced change, mounting pressure to innovate, and heightened globalized competition, all of which contribute to growing levels of uncertainty (Lim & Ployhart, 2004). Among these important developments in the workplace are the increasing reliance on teams to generate the solutions required for sustained business success (Kozlowski & Bell, 2003) and the inevitably rising levels of diversity in these teams (Van Knippenberg & Schippers, 2007). In light of these trends, it is vital to examine if and how the currently most popular and arguably most generally effective type of leadership (Bass & Riggio, 2006) may be suitable for meeting the demands entailed by an increasing demographic and informational/cognitive heterogeneity in organizational teams. Despite the current popularity of both diversity and transformational leadership research, a gap exists in both literatures in that it has thus far not been explored how transformational leadership affects the balance between the negative and the positive effects spawned by different types of team heterogeneity.

The effects of diversity are typically explained in the literature from an information-decision-making perspective (which predicts positive effects of diversity) on the one hand or from a similarity-attraction or social categorization perspective (which posit negative effects of diversity) on the other (Williams & O'Reilly, 1998). Unlike most previous empirical studies, we consider both of these perspectives and propose that transformational leadership has a dual effect. With respect to the information-decision-making perspective, we posit that transformational leadership fosters the elaboration and in-depth processing of the broader range of task-relevant information that is available in heterogeneous teams. In line with Van Knippenberg, De Dreu, and Homan (2004), we

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assume that the elaboration of task-relevant information—that is, the exchange, discussion, and integration of ideas, knowledge, and insights pertaining to assigned tasks—is the primary process whereby diversity can exert positive effects on team performance. Moreover, concerning the social categorization perspective, we argue that transformational leadership obviates adverse effects such as low levels of collective team identification in diverse teams. These potential negative effects of heterogeneity can disrupt the elaboration of task-relevant information and thus impede team performance (Van Knippenberg et al., 2004). Figure 1 depicts these posited linkages. We assume that, primarily via these processes, transformational leadership constitutes a viable strategy for bringing to fruition the propitious effects and at the same time preventing the deleterious effects of different dimensions of team diversity, thus enhancing team performance. We tested these assumptions in a field study of 62 research and development (R&D) teams in the pharmaceutical industry.

Marks, Mathieu, and Zaccaro (2001) have argued that there is a difference between team processes—that is, the means whereby team members utilize team resources—and emergent states—that is, the cognitive, motivational, and affective states of teams. In our model, we consider the role of collective team identification as an emergent state in teams as well as the role of the elaboration of task-relevant information as a team process. By including the concepts of both emergent states and team processes as intervening variables, we heed the advice to develop more inclusive models that enable a deeper understanding of the antecedents of team performance (Marks et al., 2001).

Our aim is to contribute to two literatures. First, regarding the diversity literature, we extend the attempts to better understand when (i.e., the conditions under which) and how (i.e., the processes through which) both demographic *and* informational/cognitive diversity have more or less positive effects on team performance. Second, with respect to the transformational leadership literature, we investigate the role of this leadership style in an increasingly important context—the management of demographically and informationally diverse teams. Both aspects are of major theoretical and practical importance. For example, if transformational leadership were identified as a means whereby the balance between the positive and the negative effects of different dimensions of diversity could be tipped in favor of the former, organizations could take informed steps in selecting and training leaders of diverse teams.

### Diversity and Team Performance

Due to demographic developments, greater mobility, increasingly globalized markets, and stiffer competition, as well as laws

aimed at furthering fairness in hiring practices, organizational teams have become more and more diverse over the years with respect to educational background and demographic characteristics such as age and nationality (Jackson, Joshi, & Erhardt, 2003). Diversity can be conceptualized as a characteristic of a social grouping (i.e., a team, organization, or society) that reflects the degree to which there are objective or subjective differences among people within the group (Van Knippenberg & Schippers, 2007). These differences can indicate either separation (i.e., diverging positions, opinions, or values), variety (i.e., heterogeneity with respect to task-relevant categories that the group members belong to), or disparity (i.e., an unequal distribution of valued resources) (Harrison & Klein, 2007).

Although increasing diversity is an inevitable trend in today's organizations, its effects are not yet fully understood. The extant literature has not been able to identify direct effects of diversity that generalize across different studies and contexts (Stewart, 2006; Van Knippenberg & Schippers, 2007). For example, there is little support for the plausible suggestion that directly task-related informational diversity (e.g., variety concerning educational background) generally has more positive effects than does less directly job-related demographic diversity (e.g., differences regarding age or nationality) (Bowers, Pharmer, & Salas, 2000; Dahlin, Weingart, & Hinds, 2005; Webber & Donahue, 2001). This has led some authors to conclude that all dimensions of diversity can give rise to positive as well as negative effects (Van Knippenberg et al., 2004).

Hence, more research is needed to examine when (i.e., in the presence of what moderators) and how (i.e., through what mediators) different types of diversity either benefit or impede team performance. Past studies have reported that, for example, the negative effects of demographic diversity diminish over time (Harrison, Price, & Bell, 1998), and the positive effects of diversity are more likely to surface when there are high levels of outcome interdependence (Schippers, Den Hartog, Koopman, & Wienk, 2003), task interdependence (Jehn, Northcraft, & Neale, 1999), and collective team identification (Van der Veegt & Bunderson, 2005) and when tasks are complex rather than routine (Pelled, Eisenhardt, & Xin, 1999). Moreover, Jehn et al. (1999) as well as Pelled et al. (1999) have identified intrateam conflict as an important mediator of the diversity–team outcomes relationship. Other researchers have found evidence for a mediating role of team learning (Van der Veegt & Bunderson, 2005) and team reflexivity (Schippers et al., 2003), respectively. Despite these valuable insights, however, the knowledge of when and how diversity affects team outcomes is still fragmentary and leaves many questions unanswered (Van Knippenberg & Schippers, 2007). For example,

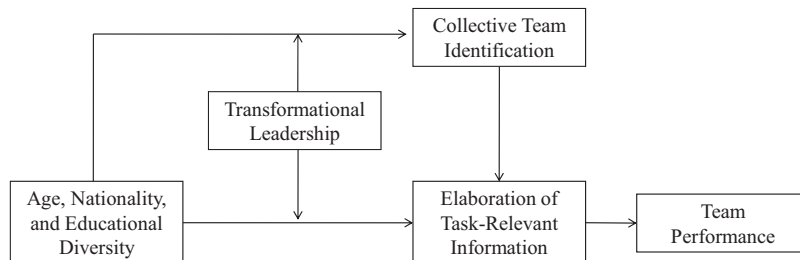


Figure 1. Proposed relationships among the variables.

there is little knowledge on how transformational leadership affects the association of both demographic and informational diversity with team performance.

### Transformational Leadership and Team Performance

Transformational leadership goes beyond a purely rational social exchange process by establishing an emotional bond between leader and followers. It engages the full person of the follower, including the higher order needs, and thus enables him or her to perform beyond expectations (Bass, 1985). As conceptualized by Avolio and Bass (2004), transformational leaders act as role models, provide inspirational motivation and intellectual stimulation, and show individualized consideration. They are assumed to facilitate team performance by aligning team members' goals and values and by fostering collective optimism, efficacy, and identification with the team and its objectives (Bass & Riggio, 2006).

Despite the multitude of studies documenting the positive effects of transformational leadership on numerous important outcomes (Judge & Piccolo, 2004), the preponderance of past research has focused on the individual level (Judge, Bono, Ilies, & Gerhardt, 2002). Because it cannot be assumed that findings at one level of analysis are automatically applicable to higher levels of analysis (Kozlowski & Klein, 2000), much more research is needed on the links between transformational leadership and team outcomes (Judge et al., 2002). Several scholars have argued that current organizational trends call for shifting the focus from the leadership of individuals to the leadership of teams (Chen, Kirkman, Kanfer, Allen, & Rosen, 2007; Lim & Ployhart, 2004). Although many teams in less hierarchical organizations are being granted more autonomy and control over their activities, leadership is bound to remain important, because even self-managing teams are seldom afforded full decision-making authority, and key decisions remain in the hands of those individuals explicitly designated as leaders (Morgeson, 2005).

### Transformational Leadership as a Moderator

Despite several recent studies investigating team-level outcomes of transformational leadership (Bass, Avolio, Jung, & Berson, 2003; Lim & Ployhart, 2004; Schaubroeck, Lam, & Cha, 2007), research is needed that examines whether the relationship of both demographic and informational diversity with team performance varies depending upon levels of transformational leadership and, if it does, what processes mediate this moderating effect. Although organizations assemble heterogeneous teams in the hopes that the broadened pool of knowledge, skills, and abilities will yield solutions superior to those attainable by homogeneous teams, it is by no means certain that this increased performance potential will be leveraged (Stewart, 2006). Teams must learn to work together in such a way that the resources brought into the group by each member are fully utilized toward meeting collective objectives. Leaders are likely to play a key role in facilitating this process (Hogan & Kaiser, 2005).

However, to the best of our knowledge, only two empirical studies have thus far examined this important linkage among team composition, leadership, and team outcomes. Somech (2006) found that in functionally heterogeneous teams, participative leadership was positively related to team reflection, which in turn

facilitated team innovation, but negatively related to team in-role performance. By contrast, directive leadership was positively associated with team reflection when functional heterogeneity was low. Moreover, Shin and Zhou (2007) have shown that transformational leadership moderates the relationship between educational specialization diversity and team creativity such that this relationship is more positive when transformational leadership is high rather than low. The findings of both of these studies underscore the importance of studying leadership as a moderator of the diversity–team performance relationship.

Our research builds on, extends, and differs from these previous studies in the following ways. With respect to Somech's (2006) findings, the functional heterogeneity in the primary care teams may not only have constituted variety, but also disparity. For example, doctors are likely to have more power and influence than social workers or dieticians. In many other settings, such as R&D teams, diversity may be more appropriately conceptualized as variety and/or separation (Harrison & Klein, 2007). Moreover, the influence of leaders on team outcomes extends well beyond the degree of participation or direction that the leader provides. Transformational leadership can be either participative or directive (Bass & Riggio, 2006), but only a fraction of its overall effects are captured by this distinction. We argue below that transformational leadership is particularly promising as a means to realize the team performance potential entailed by a wider range of knowledge and perspectives (i.e., diversity as variety; Harrison & Klein, 2007).

In examining a demographically highly homogeneous sample, Shin and Zhou (2007) focused on one type of (informational) diversity and showed that it was positively related to team creativity only when transformational leadership was high. We argue that the promise of transformational leadership with respect to leveraging the potential inherent in diversity is even more far-ranging in that it also extends to demographically diverse teams. Given the important conceptual differences between demographic and informational diversity (Dahlin et al., 2005; Jackson et al., 2003; Williams & O'Reilly, 1998), it is vital to examine the interactive effects of transformational leadership and different dimensions of diversity. Moreover, although Shin and Zhou examined team creativity, we focus on team performance as the dependent variable. In the context of R&D teams, creativity is an important, but by no means sufficient, prerequisite for team performance, which to a large extent depends on whether teams succeed in integrating and implementing creative ideas. Finally, although Shin and Zhou examined as a mediator the very specific variable team creative efficacy, our model is based on the broader categorization–elaboration model proposed by Van Knippenberg et al. (2004). Consequently, we examine as mediators an emergent state that we argue is linked to social categorization effects (i.e., collective team identification) as well as the team process that, according to Van Knippenberg et al., is assumed to be directly linked to overall team performance (i.e., the elaboration of task-relevant information).

In line with Van Knippenberg et al. (2004), we assume that all types of diversity in teams can have positive effects (i.e., a thorough processing of an enlarged range of task-relevant resources) as well as negative effects (i.e., less interpersonal attraction and higher levels of social categorization processes resulting in, for example, low collective team identification). Assembling informationally diverse teams that include members from different educational or functional backgrounds is often regarded as a means to

foster a cross-fertilization of ideas and to ensure that the team will consider various task-relevant perspectives (Jackson, 1995). Although it is obvious that educational background diversity expands the pool of skills, knowledge, and abilities, demographic diversity may also be associated with important task-relevant differences (Dahlin et al., 2005; Wegge, Roth, Neubach, Schmidt, & Kanfer, in press). For example, both age and nationality diversity are likely to yield different perspectives on work tasks. Under the right circumstances, these differences in perspectives may yield synergistic effects and in turn improve team performance. Exposure to different views forces the team members to think about alternative solutions they might not have considered otherwise. It thus may enhance a more careful deliberation not only of the ideas espoused by others but also of one's own position. Younger team members could benefit from the experiences, practical knowledge, and social networks of their older colleagues, whereas older team members stand to gain from the creativity and up-to-date theoretical knowledge of their younger colleagues. Analogously, team members of different nationalities may bring unique and complementary perspectives to the team. Understanding the effects of age diversity is particularly important in countries with low birth rates and aging workforces that face the challenge of intergenerational knowledge transfer (DeLong, 2004). Moreover, increasing nationality diversity is one of the inevitable effects of globalization (Dahlin et al., 2005). Age, nationality, and educational diversity could all help to avoid pitfalls such as premature consensus or "groupthink" (Janis, 1982). Hence, with respect to the typology developed by Harrison and Klein (2007), we posit that all three of these diversity dimensions constitute variety—that is, a broadened pool of task-relevant resources and perspectives.

At the same time, however, demographic heterogeneity is likely to covary with differences in values, beliefs, attitudes, and social ties. These differences may diminish interpersonal attraction and give rise to deleterious social categorization processes. Moreover, Dougherty (1992) has pointed out that different educational backgrounds entail specific interpretive schemata or thought worlds, which enable a cognitive orientation concerning particular problems and tasks. It is plausible that such differences in viewing important issues can likewise lead to less liking, impaired communication and cooperation, as well as adverse social categorization processes.

Hence, the relationship of demographic and informational variety with team performance depends on whether the potential positive effects of diversity are realized and, at the same time, whether the potential negative effects of diversity are held in check. We posit that transformational leadership has this dual effect of fostering the positive and preventing the negative effects of diversity. Consequently, we propose the following:

*Hypothesis 1:* Transformational leadership moderates the relationship of age, nationality, and educational diversity with team performance, such that this relationship is positive when levels of transformational leadership are high but negative or nonsignificant when levels of transformational leadership are low.

Our model (depicted in Figure 1) assumes two instances of mediated moderation as the primary explanatory processes for the moderating effect specified in Hypothesis 1. Mediated moderation

exists when the interaction between two variables (in our model, diversity and transformational leadership) affects a mediator, which then affects a dependent variable (Morgan-Lopez & MacKinnon, 2006).

#### Elaboration of Task-Relevant Information as a Mediator

With respect to the positive effects of diversity, we assume that transformational leadership moderates the relationship between diversity and the elaboration of task-relevant information and that the elaboration of task-relevant information in turn is positively associated with team performance. Although the broader range of task-relevant resources and perspectives that diversity affords constitutes a potential benefit, active steps must be taken to ensure that teams make use of this variety (Van der Vegt & Bunderson, 2005). Many studies have shown that it cannot be taken for granted that individuals who possess unique, nonredundant information will share this information with their team members (e.g., Stasser & Titus, 1985) or elaborate constructively on the input provided by others (e.g., Brodbeck, Kerschreiter, Mojzisch, & Schulz-Hardt, 2007).

We propose that, for several reasons, transformational leadership fosters the exchange and elaboration of task-relevant information in diverse teams. Transformational leadership promotes the internalization of the goals and values that underlie the collective cause (Bass & Riggio, 2006). Moreover, the charismatic and inspirational appeals of the transformational leader establish a unifying superordinate social identity based on the common vision. Consequently, working toward meeting the common objectives becomes a means for a follower to enhance his or her self-concept (Shamir, House, & Arthur, 1993). By fully engaging the followers motivationally in the effort to realize an inspiring vision, transformational leaders induce followers to share all their task-relevant information. Even if it incites dissent and criticism, the team members are likely to contribute this information because the collective vision takes precedence over individual—and possibly egotistical—work-related goals. Furthermore, by providing inspirational motivation, transformational leaders foster collective enthusiasm, optimism, and efficacy (Shin & Zhou, 2007). At the same time, the transformational leader's individually considerate behavior ensures that all team members feel acknowledged and appreciated in their uniqueness and are positively reinforced for the input they provide. Intellectually stimulating leaders encourage their teams to welcome and take advantage of diverse knowledge bases and perspectives (Bass & Riggio, 2006), even if the voiced views deviate from the general consensus. In this sense, transformational leaders may become catalysts for creativity and innovation. Moreover, they may act as buffers against performance-inhibiting levels of stress caused by uncertainty and external pressures (Bass & Riggio, 2006). Accordingly, we argue that transformational leadership promotes a thorough consideration of all available task-relevant resources in diverse teams.

Particularly when the teams' tasks require creativity, innovation, and high-quality decision-making, it is this cross-fertilization of perspectives that enhances team performance and enables propitious effects of diversity through positive synergies—that is, collectively developed group solutions that are superior to the solutions generated by the best individual in the team (Michaelsen, Watson, & Black, 1989). Hence, we posit that the elaboration of



task-relevant information is positively related to team performance. In line with Van Knippenberg et al. (2004), we assume that diversity can enhance team performance only to the degree that it entails added value in the form of nonredundant experience, knowledge, perspectives, and social network ties. The utilization of this variety of resources is the team process whereby diversity can benefit team performance. We therefore posit the following:

*Hypothesis 2:* The elaboration of task-relevant information fully mediates the moderating effect of transformational leadership on the relationship of age, nationality, and educational diversity with team performance.

### Collective Team Identification as a Mediator

With respect to preventing the negative effects of diversity, we argue that transformational leadership moderates the relationship between diversity and collective team identification—that is, the emotional significance that individuals attach to their membership in a given team (Van der Vegt & Bunderson, 2005)—and that collective team identification in turn is positively associated with the elaboration of task-relevant information. Collective team identification is the emotional component of social identification that has been shown to most adequately capture the motivational force that induces individuals to engage in interactions with others (Bergami & Bagozzi, 2000). A large body of research has shown that individuals tend to prefer to interact with similar rather than dissimilar others (Byrne, 1971) and that dissimilarity can lead to less interpersonal liking and to socially categorizing others as outgroup members, who are subsequently treated less favorably than ingroup members (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). One such negative effect of low interpersonal attraction and high levels of social categorizations is low collective team identification (Van Knippenberg et al., 2004).

Zaccaro, Rittman, and Marks (2001) argued that a team leader's main job lies in fulfilling those functions that are not being handled adequately in regard to the respective team's needs. Diverse teams in particular may benefit from a leader's guidance to shift attention from the difficulties entailed by the need to accommodate different backgrounds, perspectives, communication styles, and social identities to the commonalities and shared goals. Hence, a leader's role in diverse teams may consist of emphasizing the potential advantages of variety and thus fostering motivation among the team members to work through dissent. By furthering collective optimism and efficacy and decreasing perceived stress and uncertainty, transformational leaders may facilitate a team climate in which diverse input is appreciated and invited, rather than regarded as an annoyance. Moreover, transformational leaders are likely to foster collective team identification in diverse teams by establishing a superordinate social identity built around common values and objectives, while retaining the appreciation of and encouragement for each team member's uniqueness. Thus, we propose that transformational leadership obviates the potential disadvantage of low levels of collective team identification in diverse teams and that this effect of transformational leadership helps foster the elaboration of task-relevant information. Because there are likely to be other variables such as team potency (Schaubroeck et al., 2007) through which transformational leadership may affect the processes occurring in diverse teams, we posit that collective team

identification partially mediates the moderating effect of transformational leadership on the relationship between diversity and the elaboration of task-relevant information.

Although transformational leadership theory (Bass & Riggio, 2006) predicts that this leadership style should enhance collective team identification, there are no empirical studies that examine whether transformational leadership actually does have this effect in diverse teams or whether a high level of collective team identification in diverse teams is related to a greater utilization of the available task-relevant resources. Uniting all members of a diverse team around shared objectives and a common social identity could theoretically entail the danger that team members might simply adopt the leader's vision and repress their own views. Thus, by enhancing collective team identification, transformational leadership could indirectly impede the elaboration of task-relevant information and counteract the potential benefits of variety. We argue, however, that although charisma and inspirational motivation promote unity in the face of diversity, individually considerate and intellectually stimulating behavior militates against a situation in which no one dares to voice reservations for fear of jeopardizing team harmony. Although intellectual stimulation induces the team to develop new ideas that may deviate from established views, individual consideration ensures that team members who voice such ideas feel valued and reinforced rather than discouraged in doing so. Hence, we posit that transformational leadership builds collective team identification in diverse teams not by establishing a groupthink-like harmony that is based on the team members' restraint in articulating objections but by creating an atmosphere in which all task-relevant information is shared and considered in the interest of obtaining the best possible team results. In this sense, we propose that collective team identification is an emergent state in teams that fosters the team members' willingness to engage in the elaboration of task-relevant information, which in turn is needed for high levels of team performance. In sum, we therefore posit the following:

*Hypothesis 3:* Collective team identification partially mediates the moderating effect of transformational leadership on the relationship of age, nationality, and educational diversity with the elaboration of task-relevant information.

## Method

### *Sample and Data Collection*

The sample consisted of 62 R&D teams in a multinational pharmaceutical company with headquarters in Germany. The team members interacted frequently and worked interdependently toward common team goals. With the permission of their direct supervisors, the respective team leaders were asked to have their teams participate in this study. English-language surveys were sent out and returned by e-mail. (In this company, English is the standard language at important meetings and for the dissemination of team results.) We collected data from three sources: Data on demographic variables and educational background were provided by the human resources department; the team members provided the data on all other variables except team performance, which team leaders rated longitudinally (6 months after the collection of team member data). Each team leader was responsible for and thus

provided performance ratings of only one team. The teams ranged in size from 4 to 15 members ( $M = 7.73$ ,  $SD = 2.46$ ). The mean average age of the members of the 62 teams was 39.56 years. Of the team leaders, 13% were women and 87% were men; of the team members, 18% were women and 82% were men. Ninety-six percent of the team members had at least a master's degree level of education. Only those teams from which we had received data from the team leader and from at least 3 as well as at least 50% of the team members were included in our sample. Overall, data were collected from 339 team members and 62 team leaders. The mean number of respondents per team was 5.47. Response rates were 91% (at the team level) and 71% (at the individual level), respectively.

### Measures

Transformational leadership was measured with the 20 items of the Multifactor Leadership Questionnaire (MLQ-5X Short; Avolio & Bass, 2004).<sup>1</sup> We used a response format ranging from 1 (*not at all*) to 5 (*frequently, if not always*). (The MLQ typically uses a scale from 0 to 4.) Similar to other researchers (e.g., Bass et al., 2003), we combined the five scales (Idealized Influence Attributed, Idealized Influence Behavior, Inspirational Motivation, Intellectual Stimulation, and Individualized Consideration) into a single transformational leadership composite. A principal components analysis revealed that a single transformational leadership factor explained 80% of the variance in the dimensions.

*Team diversity.* Harrison and Klein (2007) convincingly argued that the operationalization of diversity variables should correspond to the respective conceptualization of diversity (i.e., as separation, variety, or disparity). Because we posit that age, nationality, and educational diversity broaden the range of task-relevant experience, perspectives, and network ties and thus entail a potential for enhanced performance, these diversity variables constitute variety in our model. Hence, in line with Harrison and Klein's recommendations, we measured these variables via Blau's (1977) index of heterogeneity,  $1 - \sum p_i^2$ . In this formula,  $p$  is the proportion of a team in the respective diversity category and  $i$  is the number of different categories represented on the team. The index varies from 0, indicating no diversity, to a theoretical maximum of 1. We calculated age, nationality, and educational background diversity on the basis of archival data. For age diversity, we categorized participants by 5-year increments (i.e., 25–29, 30–34, 35–39, etc.). There were 27 different nationalities represented in the sample as a whole. The average number of nationalities per team was 2.8. Concerning educational background, we categorized individuals on the basis of the academic field in which they obtained their highest degree. We used the German educational system to define the categories. Fourteen different educational backgrounds (e.g., pharmacology, chemistry, medicine) were represented in the overall sample, and the average number of educational backgrounds per team was 3.3.

We focused on age and nationality diversity as examples of demographic heterogeneity because these are frequently researched variables (Van Knippenberg & Schippers, 2007) that are meaningful to many companies, including the one that provided the data for the present study. Moreover, we chose to examine educational diversity because, unlike functional diversity, it offers only weak social categorization cues and may therefore be the purest indicator of informational diversity (Dahlin et al., 2005).

Because the proportion of women in our sample was low and males constituted the majority in all but seven teams, we did not include gender diversity. Moreover, we did not include tenure diversity because the company we studied had grown in large part through acquisitions. Simply measuring tenure in the current company would not have captured the experience and social networks acquired in formerly independent companies. Informal conversations with managers confirmed that the current influence of some individuals was based in large part on this aspect of their work history.

Collective team identification was measured with the four items used by Van der Vegt and Bunderson (2005). Respondents were asked to rate the degree to which the members of their team "feel emotionally attached to their team," "feel a strong sense of belonging to their team," "feel as if the team's problems are their own," and "feel like part of the family in their team" (Van der Vegt & Bunderson, 2005, p. 538).

*Elaboration of task-relevant information.* There is no established scale that measures what Van Knippenberg et al. (2004) called the elaboration of task-relevant information. We therefore developed a four-item measure based on the extant literature. On a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), these items were worded as follows: "The members of this team complement each other by openly sharing their knowledge"; "The members of this team carefully consider all perspectives in an effort to generate optimal solutions"; "The members of this team carefully consider the unique information provided by each individual team member"; "As a team, we generate ideas and solutions that are much better than those we could develop as individuals." A principal components analysis with varimax rotation revealed that one factor with an eigenvalue of 3.14 explained 79% of the variance among the items.

*Team performance.* Six months after collecting team member data, the team leaders rated their respective teams concerning four performance criteria suggested by Ancona and Caldwell (1992) and Van der Vegt and Bunderson (2005): efficiency, quality of innovations, productivity, and overall achievement. Each team leader was asked to compare his or her team to other teams that perform similar tasks. The response format ranged from 1 (*far below average*) to 7 (*far above average*). Cronbach's alpha for this scale was .86.

*Control variables.* We included three control variables that prior research has identified as being associated with team processes and team outcomes. Team size was measured as the number of persons on a team. Our team longevity measure was the average length of time the team members had been on the team (Pelled et al., 1999). Furthermore, we measured task interdependence with five items adapted from Van der Vegt and Janssen (2003) using a five-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). A

<sup>1</sup> The Multifactor Leadership Questionnaire, Form 5X-Short (copyright 2004 by Bruce Avolio and Bernard Bass) is used with the permission of Mind Garden, 855 Oak Grove Ave., Menlo Park, CA 94025. All rights reserved.

sample item is “The members of this team need to collaborate with colleagues to perform their jobs well.”

*Data aggregation, reliability, and confirmatory factor analysis (CFA).* Because we were interested in the team level of analysis, we calculated median  $r_{wg}$  values (James, Demaree, & Wolf, 1984), which indicate the degree of agreement among team members within teams, as well as intraclass correlation coefficients (ICCs; Bliese, 2000), which represent the ratio of between-group to total variance (ICC1) and the reliability of average group perceptions (ICC2), respectively. Moreover, we calculated aggregate-level scale internal consistencies based on the average item response of each team (Chen, Mathieu, & Bliese, 2004). These values were, for transformational leadership, .94 ( $r_{wg}$ ), .33 (ICC1), .71 (ICC2), and .93 ( $\alpha$ ); for collective team identification, .92 ( $r_{wg}$ ), .38 (ICC1), .70 (ICC2), and .95 ( $\alpha$ ); for the elaboration of task-relevant information, .89 ( $r_{wg}$ ), .29 (ICC1), .62 (ICC2), and .94 ( $\alpha$ ); and for task interdependence, .90 ( $r_{wg}$ ), .39 (ICC1), .72 (ICC2), and .95 ( $\alpha$ ). The test statistics ( $F$  ratios) associated with the ICC1 values of all four variables were statistically significant at the .05 level. Overall, these results justified aggregating responses to the team level (Bliese, 2000).

Prior to testing our hypothesis, we conducted a CFA to examine the distinctiveness of our scales for transformational leadership, collective team identification, elaboration of task-relevant information, and task interdependence. We tested the absolute fit to the data of this four-factor model and examined whether it fit the data better than did competing models (Kelloway, 1998). The expected four-factor model fit our data reasonably well,  $\chi^2(129) = 206.53$ ,  $p < .001$ ; root-mean-square error of approximation (RMSEA) = .07; standardized root mean residual (SRMR) = .05; comparative fit index (CFI) = .94, whereas conceivable alternative models with fewer factors did not fit our data. For example, a three-factor model that comprised transformational leadership and task interdependence and combined elaboration of task-relevant information and collective team identification into one factor exhibited a poor fit,  $\chi^2(132) = 403.35$ ,  $p < .001$ ; RMSEA = .19; SRMR = .13; CFI = .78, as did a two-factor model that included task interdependence and combined transformational leadership, elaboration of task-relevant information, and collective team identification into one factor,  $\chi^2(134) = 629.84$ ,  $p < .001$ ; RMSEA = .27; SRMR = .19; CFI = .59.

## Results

Table 1 presents the means, standard deviations, and correlations among the study variables. None of the diversity variables was significantly correlated with either the elaboration of task-relevant information or collective team identification, whereas transformational leadership was positively related to both of these variables. Both nationality and educational diversity were positively associated with team performance, whereas age diversity was not. There was no significant relationship between transformational leadership and team performance. The elaboration of task-relevant information was positively associated with both collective team identification and team performance.

To test Hypothesis 1, which posits a moderating effect of transformational leadership on the relationship of age, nationality, and educational diversity with team performance, we conducted a hierarchical regression analysis with mean-centered predictor variables (Aiken & West, 1991). We entered the control variables (team size, team longevity, and task interdependence) in the first step; age, nationality, and educational diversity as well as transformational leadership in the second step; and the respective interactions of transformational leadership with the three diversity dimensions in the third step. Table 2 (Model 1) summarizes the results. Because the statistical power for detecting moderators in field studies is inherently low (McClelland & Judd, 1993), in line with previous research on group diversity (Harrison et al., 1998), we relaxed significance levels to  $p < .10$  for findings involving interactions. (For all the regression coefficients reported below as significant at the .10 level, the statistical power at the .05 level was lower than .60.)

In support of Hypothesis 1, we found a significant change in the multiple squared correlation coefficient after adding the three interaction terms ( $\Delta R^2 = .17$ ,  $p < .01$ ; see Step 3 of Model 1). The regression coefficients for the interactions of transformational leadership with diversity concerning age ( $b = 2.23$ ,  $p < .05$ ), nationality ( $b = 1.02$ ,  $p < .05$ ), and educational background ( $b = 1.04$ ,  $p < .05$ ) were all significant. Simple slope analyses (Aiken & West, 1991) revealed that when transformational leadership was high, team performance was significantly positively related to diversity regarding nationality ( $b = 1.02$ ,  $t = 2.15$ ,  $p < .05$ ) and educational background ( $b = 1.37$ ,  $t = 2.55$ ,  $p < .05$ ) but, contrary

Table 1  
Means, Standard Deviations, and Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Team size	7.73	2.46	—									
2. Team longevity	2.29	1.07	.06	—								
3. Task interdependence	3.99	0.44	-.16	.13	—							
4. Age diversity	0.55	0.15	-.01	-.12	-.10	—						
5. Nationality diversity	0.41	0.25	-.07	-.07	.16	.14	—					
6. Educational diversity	0.46	0.25	-.01	-.02	.03	.08	.19	—				
7. Transformational leadership	3.48	0.73	.15	.07	.15	-.14	.20	.15	—			
8. Elaboration of information	3.73	0.71	-.10	-.01	-.02	.10	.21 <sup>†</sup>	.13	.42**	—		
9. Collective team identification	3.65	0.60	-.30*	.06	.10	.06	-.02	.08	.32*	.54***	—	
10. Team performance	5.59	0.73	-.01	-.07	.16	.05	.26*	.25*	.10	.44***	.18	—

Note.  $N = 62$  research and development (R&D) teams.  
<sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 2  
Results of Regression Analyses

Variable	Model 1: Team performance				Model 2: Elaboration of information				Model 3: Collective team identification			
	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4
Control												
Team size	0.01 (0.04)	0.01 (0.04)	0.01 (0.04)	0.02 (0.04)	-0.03 (0.04)	-0.05 (0.04)	-0.05 (0.03)	-0.02 (0.03)	-0.07* (0.03)	-0.09** (0.03)	-0.09** (0.03)	-0.09** (0.03)
Team longevity	-0.07 (0.09)	-0.05 (0.09)	-0.11 (0.08)	-0.09 (0.08)	0.00 (0.09)	0.01 (0.08)	-0.06 (0.07)	-0.05 (0.07)	0.04 (0.07)	0.03 (0.07)	-0.02 (0.06)	-0.02 (0.06)
Task interdependence	0.30 (0.22)	0.23 (0.22)	0.26 (0.21)	0.33 (0.20)	-0.07 (0.22)	-0.20 (0.20)	-0.20 (0.18)	-0.20 (0.18)	0.06 (0.18)	0.02 (0.17)	0.02 (0.15)	0.02 (0.15)
Step 2: Main effects												
Age diversity (AD)	0.08 (0.63)	-0.49 (0.61)	-0.51 (0.59)	0.30 (0.37)	0.59 (0.57)	0.05 (0.54)	0.05 (0.54)	0.01 (0.52)	0.05 (0.54)	0.55 (0.48)	0.11 (0.45)	0.11 (0.45)
Nationality diversity (ND)	0.56 (0.40)	0.32 (0.38)	0.30 (0.37)	0.53 (0.35)	0.30 (0.36)	0.06 (0.33)	0.06 (0.33)	0.24 (0.33)	0.06 (0.33)	-0.37 (0.30)	-0.54† (0.28)	-0.54† (0.28)
Educational diversity (ED)	0.61 (0.39)	0.55 (0.36)	0.53 (0.35)	-0.15 (0.14)	0.11 (0.35)	0.05 (0.31)	0.05 (0.31)	0.04 (0.30)	0.04 (0.30)	0.09 (0.29)	0.04 (0.27)	0.04 (0.27)
Transformational leadership (TFL)	0.01 (0.14)	-0.01 (0.13)	-0.15 (0.14)		0.45** (0.12)	0.42** (0.12)	0.31* (0.12)		0.34** (0.10)	0.32** (0.10)		
Step 3: Interactions												
AD × TFL			2.23* (1.03)	1.56 (1.04)			1.93* (0.91)	1.41 (0.91)			1.55* (0.77)	
ND × TFL			1.02* (0.50)	0.68 (0.51)			0.99* (0.44)	0.74 (0.44)			0.73† (0.37)	
ED × TFL			1.04* (0.51)	0.60 (0.53)			1.30** (0.44)	0.93† (0.47)			1.11** (0.37)	
Step 4: Mediators				0.34* (0.15)								
Elaboration of information								0.34* (0.16)				
Collective team identification												
R <sup>2</sup>	.04	.13	.31	.37	.01	.25	.44	.49	.10	.26	.44	.44
ΔR <sup>2</sup>	.04	.10	.17**	.06*	.01	.24**	.19**	.05*	.10	.16*	.18**	.18**
F	0.72	1.17	2.24*	2.65**	0.21	2.58*	4.08***	4.35***	2.05	2.71*	4.03***	4.03***

Note. N = 62 research and development (R&D) teams. Unstandardized regression coefficients are reported (with standard errors in parentheses).

† p < .10. \* p < .05. \*\* p < .01. \*\*\* p < .001.



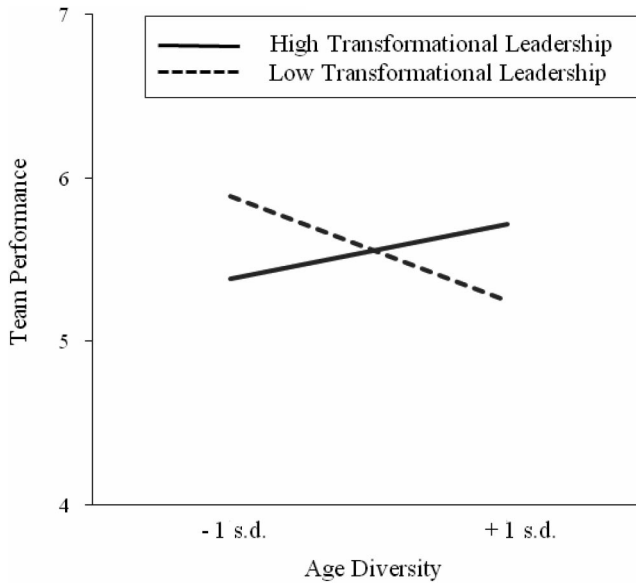


Figure 2. Transformational leadership as a moderator of the relationship between age diversity and team performance.

to our expectations, not age diversity ( $b = 1.29, t = 1.54, ns$ ). By contrast, when transformational leadership was low, team performance was negatively related to age diversity ( $b = -2.00, t = -1.72, p < .10$ ) and negatively but nonsignificantly related to diversity regarding nationality ( $b = -0.30, t = -0.47, ns$ ) and educational background ( $b = -0.16, t = -0.30, ns$ ). Figures 2, 3, and 4 illustrate these relationships.

Hypotheses 2 and 3 both posit a mediated moderation effect, which occurs when the interaction between two variables affects a mediator, which in turn is associated with a dependent variable. To

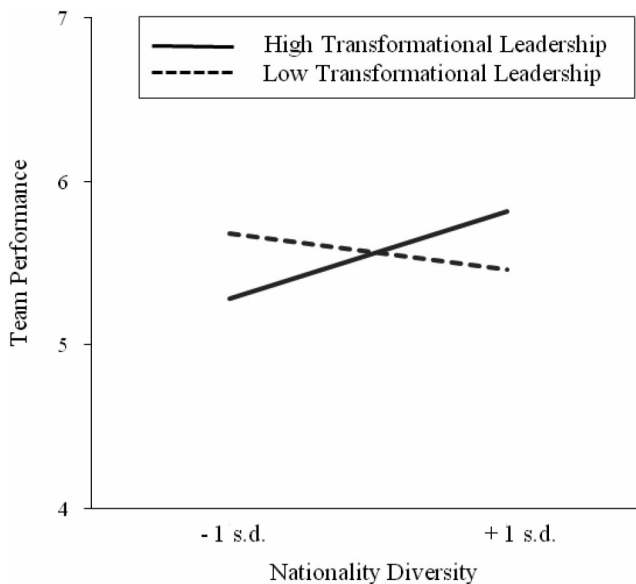


Figure 3. Transformational leadership as a moderator of the relationship between nationality diversity and team performance.

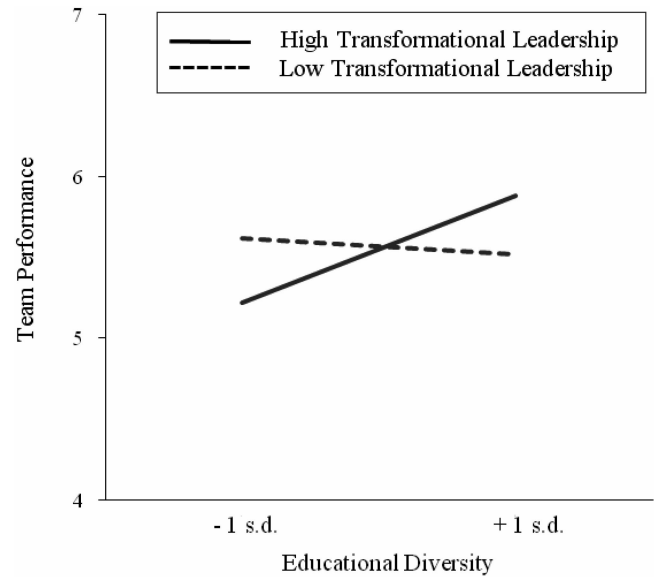


Figure 4. Transformational leadership as a moderator of the relationship between educational diversity and team performance.

test for mediated moderation, we followed the procedures outlined by Morgan-Lopez and MacKinnon (2006) to obtain estimates of the respective mediated moderation effects. Specifically, we first regressed the mediator on the control, independent, and moderator variables, as well as the interactions between the independent variables and the moderator. Next, we regressed the dependent variable on the control, mediator, independent, and moderator variables, as well as the interactions between the independent variables and the moderator. The estimate of the indirect (mediated moderation) effect is the product of the path from the respective interaction term to the mediator and the path from the mediator to the dependent variable (Morgan-Lopez & MacKinnon, 2006). To test the statistical significance of the respective indirect effect, we calculated 90% confidence intervals derived from bias-corrected bootstrap estimates (Efron & Tibshirani, 1993; Preacher, Rucker, & Hayes, 2007; Shrout & Bolger, 2002). In comparing different methods of testing for mediation, MacKinnon, Lockwood, and Williams (2004) found that bias-corrected bootstrap confidence intervals had the highest level of statistical power, particularly in the case of small sample sizes. We concluded the effect to be statistically significant when the 90% confidence interval excluded zero.

Hypothesis 2 states that transformational leadership moderates the relationship of age, nationality, and educational diversity with the elaboration of task-relevant information and that the elaboration of task-relevant information in turn is positively associated with team performance. Results confirmed the posited moderating effect of transformational leadership on the relationship of age, nationality, and educational diversity with the elaboration of task-relevant information (see Table 2, Step 3 of Model 2). Adding the respective interactions of transformational leadership with the three diversity dimensions yielded a significant change in the amount of variance explained ( $\Delta R^2 = .19, p < .01$ ), with significant regression coefficients for all three interactions. Simple slope analyses showed that when transformational leadership was high, the elab-

oration of task-relevant information was positively related to diversity concerning age ( $b = 1.67, t = 2.17, p < .05$ ), nationality ( $b = 0.73, t = 1.70, p < .10$ ), and educational background ( $b = 1.04, t = 2.20, p < .05$ ). In contrast, when transformational leadership was low, the elaboration of task-relevant information was negatively related to educational diversity ( $b = -0.85, t = -1.78, p < .10$ ) and negatively but nonsignificantly related to diversity with respect to age ( $b = -1.24, t = -1.16, ns$ ) and nationality ( $b = -0.52, t = -0.90, ns$ ). The indirect (mediated moderation) effects of the respective interactions of the three diversity dimensions with transformational leadership via the elaboration of task-relevant information on team performance were all significant (for age diversity,  $b = 0.66, SE = 0.42, p < .05$ ; for nationality diversity,  $b = 0.34, SE = 0.21, p < .05$ ; and for educational diversity,  $b = 0.44, SE = 0.25, p < .05$ ). Results indicated that, in line with Hypothesis 2, the interactive effects of all three diversity dimensions with transformational leadership on team performance were fully mediated by the elaboration of task-relevant information. The formerly significant direct effects of these interactions (see Table 2, Step 3 of Model 1) were no longer significant after controlling for the mediator (see Table 2, Step 4 of Model 1).

Hypothesis 3 states that transformational leadership moderates the relationship of age, nationality, and educational diversity with collective team identification and that collective team identification in turn is positively associated with the elaboration of task-relevant information. Results supported the posited moderation effect (see Table 2, Step 3 of Model 3). Entering the respective interactions of transformational leadership with the three diversity dimensions yielded a significant change in the multiple squared correlation coefficient ( $\Delta R^2 = .18, p < .01$ ), with significant regression coefficients for all three interactions. Simple slope analyses revealed that when transformational leadership was high, collective team identification was positively related to diversity concerning age ( $b = 1.43, t = 2.21, p < .05$ ) and educational background ( $b = 0.88, t = 2.25, p < .05$ ) but not nationality ( $b = -0.05, t = -0.13, ns$ ). Conversely, when transformational leadership was low, collective team identification was negatively related to diversity with respect to nationality ( $b = -0.97, t = -1.98, p = .05$ ) and educational background ( $b = -0.73, t = -1.82, p < .10$ ) and negatively but nonsignificantly related to age diversity ( $b = -0.94, t = -1.05, ns$ ). The indirect effects of the respective interactions of age and educational diversity with transformational leadership via collective team identification on the elaboration of task-relevant information were significant (for age diversity,  $b = 0.53, SE = 0.35, p < .10$ ; for educational diversity,  $b = 0.38, SE = 0.21, p < .05$ ). Contrary to our expectations, however, the analogous indirect effect involving nationality diversity was not statistically significant ( $b = 0.25, SE = 0.17, ns$ ). The formerly significant direct effects of the respective interactions of age and educational diversity with transformational leadership (see Table 2, Step 3 of Model 2) were decreased after controlling for the mediator. The regression coefficient for the interaction between age diversity and transformational leadership was reduced to a nonsignificant level—thus indicating full mediation—while the regression coefficient for the interaction of educational diversity with transformational leadership was lowered but remained significant after controlling for the mediator—thus indicating the partial mediation

we had expected (see Table 2, Step 4 of Model 2). Overall, these results lend partial support to Hypothesis 3.

## Discussion

Parallel to the rising interest in the effects spawned by an increasingly diverse work force and in what can be done to ensure that the benefits of diversity outweigh its costs (Van Knippenberg & Schippers, 2007), an abundance of research in the last 2 decades has shown that transformational leadership is positively related to many important outcomes (Judge & Piccolo, 2004). This study links these two literatures and empirically examines the claim that transformational leadership helps to realize the performance potential inherent in both demographic and informational diversity. Results confirm that transformational leadership moderates the relationship of age, nationality, and educational diversity with team performance. Both nationality and educational diversity were positively related to team performance only when transformational leadership was high. These relationships were nonsignificant when transformational leadership was low. Age diversity was not significantly associated with team performance when transformational leadership was high, and it was negatively associated with team performance when transformational leadership was low. Two mediated moderation effects shed some light on how transformational leadership may exert advantageous effects on the performance of diverse teams. First, the respective interactive effects of age, nationality, and educational diversity on team performance were fully mediated by the elaboration of task-relevant information. Second, results indicated that collective team identification fully mediated the interactive effect of age diversity with transformational leadership and partially mediated the interactive effect of educational diversity with transformational leadership on the elaboration of task-relevant information.

## Theoretical Implications

Our study makes a contribution to both the diversity and the transformational leadership literature. With respect to diversity, we believe that both demographic and informational heterogeneity constitute potentially valuable variety—as defined by Harrison and Klein (2007)—and that it depends on contextual conditions such as the type of leadership that is provided whether this variety will have predominantly positive or negative effects. Under some circumstances, the latter may prevail even in the case of highly task-related diversity, as shown by the negative relationship between educational diversity and both the elaboration of task-relevant information and collective team identification when transformational leadership was low. On the basis of our findings, we would argue that transformational leadership helps to tap the benefits of team diversity as variety by fostering the utilization of the enlarged pool of ideas and perspectives. At the same time, transformational leadership ensures that demographic or informational differences among team members do not lead to harmful effects of diversity, such as low collective team identification, which may impede the utilization of the full range of task-relevant resources and perspectives. Against the backdrop of the categorization–elaboration model (Van Knippenberg et al., 2004), we addressed both the information–decision-making perspective—by examining the elaboration of task-relevant information as

a team process—as well as the social categorization perspective—by measuring collective team identification as an emergent state in teams—in order to respond to calls by several authors (e.g., Marks et al., 2001; Srivastava, Bartol, & Locke, 2006) to provide more inclusive and thus more theoretically and practically useful models of the determinants of team performance.

Regarding the transformational leadership literature, perhaps the most surprising finding of the present study was the nonsignificant relationship between transformational leadership and team performance. This result contradicts the preponderance of findings in the transformational leadership literature (Judge & Piccolo, 2004) and again raises the question of what factors may act as substitutes for leadership in certain contexts (Kerr & Jermier, 1978). For example, the participants in our sample had exceptionally high levels of education and were on average older (and may thus have had more experience and training) than the participants in previous studies of transformational leadership in R&D teams (Keller, 2006; Shin & Zhou, 2007). Most importantly, however, our study, having found no significant relationship between transformational leadership and team performance, underscores the need identified by Schaubroeck et al. (2007) to go beyond the investigation of main effects at the individual or organizational level and examine the conditions under which transformational leadership at the team level is likely to be more or less effective. Because moderation is symmetric, we could have also cast transformational leadership as the predictor and team diversity as the moderator variable. Aside from contributing to the still nascent literature on transformational leadership of teams, the present study shows that transformational leadership is particularly likely to have beneficial effects on team performance when these teams are diverse with respect to age, nationality, and educational background. By contrast, our findings suggest that high levels of transformational leadership in homogeneous teams may occasionally even have detrimental effects on team outcomes. Further research is needed to examine whether this rather surprising finding may be due to certain particularities of our sample (in the sense that these may have constituted viable substitutes for transformational leadership).

Moreover, it is interesting that although the correlation between the transformational leadership ratings provided by the team members and those supplied by the team leaders was .65 ( $p < .001$ ), the mean of the leader ratings (3.71) was significantly higher than that of the member ratings (3.48). Although the moderating effect of transformational leadership on the diversity–performance relationship was also confirmed when we used leader instead of member ratings (with  $\Delta R^2 = .13$ ,  $p < .05$ , in the third step of Model 1 depicted in Table 2), it appears that, at least in this sample, team leaders viewed themselves as exhibiting transformational leadership to a greater extent than did their followers. It would be interesting to systematically examine in future studies the impact of such perceptual differences.

### *Practical Implications*

Because diversity is likely to further increase in the future (Fullerton & Toossi, 2001), the importance of transformational leadership—as a means to unlock the performance potential inherent in heterogeneous teams—is likewise bound to increase. This presupposes, however, that organizations recognize transformational leadership as a strategy that can be specifically tailored to

the challenge of managing diversity. Our results are therefore highly important for organizations that either employ diverse team compositions intentionally to stimulate performance or seek ways of coping with an increasingly diverse workforce, without yet having discerned the benefits that heterogeneity can entail. Nevertheless, the first step for organizational managers is to realize that a broadened range of task-relevant resources and perspectives does not automatically improve team performance. In order to fully benefit from age, nationality, and educational diversity and to prevent the negative effects that all of these diversity types may engender, organizations must take active and informed steps. Our results indicate that organizations with diverse teams would be well advised to appoint as team leaders those individuals who possess transformational qualities or to train team leaders to lead more transformationally. Several studies have shown that transformational leadership is a skill that can be developed (e.g., Barling, Weber, & Kelloway, 1996). Moreover, organizations could attempt to identify qualified individuals who exhibit transformational leadership behaviors and consider these individuals as potential leaders of diverse teams. Our findings suggest that finding and developing transformational team leaders is considerably more important when teams are diverse rather than homogeneous with respect to age, nationality, and education.

Besides identifying transformational leadership as a strategy that holds much promise with respect to managing diversity, our results offer insights into how transformational leadership may affect diverse teams. This knowledge may give organizations further options in regard to fostering performance in heterogeneous units. As predicted by Van Knippenberg et al. (2004), diversity appears to benefit team performance via the elaboration of task-relevant information. Ultimately, diverse teams are likely to outperform homogeneous teams to the extent that they utilize their greater range of task-relevant resources to create synergies that are beyond those attainable on the basis of a more homogeneous input. Hence, organizations may consider what additional measures they could take to facilitate this elaboration of task-relevant information in diverse teams. At the same time, they must prevent dysfunctional social categorization processes from undermining the exchange, discussion, and integration of ideas and perspectives. Although transformational leadership apparently has this beneficial dual effect, top managers could attempt to augment their team leaders' efforts by shaping their organizational culture with these two goals in mind. Measures that emphasize interdependence, trust, and shared goals may have similar effects as transformational leadership. For example, team-based incentive and reward systems may complement or perhaps even serve as substitutes for transformational leadership in diverse teams. This search for measures that could complement or be used in lieu of transformational leadership may be particularly important for organizations that establish flatter, less hierarchical structures and rely on shared leadership and self-managing teams.

### *Limitations*

We acknowledge limitations of our study. First, our sample consisted only of R&D teams in one pharmaceutical company. Highly complex R&D tasks may be particularly suitable for large potential benefits of team diversity (Pelled et al., 1999). Further research is needed to investigate whether the obtained results

generalize to other types of teams and tasks. Second, we relied on subjective performance ratings. At least for our sample, objective data regarding team performance could only have been collected at a higher level of analysis comprising numerous teams or entire departments. Third, we did not directly measure social categorization processes, which are usually cited as the origin of impaired outcomes in diverse teams (Williams & O'Reilly, 1998). Instead, as is typical in the diversity literature (Van Knippenberg & Schippers, 2007), we relied on an indirect measure, which in our case was collective team identification. This approach was premised on the logic that high collective team identification is likely to be an indication of low levels of dysfunctional social categorizations. Further research is needed to examine whether this assumption is valid. Fourth, despite the fact that we tested some of the examined relationships with data from different sources and used a partly longitudinal design, our study relied on correlational data. Hence, other factors not considered here may have exerted an influence on our findings, and more research is needed to ascertain the causal linkages that our model implies. However, the fact that we measured team performance 6 months after we had collected the team member data lends some credence to the assumption that our findings are a reflection of the interplay of diversity and transformational leadership actually preceding success. Moreover, collecting data from different sources (archival data as well as data from team members and team leaders) circumvents the problem of common-method bias.

### Conclusion

In sum, the present study shows that transformational leadership can help turn demographic and informational differences among team members into an asset rather than a liability. In light of the fact that most of the previously identified moderators of the diversity–outcome relationship (such as team longevity, task interdependence, task complexity, and collective team identification) are not directly controllable, transformational leadership could be a key factor in fostering performance and preventing process losses in diverse teams. We hope that our results will stimulate both the leadership and the diversity literature and that researchers in both fields will feel encouraged to afford closer scrutiny to the important role that leadership plays in making the most out of the increasing levels of demographic and informational diversity in today's organizations.

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