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Getting Specific about Demographic Diversity Variable and Team Performance Relationships: A Meta-Analysis

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The authors revisited the demographic diversity variable and team performance relationship using meta-analysis and took a significant departure from previous meta-analyses by focusing on specific demographic variables (e.g., functional background, organizational tenure) rather than broad categories (e.g., highly job related, less job related). They integrated different conceptualizations of diversity (i.e., separation, variety, disparity) into the development of their rationale and hypotheses for specific demographic diversity variable–team performance relationships. Furthermore, they contrasted diversity with the team mean on continuous demographic variables when elevated levels of a variable, as opposed to differences, were more logically related to team performance. Functional background variety diversity had a small positive relationship with general team performance as well as with team creativity and innovation. The relationship was strongest for design and product development teams. Educational background variety diversity was related to team creativity and innovation and to team performance for top management

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teams. Other variables generally thought to increase task-relevant knowledge (e.g., organizational tenure) and team performance were unrelated to team performance, although these variables were almost never studied as the variety conceptualization (i.e., the conceptualization that can reflect the breadth of knowledge that can be applied to the task). Team mean organizational tenure was related to team performance in terms of efficiency. Race and sex variety diversity had small negative relationships with team performance, whereas age diversity was unrelated to team performance regardless of diversity conceptualization. Implications for staffing teams and future research are discussed.

Keywords: *teams; diversity; demographic diversity; team diversity; meta-analysis*

Characteristics of team members that influence team performance are of interest to researchers and practitioners (e.g., Bell, 2007; Carpenter, Geletkanycz, & Sanders, 2004). Of particular interest is how diversity on team member demographic variables (e.g., race, age, educational background) is related to team performance (e.g., Ancona & Caldwell, 1992; Kochan et al., 2003; Mannix & Neale, 2005; Milliken & Martins, 1996; Pelled, 1996). The increased attention given to demographic diversity is primarily due to the changing nature of the workforce and to social policy concerns surrounding diversity issues (Jackson, May, & Whitney, 1995).

Despite the quantity and quality of existing team diversity research based on sound psychological theories and paradigms of team behavior (e.g., Byrne, 1971; McGrath, Berdahl, & Arrow, 1995; Tajfel, 1969), the effects of demographic diversity on team performance are not clear (e.g., Horwitz & Horwitz, 2007; Webber & Donahue, 2001). Mixed results pervade the team diversity literature, which offers limited direction to practitioners and scientists alike. We believe that a primary source of confusion is the oversimplification of team diversity—an inherently complex construct. Making general statements about the "good" or "bad" effects of diversity in teams is a flawed approach, and we believe that future research must be guided by a more nuanced view of diversity itself. Accordingly, we conducted a meta-analysis of the demographic diversity and team performance relationship using the most current frameworks for understanding and conceptualizing diversity. The primary interest of our investigation was the extent to which specific demographic diversity variables (e.g., functional background, organizational tenure, race) are related to team performance, with special consideration for the conceptualization of diversity—that is, separation, variety, and disparity (Harrison & Klein, 2007). Second, we integrated the team composition and team diversity research by hypothesizing and testing when the team mean of continuous demographic variables should have a stronger relationship with team performance than diversity on the variables. Finally, within the context of the specific diversity variable and conceptualization, we investigated additional moderators of the demographic diversity and team performance relationship as suggested by Argote and McGrath (1993). Specifically, we examined the type of performance outcome (i.e., efficiency, general performance, creativity, and innovation) and the nature of the tasks (studied as team type) as moderators of the relationships between demographic diversity variables and team performance, in an effort to demonstrate how expected relationships may emerge once the specific diversity variable and the conceptualization

of diversity are taken into account. Given the pronounced effect of study setting in studies of team composition and team performance (Bell, 2007) and the likelihood that the study of some demographic variables (e.g., organizational tenure) but not others (e.g., race) may be limited to field settings, we also examined study setting as a potential moderator.

Team Diversity Research

Team diversity refers to the distributional differences among members of a team with respect to a common attribute (Harrison & Klein, 2007). Researchers have suggested that differences on demographic variables can be related to team performance both positively and negatively (see Tsui & Gutek, 1999; van Knippenberg, De Dreu, & Homan, 2004). The idea that demographic diversity improves team performance is based on the informational diversity–cognitive resource perspective (e.g., Cox & Blake, 1991; Williams & O'Reilly, 1998), which suggests that distributional differences can serve as indicators of available knowledge and differing perspectives. A team that is more diverse in terms of demographic variables related to the task may be more successful than a homogeneous team because the former team can draw on a greater pool of knowledge and different perspectives. Based on this notion, diversity of attributes that are "highly job related" (e.g., educational background, functional background) are thought to be positively related to team performance, whereas those that are "less job related" (i.e., age, sex, race) are not (Pelled, 1996).

Despite the potential positive effects for team diversity on some attributes, several theories suggest that increased diversity can lead to decreased cooperation, coordination, and cohesion among team members and, ultimately, decreased team performance (Milliken & Martins, 1996). For example, the similarity–attraction paradigm (Byrne, 1971) suggests that homogeneous teams should be more productive than diverse teams because of the mutual attraction shared among team members with similar attributes. This mutual attraction can result in more efficient team processes, such as communication, thereby leading homogeneous teams to outperform diverse teams (Wiersema & Bantel, 1992). Similarly, social categorization theory suggests that team members categorize other team members into subgroups (Tajfel, 1969; Tajfel & Turner, 1979), which can form the basis for an in-group–out-group distinction. Team members may develop an intergroup bias (Brewer, 1979) in some conditions (van Knippenberg et al., 2004) and favor and cooperate with members of their in-group more than with members of an out-group. As such, team members with similar demographic attributes, as opposed to differing demographic attributes, may be more attracted to and may cooperate more with one another, which suggests that homogeneous teams should outperform heterogeneous teams. The expectations model (McGrath et al., 1995), which is based on social categorization theory, suggests an indirect link between demographic diversity and team performance through expectations based on the target member's social category. Team members make assumptions about other team members based on the target team member's demographic status (e.g., female), and they interact with the target team member in a manner consistent with their expectations. Demographic characteristics that are easily observable—surface-level variables such as age, sex, and race—are more likely to evoke responses that result from basic social categorization. Thus, although surface-level variables are typically

considered less job related, they are still thought to influence team performance, albeit negatively, through social processes.

Although these theories are intuitively appealing, meta-analytic investigations examining the relationship between demographic diversity and team performance indicate mixed results. Specifically, Webber and Donahue (2001) found no support for a demographic diversity–team performance relationship for highly job-related or less job-related diversities. In a follow-up to Webber and Donahue, Horwitz and Horwitz (2007) found that task-related (i.e., highly job-related) demographic diversity is positively related to the quality and quantity of team performance, whereas biodemographic (i.e., less job-related) diversity has no relationship with team performance. As a result of such inconclusive findings, researchers have become discouraged with examining main effect relationships between demographic diversity and team performance (van Knippenberg & Schippers, 2007), and they have begun to expand in directions that include the search for mediators or moderators (e.g., Kearney & Gebert, 2009; van Knippenberg et al., 2004). For example, in a recent meta-analysis, Joshi and Roh (2009) abandoned the notion of determining whether diversity attributes have a positive or negative effect on team performance; instead, they sought to understand how contextual factors (e.g., occupational demography) shape these relationships. Their results indicate that accounting for contextual moderators increases the size of the relationship between team performance and relations- and task-oriented diversity. Although research efforts in search of moderators and mediators of the demographic diversity–team performance relationship are undoubtedly valuable, we believe that they must be conducted in conjunction with a more nuanced approach to diversity.

What Is Meant by *Diversity*

Clarification of *diversity* is paramount to a discussion of how differences on demographic variables may influence team performance. Harrison and Klein (2007) presented a framework suggesting that diversity is best conceptualized in three ways—separation, variety, disparity—which vary in terms of their substance, pattern, and operationalization and, ultimately, their consequences. Although homogeneous teams are equivalent across conceptualizations, the differences among the conceptualizations become apparent in diverse teams.

Separation refers to differences among team members in their lateral position on a continuum, such as a value, attitude, or belief (Harrison & Klein, 2007). With separation, diversity effects are thought to be symmetrical. In other words, it is the extent to which team members are similar or different that is thought to influence team processes and outcomes; whether team members are high or low on the construct of interest does not matter. Take, for example, the continuum of educational experience. A team solely composed of high school graduates and a team solely composed of members with professional degrees would be considered equally homogeneous when educational-level diversity is conceptualized as separation. A team half composed of high school graduates and half composed of members with professional degrees would represent the maximum amount of diversity in terms of separation. Hypothesized relationships between demographic variables and team performance that are based on the theories of similarity and attraction (Byrne, 1971), social

identity and self-categorization (Tajfel & Turner, 1969), and attraction, selection, and attrition (Schneider, Goldstein, & Smith, 1995) conceptualize diversity as separation. These theories suggest that greater similarity (reduced separation) yields positive outcomes that ultimately lead to increased team performance.

Variety refers to categorical differences among team members wherein the number of represented categories contributes to team diversity (Harrison & Klein, 2007). For example, a team with a maximum amount of functional background diversity (conceptualized as variety) would consist of every member of the team having a functional background different from the others (e.g., sales, marketing). Having greater variety captures the essence of the informational diversity–cognitive resource perspective, which suggests that diversity is beneficial to performance because diverse teams can draw from different pools of information or resources. These differing perspectives can lead to debate and a broader understanding of the task, ultimately resulting in increased team performance, especially for tasks requiring creativity or innovation.

Finally, *disparity* represents differences in the concentration of valued assets or desirable resources (Harrison & Klein, 2007). Disparity captures the extent to which an inequality is present; that is, the team displays vertical differences on a resource between a few privileged team members and the rest of the team (Harrison & Klein, 2007). Disparity differs from separation in that the direction of the difference between a team member and all other team members matters in terms of predicting the effect of diversity on team outcomes. Whereas maximum separation manifests when two opposing camps form at opposing ends of a horizontal continuum (without regard to which camp is high on the variable and which camp is low), maximum disparity is reached when one team member is high on a dimension and separated on a continuum from all other team members. For example, organizational tenure can be viewed as a proxy for access to resources; that is, more tenure is associated with more privilege. A maximum amount of organizational tenure disparity would consist of one team member having been with the organization for 20 years and all other team members' being fairly new to the organization. If high levels of a variable are associated with status or power (e.g., tenure with organization, education level), diversity in terms of disparity might foster conformity and silence and suppress creativity within the team (Harrison & Klein, 2007).

Separation, variety, and disparity each represent a unique pattern of differences among team members. Although differences on a given variable (e.g., education level) may be conceptualized in different ways (e.g., separation, disparity), it is important that the choice of the conceptualization and related operationalization be theoretically driven (Harrison & Klein, 2007). The pattern of differences must be considered when articulating how each demographic diversity variable of interest is related to team performance. For example, when diversity on a demographic variable is thought to positively benefit team performance because of an increased number of perspectives or task-relevant information (e.g., cognitive resource perspective), diversity is conceptualized as variety. Separation and disparity conceptualizations are generally consistent with theories suggesting that diversity on a demographic variable leads to negative outcomes such as misunderstandings and a lack of cohesion (e.g., similarity–attraction theory, social identity theory, and social categorization theory; Harrison & Klein, 2007).

Despite the potential for diversity effects in the opposite direction (depending on the conceptualization of diversity), it is not clear what differences were included in previous meta-analytic estimates that aggregated not only different demographic variables (e.g., functional background, educational background) but also different conceptualizations of diversity (e.g., functional background variety with organizational tenure disparity) into one overarching category (e.g., highly job related). This is problematic for one reason: When researchers made claims that diversity (whether highly job related or less job related) had no relationship with team performance, they did not make clear whether included estimates measured team member differences with operationalizations that were able to capture the spirit of the theoretical justification. Accordingly, we present hypothesized relationships between specific demographic diversity variables and team performance based on theoretically derived conceptualizations of diversity—namely, separation, variety, and disparity. Given the recency of Harrison and Klein's typology (2007), authors of previous diversity research did not likely base their theoretical arguments on the different conceptualizations. However, diversity conceptualizations are expressed empirically through specific operationalizations of diversity variables (e.g., coefficient of variation, standard deviation; Harrison & Klein, 2007), thereby allowing for conceptualization to be examined as a moderator when authors reported the operationalization used. Summarizing the extent to which previous research has used operationalizations consistent with prevailing theories of how demographic diversity variables are related to team performance is important for clarifying observed meta-analytic effects and critical for identifying gaps in the literature in need of additional research.

Elevated Levels of Demographic Variables in a Team

Regarding the effect of team member demographics on team performance, a potential problem in the literature is its singular focus on how differences (i.e., diversity) on demographic variables affect team performance, with little regard for other team-level representations of the demographic variables. Even if weak or no effects are observed for the relationship between diversity on a demographic variable and team performance, the demographic variable may still be an important predictor of team performance. Demographic diversity in teams has typically been examined in isolation from the team composition literature on ability, personality, and values. Team composition is concerned with the configurations of attributes in teams (Levine & Moreland, 1990), and team heterogeneity (diversity) represents only one possible configuration of team members. Although early diversity research was caged within the context of the larger composition research (Jackson et al., 1995), later research developed relatively distinct from it (e.g., Horwitz & Horwitz, 2007; Webber & Donahue, 2001) with a few exceptions (e.g., Jackson, Joshi, & Erhardt, 2003).

Team composition research on the relationship between deep-level variables (e.g., personality, values) and team performance has consistently found larger effects for team mean operationalizations of the composition variables as compared to those of heterogeneity (Bell, 2007). Some diversity researchers have argued the importance of accounting for the mean when testing diversity effects (Harrison & Klein, 2007) and that measures of central tendency of the attributes cannot be ignored (Jackson, Joshi, & Erhardt, 2003). Compared with

measures of diversity, the team mean of the demographic variable may have a stronger relationship with team performance when teams with elevated levels of the demographic variable reflect more task-relevant knowledge to be applied to the task. Although our primary focus was on demographic diversity, we explored the extent to which elevated team levels of continuous variables may be related to team performance, when elevated levels, rather than differences, are more logically connected to team performance.

Specific Demographic Attribute of Interest

Because diversity represents distributional differences among members of a team with respect to a common attribute, diversity is attribute specific (Harrison & Klein, 2007). A team in not simply diverse; rather, a team is diverse with respect to specific attributes. The attribute of interest should influence the demographic diversity and team performance relationship (Argote & McGrath, 1993; Jackson et al., 2003). Previous meta-analyses (e.g., Horwitz & Horwitz, 2007; Webber & Donahue, 2001) examined the relationship between demographic diversity and team performance at the aggregate level, reporting only estimates for all highly job-related or task-related demographic variables together and all less job-related or biodemographic variables together. In the ensuing paragraphs, we outline why particular demographic variables should be related to team performance and how differences among team members on these variables might affect team performance. Because we used meta-analysis, we focused on the demographic diversity variables most commonly studied in the literature: functional background, educational background (major or degree), educational level, organizational and team tenure, age, sex, and race/ethnicity (Harrison & Klein, 2007). This focus was justified because a recent meta-analysis examined the relationships between deep-level team composition variables (e.g., personality variables, values) and team performance at the specific variable level (Bell, 2007).

Functional and Educational Background

Functional background diversity refers to the distribution of work history across the different functional specializations that exist within an organization (e.g., finance, marketing, research and development; Bunderson, 2003). Functional background is thought to be important in terms of reflecting a team member's type of knowledge, as well as shaping a team member's attitude and perspective (Bantel & Jackson, 1989; Dearborn & Simon, 1958; Hambrick & Mason, 1984). Schemas are thought to develop through experiences (Fiske & Taylor, 2007), and they are further ingrained by goals and rewards relevant to those experiences (Locke & Latham, 2002). Employees who spend their time in a functional division of an organization should be exposed to and be influenced by information relevant to those functional areas, and they should develop beliefs consistent with their functional roles (Chattopadhyay, Glick, Miller, & Huber, 1999). A team composed of members from diverse functional backgrounds should have a broader range of perspectives and knowledge to draw on, and they should be able to outperform teams with members from homogeneous backgrounds.

At maximum levels of functional background variety diversity, a team would have members spread across different functions, thereby suggesting more information to apply to the task. Thus, functional background variety diversity should be positively related to team performance, consistent with the core argument of the informational diversity–cognitive resource perspective.

Similar to functional background, educational background, in terms of major or content area, has the potential to influence the knowledge, attitude, and perspective that a team member brings to the task. Educational background may be directly related to a team member's background knowledge, as compared to his or her current attitude or perspective, given that a team member may be years removed from when he or she received a degree. Despite this, it may be beneficial for team performance to have teams composed of members with a variety of educational backgrounds. Arguing that increased educational background variety diversity should allow for access to more task-relevant knowledge is also consistent with the informational diversity–cognitive resource perspective.

Hypothesis 1: There will be a positive relationship between functional background diversity in terms of variety and team performance.

Hypothesis 2: There will be a positive relationship between educational background diversity in terms of variety and team performance.

Research Question 1: To what extent has functional background diversity been operationalized as an index consistent with a conceptualization other than variety, and what is the nature of the effects?

Research Question 2: To what extent has educational background diversity been operationalized as an index consistent with a conceptualization other than variety, and what is the nature of the effects?

Functional background variety diversity and educational background variety diversity are argued to be important because they allow for a broader scope of task-relevant perspectives to be applied to the task. It is therefore important to identify the context (i.e., type of team, type of performance) within which diversity of functional background and educational background may be most task relevant. Diversity in knowledge and information is related to increases in team innovation (Bantel & Jackson, 1989) and is thought to be important for team creativity (Milliken, Bartel, & Kurtzberg, 2003). Accordingly, teams that are diverse (in terms of variety) on functional background and educational background should have multiple perspectives to apply to the task and be divergent in their thinking. When performance criteria such as creativity and innovation are of interest (e.g., when performance is highly based on divergence), functional background and educational background variety diversity may contribute to performance. Divergent thinking is thought to promote the creative process (Milliken et al., 2003), although the creative process requires convergence for later idea evaluation and implementation stages. However, convergence may be of primary importance when costs or inputs are factored into how well the team is performing. Thus, when the performance metric is efficiency (e.g., performance is highly based on convergence), variety on functional background and educational background may be less helpful.

Similarly, executive teams, as well as product development and design teams, are likely to benefit from team members from a variety of functional and educational backgrounds. Design teams create and develop new products and services (Devine, 2002). Having a greater scope of skills and technical influence is thought to be beneficial for teams such as product development

or design teams because of the direct access to expertise relevant to the creation of the product, as well as the facilitation of product transfer back to the various departments when the product is complete (Ancona & Caldwell, 1992). Finally, executive teams (i.e., top management teams; TMTs) engage in a variety of ambiguous, ill-defined tasks that influence the organization's direction as a whole (Devine, 2002). TMT members typically represent different functional units within an organization, and their unique information gained from working or training in various functional areas should help them make the best decisions for the broader organization.

Hypothesis 3: The positive relationship between functional background diversity in terms of variety and team performance will be stronger when the team performance criterion is creativity or innovation rather than efficiency.

Hypothesis 4: The positive relationship between functional background diversity in terms of variety and team performance will be stronger when the team is a design team or TMT as compared to another team type.

Hypothesis 5: The positive relationship between educational background diversity in terms of variety and team performance will be stronger when the team performance criterion is creativity or innovation rather than efficiency.

Hypothesis 6: The positive relationship between educational background diversity in terms of variety and team performance will be stronger when the team is a design team or TMT as compared to another team type.

The above arguments suggest that functional and educational background diversity influence team performance because variety on these variables represents a larger base of knowledge that what can be drawn on to complete the task. Arguments are less compelling when suggesting that educational level, organizational tenure, and team tenure improve performance because variety on these attributes within a team leads to a greater breadth of perspectives and more task-relevant information. Accordingly, we investigated the extent to which the team mean on these continuous variables are positively related to team performance.

Educational Level

Educational level pertains to an individual's highest educational achievement. Although educational level is often investigated as a diversity variable (e.g., Amason, Shrader, & Tompson, 2006; Jehn & Bezrukova, 2004), having members spread across different education levels (i.e., variety) is not likely to increase the breadth of perspectives needed to increase performance on most tasks. Bantel and Jackson's early work (1989) included educational level as a predictor of innovation but not in terms of educational-level diversity. Instead, the authors proposed that education level influences innovation through an additive combination of team members' education levels. Indeed, to the extent that educational level is related to general mental ability (Sewell & Shah, 1967), teams composed of members higher in educational level should outperform teams composed of members with lower levels of education. Likewise, previous meta-analyses showed a relationship between general mental ability and team performance, with team mean general mental ability a better predictor than heterogeneity (Bell,

2007; Devine & Phillips, 2001). Although team member education level may be reflective of knowledge and information relevant to the task, a team should increase the amount of knowledge and information relevant to the task by having team members with higher levels of education rather than diverse levels of education.

Hypothesis 7: There will be a positive relationship between team mean educational level and team performance.

Hypothesis 8: The positive relationship between team mean education level and team performance will be stronger than the relationship between education-level variety diversity and team performance.

The team type may provide an important context in determining the strength of the relationship between team mean educational level and team performance. Devine's team typology (2002) distinguishes several types of teams (e.g., advisory, TMT, service) that fall under the broader distinction of being primarily engaged in intellectual work or physical work. Team mean education level should be more important for intellectual teams (i.e., advisory, design, commission, TMT, command, negotiation) than for physical teams (e.g., production, service) because of the type of functions that intellectual teams perform (e.g., planning, integrating information, directing). Although team mean education level may be related to performance in physical teams, it may be less important for the types of functions that physical teams complete (e.g., building, repairing, assembling).

Hypothesis 9: The positive relationship between team mean educational level and team performance will be stronger for intellectual teams as compared to physical teams.

Organizational Tenure

Organizational tenure is the amount of time that a team member has worked with the organization. Team members' organizational tenure may influence performance through its ties with organizational socialization—the process through which an individual comes to understand the social knowledge, values, and expected behaviors necessary to assume an organizational role (Chatman, 1991; Sturman, 2003; Van Maanen & Schein, 1979). A team composed of members with long organizational tenure may have a greater understanding of how to successfully operate within the organizational system. For example, members of a research and development team with long organizational tenure might have a better understanding of how to access valued organizational resources (e.g., money, upper management support) needed for team performance. In addition, members of organizations develop a common unique language that facilitates transmission of work-related information, which should make communication among team members with greater organizational tenure more efficient.

Despite the apparent advantage of having teams composed of members with long organizational tenure, the attraction–selection–attrition framework (Schneider, 1987) suggests that organizational members become homogeneous over time, which might have negative consequences in terms of dealing with an uncertain environment or unexpected change. As such, composing teams with members who all have long organizational tenure might not lead to

increased team performance. The type of performance must be considered to understand when organizational tenure diversity, as compared to elevated tenure levels (i.e., high team mean), should be most predictive of team performance. Specifically, when team members need to converge (e.g., efficiency is the primary performance goal or typical tasks are routine), greater average organizational tenure might benefit team performance. However, when innovation is the criterion or the team is completing tasks that require access to a greater variety of perspectives, variety diversity on organizational tenure might benefit team performance because members of the team will have been socialized into the organization at different times and will bring unique perspectives to the team in terms of organizational know-how (Jackson et al., 1995).

Hypothesis 10: There will be a positive relationship between team mean organizational tenure and team performance when efficiency is the criterion.

Hypothesis 11: There will be a positive relationship for organizational tenure diversity in terms of variety and team performance when innovation is the criterion.

Research Question 3: To what extent has organizational tenure diversity been operationalized as a diversity index consistent with a conceptualization other than variety, and what is the nature of the effects?

Team Tenure

Team tenure is defined as the length of time that team members have interacted with one another (Katz, 1982). Team tenure affects project performance by reducing the communication among team members to a particular information domain. Over time, team members become cohesive and can become increasingly isolated from important sources that provide evaluation, information, and feedback (Katz, 1982). As such, differences in team tenure among team members—that is, having a mix of experienced and newer team members—might benefit team performance. If new team members are integrated into the team over time, new team members can provide fresh ideas and approaches, and challenge existing methods, while more tenured team members can offer information about the team's existing structure and responsibilities. This team tenure variety diversity should be important for team innovation. Furthermore, team tenure effects have been observed beyond those of age and organizational tenure (Katz, 1982).

Although team tenure variety diversity may be important for team innovation, it may be less important for general performance and efficiency. Kozlowski, Gully, Nason, and Smith (1999) proposed a dynamic theory of team development and team performance wherein teams navigate through four important phases of team development: team formation, task compilation, role compilation, and team compilation. When a team forms, individuals come together and seek information about one another and the nature of the team (e.g., its purpose). Teams next enter a task compilation phase wherein team members demonstrate their task competencies to one another and focus on what they need from one another. In the third phase, role compilation, team members connect with one another and figure out how their actions affect other team members. It is during the role compilation phase that team members also focus on having their needs met and figure out what they need to do to help others. During the final

phase (i.e., team compilation), team members learn how to improve their network of roles and how to deal with routine and normative situations. Teams with members who have been part of the team compilation process should have a better understanding of how the team will approach a typical team task. Accordingly, teams with longer average tenure should have better performance in general and in terms of efficiency in particular.

Hypothesis 12: Team tenure diversity in terms of variety will be positively related to team performance when innovation is the criterion.

Hypothesis 13: Team mean tenure will be positively related to team performance when efficiency is the criterion.

Research Question 4: To what extent has team tenure diversity been operationalized as a diversity index consistent with a conceptualization other than variety, and what is the nature of the effects?

Race, Sex, and Age

In their categorization elaboration model, Van Knippenberg et al. (2004) argued that diversity research has taken an overly simplified conceptualization of the social categorization process. They suggested that the salience of various demographic variables contributes to social categorization and that demographic diversity is negatively related to team performance only in situations where social categorization results in intergroup bias. The circumstances under which social categorization leads to intergroup bias (e.g., threats and challenges to subgroup's identity; van Knippenberg et al., 2004) have not been examined in the team demographic diversity and team performance literature; however, whether differences are perceived is fundamental to whether intergroup bias can occur.

Social psychology research supports the notion that people form first impressions and categorize one another on easily observable characteristics such as age, sex, and race (Fiske & Neuberg, 1990; Messick & Mackie, 1989; Stangor, Lynch, Duan, & Glas, 1992). The initial categorization tends to be tied to immediate physical features thought to be informative about another person's disposition. These social categories are so frequently activated in daily social perception that they are chronically accessible and habitual in all situations (Fiske & Neuberg, 1990). Furthermore, categorizing sex and race has shown to be fairly consistent and resistant to short-term manipulations designed to decrease social categorization on the basis of these variables (Hewstone, Hantzi, & Johnston, 1991; Stangor et al., 1992). In sum, the research is clear that individuals take surface-level information (e.g., sex, race, age) into account when categorizing others.

There is evidence that the saliences of race, sex, and age are not necessarily equal. Harrison, Price, Gavin, and Florey (2002) found that surface-level aspects of diversity (i.e., age, sex, race) were differentially related to team members' perceptions of similarity. Specifically, race diversity was most predictive of team members' ratings of how similar they were to one another (r = .52). In comparison, sex diversity had the least influence on perceptions of surface-level diversity (r = .17), and age diversity had a moderate effect (r = .30). Similarly strong relationships between race diversity and perceptions of surface-level differences were observed in MBA project teams (Zellmer-Bruhn, Maloney, Bhappu, & Salvador, 2008). In

addition to influencing perceived social similarity to other team members, race diversity influenced early estimates of perceived work style similarity. Taken together, these results suggest that age, sex, and race diversity might be related to team performance through the activation of social categorization, each to a different extent. Diversity is conceptualized as separation when differences are thought to be related to team performance through mechanisms such as social categorization theory and intergroup bias as well as similarity–attraction theory. Thus, the negative relationships between age, sex, and race diversity and team performance are most likely to emerge when age, sex, and race diversity are operationalized as a diversity index consistent with separation. Separation describes a situation when two subgroups are formed at separate ends of a continuum. Because sex and race are categorical variables, operationalizing diversity with indices associated with separation diversity is not appropriate. Therefore, researchers likely captured race and sex diversity in terms of variety. Doing so, however, presents another problem. Variety—specifically, maximum variety—reflects a situation where each member within the team comes from a unique category (e.g., a different race), precluding subgroups defined by the variable in question. As such, maximum variety is not reflective of differences among team members for which social categorization theory and intergroup bias would predict negative consequences on team performance. Given these potential difficulties, although we hypothesized race, sex, and age separation diversity would be negatively related to team performance, we also investigated the relationship between race and sex variety diversity via a research question.

Hypothesis 14: There will be a negative relationship between race diversity in terms of separation and team performance.

Hypothesis 15: There will be a negative relationship between sex diversity in terms of separation and team performance.

Hypothesis 16: There will be a negative relationship between age diversity in terms of separation and team performance.

Research Question 5: To what extent has race diversity been operationalized as a diversity index consistent with variety, and what is the nature of the effects?

Research Question 6: To what extent has sex diversity each been operationalized as a diversity index consistent with variety, and what is the nature of the effects?

Research Question 7: To what extent has age diversity been operationalized with a diversity index consistent with a conceptualization other than separation, and what is the nature of the effects?

Study Setting as a Moderator

Finally, a potential confounding variable in a meta-analysis of relationships between demographic diversity variables and team performance is whether the study was conducted in a lab or field setting. Study setting is a potential confound because the examination of some variables might be mostly limited to field studies (i.e., organizational tenure), whereas others (e.g., race, sex, age) might lend themselves to examination in field or laboratory settings. Study setting is also likely to be highly correlated with the length of time that a team has been together. Although the correlation between study setting and time suggests that weaker effects would be observed between surface-level variables and team performance in field studies as

compared to lab studies (e.g., Harrison et al., 2002; Watson, Kumar, & Michaelsen, 1993), other features of the study setting suggest the converse. Demographic diversity may be most related to team performance when team members are working on projects that they believe are relevant to the organization's functioning (e.g., Jackson et al., 1995). Features of the setting (e.g., fidelity) may affect the relationships between demographic diversity variables and team performance, especially for surface-level variables thought to be related to performance via social mechanisms such as intergroup bias. Relationships between surface-level variables and team performance may not emerge in artificial lab settings, because they require the investment and concern for the outcome more readily experienced by team members in organizational settings. Accordingly, we examined the moderating effect of research setting on the relationship between specific demographic variables and team performance. We expected that the relationship between surface-level variables (race, sex, and age) and team performance would be stronger in field studies than in lab studies.

Method

Literature Search

The present study included the demographic diversity and team performance literature from 1980 to November 2009. The process to obtain relevant studies included electronic searches of PsycInfo, ABI/Inform, and ProQuest Digital Dissertations, using keyword combinations of the specific diversity variable (e.g., *age*, *functional background*), *diversity* and variants of the word (e.g., *heterogeneity* or *homogeneity*), and *team* (or *group*). The database searches were supplemented with manual searches of reference lists from reviews and meta-analyses of team diversity research (e.g., Bowers, Pharmer, & Salas, 2000; Horwitz & Horwitz, 2007; Joshi & Roh, 2009; Webber & Donahue, 2001), searches of "in press" articles available at relevant journals (e.g., *Academy of Management Journal, Small Group Research*), and other articles we knew of. We reviewed articles for potential inclusion—for which, studies had to report sample sizes and information that allowed for the computation of a correlation that represented the relationship between the demographic variable and performance at the team level. Studies conducted in lab and field settings were included. Self-report measures of team members' perceptions of team performance were not included (e.g., Schippers, Hartog, Koopman, & Wienk, 2003), and sports teams were not included. Because of the inappropriateness of mixing levels of analyses when calculating sample-weighted effects (Gully, Devine, & Whitney, 1995), articles that reported only individual-level performance data were excluded, even if the individual performed in the context of a team. For TMTs, the performance criteria were often organizational-level performance metrics such as return on assets. We included these correlations because TMT functioning and goals are closely tied to these performance metrics and because studies of TMTs tie one team to one performance metric, thereby allowing the correlations to contribute to the sample-weighted effects at the team level. Furthermore, because we examined type of team as a moderator, including studies on TMTs allowed us to be more comprehensive. Measures of relational demography were excluded when they focused on an individual's experience as being demographically

similar or different from the remainder of the team and how that difference affects individual outcomes (for discussion of the relational demography and demographic diversity distinction, see Harrison & Klein, 2007; Tsui & Gutek, 1999; Tsui & O'Reilly, 1989). Finally, only English-language articles were included. Note that our inclusion criteria are not the same as previous meta-analyses in the same content area (Horwitz & Horwitz, 2007; Joshi & Roh, 2009; Webber & Donahue, 2001). For example, Horwitz and Horwitz (2007) included studies with self-report team performance measures and did not include TMTs; Webber and Donahue (2001) did not include the same set of demographic variables examined here (e.g., they included occupational background but not organizational tenure).

We considered correlations from the same group of participants to be dependent if they contributed to the same demographic variable–team performance relationship for a particular moderator level. To create an independent data set, we computed linear composites for dependent correlations when intercorrelations were available. When intercorrelations were not available, we used the mean of the dependent effect sizes. The majority of the articles included intercorrelations. The final data set was based on 92 sources (e.g., journal articles, dissertations), and it included 274 independent correlations for analyses that examined diversity conceptualization as a moderator and 323 independent correlations for analyses that examined criterion type as a moderator.

Coding of Variables

Two authors independently coded each article and discrepancies were resolved via consensus. When consensus could not be reached between the two coders, the first author was brought in to discuss the coding question. Disagreement between coders rarely occurred (< 10% of the time). Demographic variables were coded as educational background, functional background, educational level, organizational tenure, team tenure, age, sex, and race. Study setting was coded as lab setting when data were collected from teams that were in an artificial or classroom situation or when student teams were the sample. Study setting was coded as field setting when data were collected from an organizational setting using real teams. Using Devine's typology (2002), we coded type of team if it was explicitly stated or described in enough detail to make a reasonable judgment. Devine's team typology includes two major team categories: those involved in physical work and those involved in intellectual work. Intellectual teams are further divided as follows: advisory teams, which address workflow problems and organizational improvement; design teams, which design new products, goods, and services (we included product development teams and similar cross-functional teams in this category); commission teams, which handle special and nonroutine decision making that requires extensive acquisition and integration of information; executive teams (TMTs), which coordinate work of functions, departments, and organizations as a whole; command teams, which make organizational-level decisions in real time; and negotiation teams, which represent larger entities and attempt to maximize the outcomes for their constituents. Physical teams include production teams, which build, assemble, and harvest; service teams, which process orders and requests from customers as quickly as possible; and an action/performance/work team category, which includes performance, medical response, sports, transportation, and

military combat teams. Team performance was coded as efficiency, general performance, and creativity or innovation. Efficiency was coded for performance measures where the outputs were adjusted for inputs (e.g., productivity, efficiency; Beal, Cohen, Burke, & McLendon, 2003). We coded general performance for performance measures that reflected the extent that the team met its overall objectives or goals, without consideration of the costs or inputs needed for achieving the results. We coded creativity for performance measures that captured the uniqueness of an output compared to other outputs, and we coded innovation for performance measures that captured the development and application of ideas to processes, products, and procedures that were new to the unit of adoption and were designed to benefit the recipient of interest (West & Farr, 1990). Finally, we coded diversity conceptualization using Harrison and Klein's typology (2007), linking the diversity operationalization to the different conceptualizations. We coded standard deviation and mean Euclidean distance as operationalizations consistent with separation. We coded Blau's index and Techman's entropy as operationalizations consistent with variety. We coded coefficient of variation and Gini coefficient as operationalizations consistent with disparity. We coded all other operationalizations of diversity (e.g., diversity composition was experimentally manipulated or the operationalization was not reported) as *other* unless the manipulation could be mapped onto the separation, variety, or disparity conceptualizations.

Meta-Analysis of Correlations

We used Arthur, Bennett, and Huffcutt's SAS PROC MEANS meta-analysis program (2001) to conduct a random effects model meta-analysis of correlations, using procedures recommended by Hunter and Schmidt (2004). We estimated a sample-weighted mean correlation (*SWMr*) between the demographic variable and criterion and calculated 95% confidence intervals around the *SWMr* as a measure of accuracy of the effect size (Whitener, 1990). We corrected *SWMr*s for unreliability of the criterion using an artifact distribution. Because of the nature of the predictor (i.e., demographics), only criterion unreliability was corrected. We calculated the standard deviation of the population correlation (*SD*ρ) and the percentage of variance attributed to sampling error and artifact corrections, and we report them as indicators of the presence of moderators. Finally, we calculated a fail-safe *k* (*n*) using procedures outlined by Rosenthal (1979) and Orwin (1983). The fail-safe *k* indicates the number of studies in file drawers with null effects needed to reduce the observed effect down to .05. We chose .05 with the logic that observed effects between demographic diversity variables and team performance should generally be small (ρ = .10; see Cohen, 1992) and that when reduced to .05, the effect would be as close to zero as to a small effect. We tested moderators using Hunter and Schmidt's subgroup analysis (2004) in which a meta-analysis is conducted at each moderator level of the relationship of interest.

Results

First, we examined the influence of study setting on the demographic variable–team performance relationship. Whereas 24% of the correlations (32 out of 133) between surface-level

diversity variables (race, sex, age) and team performance were examined in lab settings, less than 3% of the correlations (4 of 139) between the other demographic variables (e.g., functional background, educational background) and team performance were examined in lab settings. Study setting appeared to be a consistent moderator of the size and direction of the relationships observed. Given the moderating effect of study setting on the relationships between surface-level variable and team performance and the extremely limited number of lab studies examining other demographic variables and team performance, we interpreted our results for surface-level variables (race, sex, age) within the context of the study setting and excluded correlations from lab settings for all other demographic variables.

Table 1 presents results for Hypotheses 1 through 6. Hypothesis 1 predicted a positive relationship between functional background diversity in terms of variety and team performance. In support of Hypothesis 1, we observed a small positive relationship between team performance and functional background variety diversity ($\rho = .11$), and the 95% confidence interval around the *SWMr* did not include zero. Research Question 1 asked to what extent functional background diversity was operationalized as an index consistent with a conceptualization other than variety. Almost all studies (30 of 31) reported using a diversity index consistent with a variety conceptualization; one study did not report enough information to code conceptualization. We predicted that the relationship between functional background variety diversity would be stronger when the team performance criterion was creativity or innovation rather than efficiency (Hypothesis 3), and when the team was a design or TMT (Hypothesis 4). Consistent with Hypothesis 3, the relationship between functional background variety diversity and team performance was stronger when the criterion was creativity or innovation ($\rho = .18$) as compared to efficiency ($\rho = .03$). We also observed a small positive effect for the relationship between functional background variety diversity and general performance ($\rho = .12$). Finally, in partial support of Hypothesis 4, there was a stronger relationship between functional background variety diversity and team performance for design teams ($\rho = .16$) but not for TMTs ($\rho = .07$; the 95% confidence interval around *SWMr* included zero), as compared with other team types ($\rho = –.01$).

Hypothesis 2 predicted a positive relationship between educational background diversity in terms of variety and team performance. Educational background variety diversity was unrelated to team performance ($\rho = .01$). Research Question 2 asked to what extent educational background diversity was operationalized as an index consistent with a conceptualization other than variety. All studies reported using a diversity index consistent with a variety conceptualization. We predicted that the relationship between educational background variety diversity and team performance would be stronger when the criterion was creativity or innovation rather than efficiency (Hypothesis 5) and when the team was a design team or TMT (Hypothesis 6). Consistent with Hypothesis 5, there was a positive relationship between educational background variety diversity and team performance when the team performance criterion was creativity or innovation ($\rho = .23$) rather than efficiency ($\rho = –.02$), although the creativity and innovation estimate was based on only three correlations and should be interpreted with caution. There was no relationship between educational background variety diversity and general team performance ($\rho = –.03$). Finally, in partial support of Hypothesis 6, there was a stronger relationship between educational background variety diversity and team performance for TMTs ($\rho = .13$) but not for design teams ($\rho = .07$), as

Table 1
Relationship Between Team Performance and Functional/ Educational Background Diversity

Variable	*k*	*n*	*SWMr*	*SWSD*	VAR %	95% CI		ρ	*SD*ρ	VAR A %	k_{fs}
Functional background	31	3,726	.09	.15	35.63	.04	.15	.10	.13	35.74	25
Variety	30	3,653	.10	.15	37.57	.05	.15	.11	.13	37.70	30
Efficiency	17	1,338	.03	.17	46.82	–.05	.11	.03	.13	46.83	—
General performance	12	2,267	.11	.13	30.09	.03	.18	.12	.12	30.27	15
Creativity and innovation	5	493	.16	.16	37.52	.02	.30	.18	.14	37.79	11
Design/cross-functional	6	1,816	.14	.07	58.67	.08	.20	.16	.05	59.72	11
Top management team	16	1,373	.07	.20	32.14	–.03	.16	.07	.17	32.18	—
Other/mixed team type	9	537	–.01	.17	59.67	–.12	.10	–.01	.12	59.67	—
Educational background											
Variety	13	2,629	.01	.12	34.63	–.05	.08	.01	.11	34.63	—
Efficiency	5	1,855	–.02	.03	100.00	–.04	.01	–.02	.00	100.00	—
General performance	5	1,832	–.03	.06	82.35	–.08	.03	–.03	.03	82.41	—
Creativity and innovation	3	317	.21	.11	72.40	.08	.33	.23	.06	73.34	10
Design/cross-functional	3	291	.06	.11	93.12	–.06	.18	.07	.03	93.22	—
Top management team	6	696	.12	.11	71.25	.03	.21	.13	.06	71.59	9
Other/mixed team type	4	1,642	–.04	.09	31.31	–.13	.04	–.05	.08	31.37	—

Notes: Only results for teams from field settings are reported. The number of correlations at a moderator level (e.g., different conceptualizations) may not sum to the overall number of correlations for a specific variable (e.g., functional background) if the moderator information was not reported or if a correlation could not be categorized into the level of the moderator (e.g., included efficiency and innovation in one measure). Results are corrected for criterion unreliability. *k* = number of correlations; *n* = number of teams; *SWMr* = sample-weighted mean correlation; *SWSD* = sample-weighted standard deviation of the *SWMr*; VAR % = percentage of variance attributed to sampling error; 95% CI = 95% confidence interval; ρ = corrected population correlation; *SD*ρ = standard deviation of the corrected population correlation; VAR A % = percentage of variance attributed to sampling error and artifact corrections; k_{fs} = fail-safe *k*. Fail-safe *k* indicates the number of studies in "file drawers" with a mean *r* = .00, which would reduce the results in our meta-analysis to a trivial effect size of *SWMr* = .05. Fail-safe *k* is reported only for effects that have more than one study, are greater than *SWMr* = .05, and have a confidence interval that did not include zero.

compared with other team types (ρ = –.05). A limited number of correlations were available for non-TMT teams, so the effect sizes for design teams and other team types should be interpreted with caution. In sum, educational background variety diversity was unrelated to team performance, except when creativity or innovation was the criterion of interest or when the team was a TMT.

Table 2 presents results for Hypotheses 7 through 13. We predicted a positive relationship between mean educational level and team performance (Hypothesis 7) that would be stronger than the relationship between educational level variety diversity and team performance (Hypothesis 8). There was no support for Hypothesis 7 or 8. Team mean education level was not related to team performance (ρ = .01), but there was also no relationship observed between education level variety diversity and team performance (ρ = –.01). Finally, Hypothesis 9 predicted a stronger relationship between team mean education level and team performance for intellectual teams than for physical teams. Although the relationship between mean education level and team performance for intellectual teams suggested a small effect (ρ = .11), Hypothesis 9 was not supported in that the 95% confidence interval around the *SWMr* included

Table 2
Relationship Between Team Performance and Education Level, Organizational Tenure, or Team Tenure

Variable	*k*	*n*	*SWMr*	*SWSD*	VAR %	95% CI		ρ	*SD*ρ	VAR A %	k_{fs}
Education level											
Mean	9	2,571	.01	.13	19.43	–.08	.10	.01	.13	19.43	—
Intellectual teams	7	1,077	.10	.16	26.13	–.02	.21	.11	.15	26.24	—
Physical teams	1	1,401	–.07	—	—	—	—	—	—	—	—
Diversity	14	3,914	–.01	.10	40.57	–.05	.04	–.01	.08	41.25	—
Variety	4	244	–.01	.09	100.00	–.09	.08	–.01	.00	100.00	—
Other conceptualization	9	3,597	–.01	.09	28.14	–.07	.06	–.01	.09	31.26	—
Organizational tenure											
Mean	17	4,039	.07	.13	26.40	.01	.13	.08	.12	26.50	7
Efficiency	9	2,524	.13	.07	81.38	.09	.17	.14	.03	82.44	15
General performance	7	2,685	.00	.15	11.97	–.11	.11	.00	.15	11.97	—
Creativity and innovation	1	199	–.27	—	—	—	—	—	—	—	—
Diversity	24	4,259	.04	.12	38.13	–.01	.08	.04	.11	38.16	—
Separation	4	296	–.02	.06	100.00	–.08	.04	–.03	.00	100.00	—
Variety	2	115	.05	.07	100.00	–.05	.16	.06	.00	100.00	—
Disparity	18	3,848	.04	.13	29.92	–.01	.10	.04	.12	29.96	—
Team tenure											
Mean	15	867	.08	.19	47.40	–.01	.18	.09	.15	47.45	—
Efficiency	4	238	.10	.12	100.00	–.01	.22	.11	.00	100.00	—
General performance	8	436	.02	.18	59.30	–.10	.14	.02	.12	59.31	—
Creativity and innovation	2	116	.09	.22	34.24	–.23	.40	.10	.20	34.28	—
Diversity	12	2,124	–.04	.10	58.98	–.10	.02	–.04	.07	59.03	—
Disparity	10	1,986	–.04	.09	69.37	–.10	.01	–.04	.05	50.17	—

Notes: Only results for teams from field settings are reported. The number of correlations at a moderator level (e.g., different conceptualizations) may not sum to the overall number of correlations for a specific variable (e.g., mean team tenure) if the moderator information was not reported or if a correlation could not be categorized into the level of the moderator (e.g., included efficiency and innovation in one measure). Results are corrected for criterion unreliability. *k* = number of correlations; *n* = number of teams; *SWMr* = sample-weighted mean correlation; *SWSD* = sample-weighted standard deviation of the *SWMr*; VAR % = percentage of variance attributed to sampling error; 95% CI = 95% confidence interval; ρ = corrected population correlation; *SD*ρ = standard deviation of the corrected population correlation; VAR A % = percentage of variance attributed to sampling error and artifact corrections; k_{fs} = fail-safe *k.* Fail-safe *k* indicates the number of studies in "file drawers" with a mean *r* = .00, which would reduce the results in our meta-analysis to a trivial effect size of *SWMr* = .05. Fail-safe *k* is reported only for effects that have more than one study, are greater than *SWMr* = .05, and have a confidence interval that did not include zero.

zero. Only one correlation examined the relationship between team mean education level and team performance in physical teams, and it indicated a weaker effect in the opposite direction of the effect observed for intellectual teams (*SWMr* = –.07).

Hypothesis 10 suggested that team mean organizational tenure would be positively related to team performance when efficiency was the criterion. Consistent with Hypothesis 10, results indicated a small positive relationship between team mean organizational tenure and efficiency (ρ = .14), and the 95% confidence interval around the *SWMr* did not include zero. Hypothesis 11 suggested that organizational tenure variety diversity would be positively related to team performance when innovation was the criterion. Only two studies examined

organizational tenure variety diversity, and only one study examined innovation as the criterion, and it was not supportive of our hypothesis (*SWMr* = –.06). Research Question 3 asked to what extent organizational tenure diversity was operationalized as an index consistent with a conceptualization other than variety and what the nature of the effect was. The majority of correlations that examined the relationship between organizational tenure diversity and team performance operationalized diversity as an index consistent with disparity (k = 18). These correlations also failed to support a relationship between organizational tenure diversity and team performance (ρ = .04).

Hypothesis 12 predicted a positive relationship between team tenure diversity in terms of variety and team performance when creativity or innovation was the criterion. No studies reported the relationship between team tenure variety diversity and team performance, so Hypothesis 12 was not tested. Hypothesis 13 predicted that mean team tenure would be positively related to team performance when efficiency was the criterion. Only four studies (k = 4) investigated this relationship. The direction of the effect supported our hypothesis (ρ = .11), but the 95% confidence interval around the *SWMr* included zero. Research Question 4 asked to what extent team tenure diversity was operationalized as a diversity index consistent with a conceptualization other than variety and what the nature of the effect was. Ten of the 12 studies (k = 12) that reported the relationship between team tenure diversity and team performance conceptualized diversity as disparity and suggested only a negligible relationship (ρ = –.04). The other 2 studies did not report enough information for conceptualization to be coded.

Hypotheses 14 through 16 focused on the relationships between team performance and race, sex, and age diversity. Table 3 presents the results. Study setting moderated the relationships between team performance and race, sex, and age; as such, results are interpreted within the context of the study setting. Hypothesis 14 predicted a negative relationship between race diversity in terms of separation and team performance. As expected, no correlations in either lab or field settings examined the relationship for race diversity in terms of separation and team performance, so the hypothesis could not be tested. Research Question 5 asked to what extent race diversity was operationalized as a diversity index consistent with variety and what the nature of the effect was. Sixteen correlations from field studies examined race diversity consistent with the variety conceptualization. Results supported a small negative relationship between race variety diversity and team performance (ρ = –.13), and the 95% confidence interval around the *SWMr* did not include zero. Race variety diversity and team performance were unrelated in lab settings (ρ = .00).

Hypothesis 15 predicted that sex diversity in terms of separation would be negatively related to team performance. Only one lab study investigated sex diversity in terms of separation and team performance, and it reported a negative effect. Three studies investigated the relationship between sex separation diversity and team performance in field settings and suggested no effect (ρ = –.01). Research Question 6 asked to what extent sex diversity was operationalized as a diversity index consistent with variety and what the nature of the effect was. In field studies, the majority of studies investigated the relationship between sex variety diversity and team performance (k = 23). Results supported a small negative relationship between sex variety diversity and team performance (ρ = –.09), and the 95% confidence interval around the *SWMr* did not include zero. In lab studies, sex variety diversity was unrelated to team performance (ρ = .07; the 95% confidence interval around the *SWMr*

Table 3
Relationship Between Team Performance and Race, Sex, or Age Diversity

Variable	*k*	*n*	*SWMr*	*SWSD*	VAR %	95% CI		ρ	*SD*ρ	VAR A %	k_{fs}
Race	31	5,298	–.10	.13	34.70	–.14	–.05	–.11	.12	34.28	31
Lab	15	886	.02	.11	100.00	–.03	.08	.02	.00	100.00	—
Variety	9	693	.00	.11	100.00	–.06	.07	.00	.00	100.00	—
Field	16[a]	4,412	–.12	.12	25.25	–.18	–.06	–.13	.11	24.56	23
Variety	16	4,412	–.12	.12	24.57	–.18	–.06	–.13	.11	24.86	23
Efficiency	2	1,428	–.04	.02	100.00	–.07	–.01	–.04	.00	100.00	—
General performance	9	3,994	–.12	.11	16.74	–.20	–.05	–.14	.12	17.06	13
Creativity and innovation	3	205	–.17	.16	55.09	–.34	.01	–.18	.12	55.38	—
Sex	38	6,186	–.06	.11	47.14	–.09	–.02	–.06	.09	47.57	8
Lab	11	644	.01	.12	100.00	–.06	.09	.02	.00	100.00	—
Variety	6	365	.06	.07	100.00	.00	.11	.07	.00	100.00	—
Field	27	5,542	–.07	.11	40.90	–.11	–.02	–.07	.09	41.01	11
Separation	3	279	–.01	.14	57.26	–.17	.14	–.01	.10	57.26	—
Variety	23	5,155	–.08	.10	44.50	–.12	–.04	–.09	.08	44.69	14
Efficiency	4	1,689	–.08	.05	83.29	–.14	–.03	–.09	.02	83.99	2
General performance	12	4,354	–.05	.10	27.57	–.11	.00	–.06	.09	27.65	—
Creativity and innovation	5	380	–.15	.16	47.88	–.29	.00	–.16	.13	48.10	—
Age	40	10,953	–.02	.12	25.43	–.06	.01	–.03	.11	25.44	—
Lab	5	307	.06	.13	88.70	–.06	.18	.07	.05	88.76	—
Field	35	10,646	–.02	.12	23.44	–.07	.01	–.03	.11	23.45	—
Separation	7	688	.04	.19	28.56	–.10	.18	.04	.18	28.57	—
Variety	7	321	.01	.08	100.00	–.06	.07	.01	.00	100.00	—
Disparity	20	9,562	–.03	.11	16.78	–.08	.02	–.04	.11	16.80	—

Notes: The number of correlations at a moderator level (e.g., different conceptualizations) may not sum to the overall number of correlations for a specific variable (e.g., age) if the moderator information was not reported or if a correlation could not be categorized into the level of the moderator (e.g., included efficiency and innovation in one measure). Results are corrected for criterion unreliability. *k* = number of correlations; *n* = number of teams; *SWMr* = sample-weighted mean correlation; *SWSD* = sample-weighted standard deviation of the *SWMr*; VAR % = percentage of variance attributed to sampling error; 95% CI = 95% confidence interval; ρ = corrected population correlation; *SD*ρ = standard deviation of the corrected population correlation; VAR A % = percentage of variance attributed to sampling error and artifact corrections; k_{fs} = fail-safe *k*. Fail-safe *k* indicates the number of studies in "file drawers" with a mean *r* = .00, which would reduce the results in our meta-analysis to a trivial effect size of *SWMr* = .05. Fail-safe *k* is reported only for effects that have more than one study, are greater than *SWMr* = .05, and have a confidence interval that did not include zero.

[a]The results for overall race diversity in field studies were not the same as the results for race variety diversity, because the overall result included a correlation that represented the average effect of two correlations from two different conceptualizations generated from the same sample (e.g., variety and not coded).

included zero). Although we did not make any predictions across criterion type, it is worth noting that the negative effects for race and sex variety diversity and team performance were similar in that they were amplified when team performance was a measure of creativity or innovation.

Finally, Hypothesis 16 predicted that age diversity in terms of separation would have a negative relationship with team performance. No effect was observed for age separation diversity and team performance in field settings ($\rho = .04$). In fact, the relationship between age diversity and team performance was negligible ($\rho = -.04$ to .07) across study settings and the diversity conceptualizations (Research Question 7).

Discussion

Although team diversity research is thriving, unclear results and mixed conclusions are pervasive. We believe that the lack of clarity may be attributed to a consistent oversimplification of diversity. Our results support several thematic conclusions. First and most important, the strength and direction of the relationship between diversity and team performance were dependent on the specific demographic variable. Second, diversity on several variables was primarily operationalized as an index inconsistent with the conceptualization that we believed would have the strongest relationship with team performance, thereby suggesting room for additional research before the specific variables are abandoned as predictors of team performance. Finally, the team mean of organizational tenure had a stronger relationship with team performance compared to that of diversity operationalizations, suggesting that alternative team-level representations of the demographic variables may be more predictive of team performance for some variables. We expand on these themes and indicate their importance for practitioners and future team demographic diversity research.

The Specific Demographic Diversity Variable Matters

Meta-analytic researchers have historically grouped demographic variables into categories such as highly job-related and less job-related diversity or task oriented and relations oriented relations oriented (e.g., Joshi & Roh, 2009; Webber & Donahue, 2001). Our results indicate differential effects for demographic variables on team performance historically grouped within these categories, ranging from $\rho = .23$ to $\rho = -.14$. These results underscore the importance of using precision when discussing the demographic diversity–team performance relationship. Making statements that suggest diversity is "good," "bad," or unrelated to team performance without specifying the variable of interest and the way in which diversity is conceptualized, is a flawed approach.

In terms of specific results for the variables historically grouped into highly job-related diversity, functional background variety diversity was consistently and positively related to team performance, whereas the relationship between team performance and other variables historically grouped into highly job-related variables was nonexistent or situationally specific. There was a small effect between functional background variety and team performance ($\rho = .11$), which was further strengthened in situations where team member differences in functional background would be expected to have a relationship with team performance—that is, when team performance was general team performance ($\rho = .12$) or innovation ($\rho = .18$) or for design and cross-functional teams ($\rho = .16$). Functional background variety diversity

was unrelated to team performance in only limited situations—when efficiency was the team performance metric (ρ = .03), for example. Educational background variety diversity was related to team creativity or innovation (ρ = .23) and to team performance for TMTs (ρ = .13). Education-level diversity, team tenure diversity, and organizational tenure diversity were consistently unrelated to team performance.

We offer three potential explanations for the variation in the relationships observed between these variables historically grouped into highly job-related diversity and team performance. First, a team member's functional background may influence a team member's perspective more strongly than other variables. The predominant rationale explaining why diversity on highly job-related variables should be related to team performance is the informational diversity–cognitive resource perspective (e.g., Cox & Blake, 1991; Williams & O'Reilly, 1998). Team member differences on highly job-related variables are important because distributional differences serve as indicators of available knowledge and differing perspectives, which can be beneficial for task completion. It is possible that team members' behavior and thinking are more consistent with and shaped by their proximal functional roles (Chattopadhyay et al., 1999) than by their distal developmental experiences such as educational background, thereby making differences on functional background more reflective of task-relevant information compared to other variables (e.g., educational background). Our results indicate that some highly job-related demographic variables may be more task related than others. This finding suggests that the lack of support from meta-analyses for seemingly relevant theories (e.g., informational diversity–cognitive resource perspective) in the context of demographic diversity and team performance may be the result of the improper application of the theory (e.g., investigating diversity on highly job-related variables that are not actually job or task related) rather than any problems with the general tenants of the theories.

Second, team performance is related to the extent that teams recognize the importance of elaboration in terms of decision-relevant information (van Ginkel & van Knippenberg, 2008). The type of team may serve as a strong situational cue indicating the importance of information related to team members' functional backgrounds. Consistent with this, an effect for functional background variety diversity and team performance was observed for cross-functional and design teams (ρ = .16) but not for other types of teams. A team member may have been assigned to a team because of his or her functional expertise (e.g., engineering, marketing), thus signaling the team member's area of expertise to other team members. Team members' awareness of one another's expertise is tied to the extent that team members share information (Stewart & Stasser, 1995). It could be that team members are less aware of other team members' standings on other potentially task-related demographic variables, such as major in college (i.e., educational background), if there are no specific situational cues drawing their attention to the differences among team members. This lack of awareness of team members' standings on the demographic variable could reduce the sharing of unique information, thus limiting the potential for variety and diversity on other demographic variables to benefit team performance.

A third reason that effects were observed for functional background variety diversity and team performance more so than other highly job-related variables may be the operationalization of diversity. Variety reflects differences in kinds of information, and it is consistent

with the informational diversity–cognitive resource perspective, which suggests that diversity is beneficial to performance because diverse teams can draw from different pools of information or resources. Although functional background diversity and educational background diversity were consistently operationalized as an index reflecting the variety conceptualization (e.g., Blau's index), diversity on other variables was generally operationalized as an index consistent with separation or disparity (e.g., standard deviation, coefficient of variation). Harrison and Klein (2007) warned that a mismatch between theoretical conceptualization and operationalization may lead to erroneous conclusions. The relationship between these other variables considered to be highly job related and team performance may emerge when an operationalization consistent with the variety conceptualization is used. In other words, there was no relationship between educational level, organizational tenure, or team tenure diversity and team performance; however, our meta-analysis revealed that these demographic variables were rarely studied using the diversity conceptualization that can reflect breadth of knowledge that can be applied to the task. Future research should conceptualize diversity as variety when diversity on the variable should benefit team performance by increasing the pool of knowledge that can be applied to the task. For example, research should examine if team tenure has a positive relationship with team performance in terms of innovation when team members have staggered entry into a team, consistent with a variety diversity conceptualization. This may allow for the inclusion of fresh perspectives while minimizing the disruption to team compilation (Kozlowski et al., 1999).

Our results also indicated that for some demographic variables, the team mean best predicted team performance (and perhaps reflected increased perspectives related to the task). Specifically, there was a small effect between team mean organizational tenure and team performance ($\rho = .08$), which was larger for team performance in terms of efficiency ($\rho = .14$). The same trend was observed for mean team tenure and team performance ($\rho = .09$) and efficiency ($\rho = .11$), although the confidence intervals included zero and the efficiency estimate was based on few studies ($k = 4$). Taken together, our results suggest that there may be cases when elevated levels of team demographic variables, rather than diversity, are more reflective of task-relevant information. Future research is likely to benefit from more integration between team composition and team diversity research. We encourage researchers to consider what team-level conceptualization of the variable (e.g., elevated levels, variety diversity) best represents more task-relevant information and to operationalize the variable at the team-level accordingly.

Our results bring some clarity to surface-level demographics historically tied to social categorization (i.e., age, sex, race). Results of previous meta-analyses indicated either no relationship between these diversity variables and team performance (e.g., Horwitz & Hortwiz, 2007; Webber & Donahue, 2001) or small effects (Joshi & Roh, 2009) when context was considered. Our results indicate that the relationship between diversity on surface-level variables and team performance varied as a function of the particular variable. Specifically, we found no support for the relationship between age diversity and team performance regardless of the conceptualization of age diversity. It may be that generational differences (Smola & Sutton, 2002) rather than diversity on chronological age have implications for team performance. Our results suggest a small negative effect between race variety diversity

and team performance ($\rho = -.13$) and sex variety diversity and team performance ($\rho = -.09$). These negative effects were observed only in field settings.

The negative relationship between race diversity and team performance is interesting because diversity was consistently operationalized as an index consistent with variety (e.g., Blau's, Teachman), most likely because of the categorical nature of the variable. However, race diversity is typically hypothesized to be related to team performance through processes such as social categorization and intergroup bias, as well as the similarity–attraction hypothesis (e.g., Williams & O'Reilly, 1998), which is consistent with a separation conceptualization (Harrison & Klein, 2007). Maximum variety reflects a distribution wherein each member within a unit comes from a unique category of the variable (e.g., race); that is, every member is different from the others in terms of race. Maximum separation, however, reflects teams that have polarized subgroups. Blau's index was commonly used to operationalize race and sex diversity. It is intended for and so reflects heterogeneity (or whether more categories are represented), and it should be used when race and sex diversity is expected to be related to team performance as more categories are represented. Researchers should consider how the operationalization of race and sex diversity captures the mechanisms through which they expect diversity on these variables to be related to team performance. Pearsall, Ellis, and Evan's (2008) recent lab research on gender faultlines captures the notion of sex separation. Specifically, they compared homogeneous teams with teams equally split in terms of men and women. For real-world organizational teams, researchers have the additional challenge of considering the range of race and sex categories represented in their data set, and they likely have less ability to manipulate the size and composition of the teams. Researchers should consider whether moderate levels of variety or a different measure reflective of maximum separation (e.g., faultlines) better captures the form of the differences suggested by their theoretical arguments. Future research using data simulation and other methods is needed to help understand these issues. The potential misapplication of Blau's index to represent race differences other than heterogeneity has been noted in the social sciences more broadly (Rushton, 2008). Given the limited number of studies that examined race and sex separation diversity, we question whether the majority of previous research used the most powerful approach to examining the relationship between team performance and sex and race diversity.

There are at least two possible explanations why a negative effect was observed between race diversity (which has the potential for multiple categories) and team performance, even though race diversity was operationalized as an index consistent with variety. First, race diversity in field settings may have been generally limited to more moderate levels of variety as the upper bound. It is unlikely that most field studies included several teams wherein each member was from a different race. If this was the case, then the minimum and moderate levels of variety diversity may have mimicked the separation conceptualization. Future research using data simulations and other methods should continue to explore the effects of sampling and range restriction (e.g., Allen, Stanley, Williams, & Ross, 2007) on the different conceptualizations, as well as the general adequacy of the diversity indices used to represent specific diversity conceptualizations.

Second, race variety diversity may be predictive of team performance. For example, team members from different backgrounds or representing a variety of races may be less likely to develop a team identity, thus resulting in team members' not sharing task-relevant information

with the team. A clearer understanding of how race and sex diversity influences team functioning could be used to inform potential solutions for reducing the observed negative effect. For example, if in-group/out-group biases, stereotypes, and prejudices are the cause for the negative relationship between these types of diversities and team performance, a number of solutions may be effective in reducing the negative influence such as diversity training and increased awareness, a change in organizational culture, or the use of superordinate goals (Thomas, 2005). If the lack of a shared identity is inhibiting information elaboration, techniques such as persuading teams of the value of diversity may be more effective (Homan, van Knippenberg, Van Kleef, & De Dreu, 2007).

Implications of Main Effect Findings

Our hypotheses were based on one path through which the variable would be related to team performance (e.g., function background diversity in terms of variety would be positively related to team performance). We agree that a diversity variable may be related to team performance through different mechanisms (e.g., information diversity-cognitive resource perspective or social categorization) and conceptualizations in different situations (van Knippenberg et al., 2004). For example, there may be situations in which differences on a seemingly task-related variable results in two opposing camps or cliques in a team, causing intergroup bias and poor team performance (e.g., functional differences in a team may be negatively related to team performance in a politically charged organization with a negative history between functional units). However, the results of our meta-analysis suggest that there are some main effects (albeit small) between diversity on certain demographic variables, such as functional background, sex, and race, and team performance. In general, we expect that surface-level differences are more likely to influence performance through processes that elicit a psychological phenomenon (e.g., subgroup categorization) than serve as a surrogate for a psychological attribute relevant to the task.

Second, we examined a subset of moderators of the demographic diversity and team performance relationship (i.e., performance outcome, team type, study setting), but agree that there are other potentially important moderators that deserve consideration in future research (e.g., context; Joshi & Roh, 2009; time the team has been together; Argote & McGrath, 1993). We hope that researchers will continue to examine the importance of moderators and mediators within the context of a specific demographic diversity variable–team performance relationship. For example, we observed a consistent positive effect between functional background variety diversity and team performance, but theoretical guidance is limited regarding which functional differences are important. Future research should examine the specific functional distinctions (e.g., marketing, research and development) and contexts (e.g., industry, organizational structure) within which these functional distinctions may be important. Future research could also investigate not only the circumstances within which functional background variety diversity may be important for team performance (e.g., Cannella, Park, & Lee, 2008) but also ways to capitalize on the benefits of functional background variety diversity (e.g.,

Boone & Hendriks, 2009). Meta-analyses focused on a specific demographic variable might also help researchers and practitioners understand how to capitalize on team member differences (e.g., how can we best capitalize on functional differences to improve the performance of design teams?).

Practical Implications

Our results have specific implications for practitioners in organizations that utilize work teams. Staffing teams with members from different functional backgrounds (e.g., marketing, engineering) may be beneficial, particularly in situations where diverse functional perspectives are tied to the task such as in design teams or product development teams or when creativity or innovation is of primary importance. Staffing TMTs or teams responsible for innovation with individuals from a variety of educational specialties might lead to improved performance. When efficiency (rather than innovation) is important, practitioners should consider increasing the average organizational tenure of the team members while balancing the need for performance with the need for developing new employees. However, diversity in terms of race or sex appears to have negative consequences on team performance. Therefore, staffing aimed specifically at increasing the racial or sex diversity of teams for the purposes of increasing team performance is misguided.

Our findings offer guidance in terms of diversity training interventions that are intended to reduce the negative consequences associated with team diversity. The effect of diversity is not consistent across all variables. Therefore, the utility of diversity training will vary, depending on the relationship between the diversity variable and team performance. Specifically, organizations may achieve greater utility by expending resources to bridge team members' race and sex differences rather than their age differences. This is especially important in that diversity training is likely to be the only intervention available to organizations that want to reduce the negative effects of race or sex diversity, given the illegality of employment decisions based on race and sex. Furthermore, this is an important consideration given the recent movement toward a focus on generational differences in the workplace.

Limitations

A small number of correlations represented the relationships between demographic diversity variables and team performance at some levels of the moderators. We do not intend for our meta-analysis to be the final word on the study of demographic diversity and team performance relationships but rather to organize and quantitatively summarize the current literature in a way that is consistent with prevailing frameworks, and to highlight areas in need of future research. The meta-analytic effect size estimates were based on a small number of studies (e.g., $k < 5$) and are in no way intended to represent the population; however, such estimates do offer guidance into the possible trend and, more important, should serve as a call to areas in need of further primary research or simulation.

Second, in addition to variables included in this meta-analysis, researchers have examined other demographic diversity variables thought to be related to team performance, such as marital status (Harrison et al., 2002), industry experience (K. G. Smith et al., 1994), and nationality (Kilduff, Angelmar, & Mehra, 2000). To date, a limited number of studies have investigated these types of diversity. We limited our study to commonly studied demographic variables to have meaningful meta-analytic estimates. Given that our results indicated variability in the extent to which specific demographic diversity variables are related to team performance, research should continue to explore these and other forms of diversity, carefully articulating the theoretical connection among the specific variable, diversity conceptualization, and team performance.

Finally, our focus was at the level of a specific attribute (e.g., educational background, race). Researchers have suggested that diversity on multiple dimensions of diversity may create strong divides (i.e., faultlines) among team members that disrupt team processes such as information elaboration (Lau & Murnighan, 1998; Rico, Molleman, Sanchez-Manzanares, & Van der Vegt, 2007). Given the recency of faultline research, we could not include measures such as faultline strength for combinations of specific variables. We applaud these research efforts and hope that our results can help to inform these researchers of the particular attributes of diversity that may be meaningful in terms of affecting team performance.

Conclusion

As demographic diversity research has continued to accumulate, researchers have been perplexed by the limited meta-analytic evidence of a demographic diversity–team performance relationship despite its theoretical appeal. We revisited the team demographic diversity–team performance relationship, moving beyond previous meta-analyses by examining the relationship for specific demographic variables (e.g., functional background, race) and conceptualizations of diversity (i.e., separation, variety, and disparity). We also investigated the influence of study setting, team type, and performance criteria within those relationships. We believe that our meta-analytic results provide a meaningful summary of the demographic diversity and team performance literature to date by examining relationships more consistent with prevailing theories and frameworks.

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*Articles contributing correlations to the meta-analysis are indicated with asterisks.

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