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Diversity and Inequality in Management Teams: A Review and Integration of Research on Vertical and Horizontal Member Differences

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Keywords

diversity, inequality, social hierarchy, management teams, upper echelons, groups

Abstract

The promise and perils of heterogeneity in team member characteristics has been and continues to be one of the central questions in research on management teams. We review the literature on member heterogeneity within management teams, with a focus on summarizing and integrating research on both horizontal member differences (i.e., diversity) and vertical member differences (i.e., inequality)—two streams of research that have been largely separate in past research. We find that the overwhelming majority of research on management team heterogeneity has focused on horizontal differences, though there are few clear and consistent themes in empirical findings within either stream. We also find that horizontal and vertical differences are inter-related, such that the effects of diversity can depend critically on the degree of inequality within a team, and vice versa. Moreover, we find that our ability to clearly account for the effects of vertical and horizontal differences in



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management teams has been limited by a confusion of definitions and conceptualizations that hamper our ability to compare theoretical arguments and empirical findings across studies. We organize various conceptualizations of heterogeneity into six types based on whether a given conceptualization is concerned with horizontal or vertical differences (diversity or inequality) and whether it is focused on the differentiation, dispersion, or concentration of member differences. The result is a framework with three types of diversity (separation, variety, and skew) and three types of inequality (stratification, steepness, and centralization). Finally, we summarize different approaches to operationalizing each of these types. The conclusions and recommendations of this review can help to bring clarity and focus to research on member heterogeneity within management teams, or groups and teams of any sort.

INTRODUCTION

Recognizing that the decisions and actions of an organization's top team have far-reaching implications for organizational action (Thompson 1967, Hambrick & Mason 1984), organization and management scholars have, over the past several decades, undertaken a program of research to better understand how the characteristics of top management teams (TMTs) relate to strategic decisions and firm performance. This program of research draws heavily on the assumption that individuals and groups are bounded by their knowledge schemas and biases when processing information and making decisions, and that these schemas and biases are necessarily shaped by members' experiences, backgrounds, and affiliations (Pfeffer 1983). The composition of a TMT in terms of experience, background, and affiliation should therefore tell us something about how the team will process information and make decisions (Hambrick & Mason 1984). A large and growing body of theoretical and empirical work explores this basic proposition.

Beginning with the earliest studies of management team composition (e.g., Wagner et al. 1984), no hypothesis has received more attention than the expectation that heterogeneity in team member characteristics will matter for strategic decisions and outcomes. Indeed, more than half of the articles we found in this review of the TMT literature examined team heterogeneity in some fashion. These studies began with the assumption that the heterogeneity of backgrounds, experiences, and affiliations on a management team may be at least as important if not more important than the average of these same characteristics when it comes to predicting team decisions and actions. Interest in the importance of heterogeneity among TMT scholars aligns with a similar, long-standing interest in issues of diversity and heterogeneity among the broader community of groups researchers.

Given this broad interest and attention, one might expect that we would now have a clear understanding of how heterogeneity in various member characteristics will affect decision processes and strategic actions. Unfortunately, that does not appear to be the case. Research on heterogeneity in team member characteristics has generated an often equivocal or even contradictory pattern of empirical findings, with few clear conclusions about how different types of heterogeneity actually matter for a management team (see Webber & Donahue 2001, Horwitz & Horwitz 2007, and Bell et al. 2011 for meta-analytic reviews). In an attempt to sort out this ambiguity, researchers have pointed to the need for more careful attention to context (Joshi & Roh 2009), to moderating variables (van Knippenberg & Schippers 2007), to conceptualizations of heterogeneity (Bunderson & Sutcliffe 2002, Harrison & Klein 2007), and to the effect of the specific member characteristic being examined (Bell et al. 2011).

We agree that these recommendations can help to clarify past findings and focus future research. But we suggest here that these recommendations are incomplete. In this review, we draw attention to a generally overlooked explanation for why research on heterogeneity in management (and other) teams has generated equivocal findings—the failure to differentiate between and fully account for the effects of horizontal and vertical member differences. Research on heterogeneity in management teams has focused largely on horizontal differences between members, i.e., on differences that emerge from the horizontal differentiation of members based on specializations, social categories, cohorts, or backgrounds (e.g., functional backgrounds, tenure cohorts, genders, etc.). Less attention has been devoted to considering vertical differences between team members, i.e., differences that emerge from the vertical differentiation of members within formal or informal hierarchies of power, status, prestige, or privilege (e.g., hierarchical levels, titles, compensation differences, etc.). This is a significant oversight, especially for research on management teams where horizontal and vertical differences are not only inevitable, as they are in virtually all teams, but are inherent in the structure and function of the team. After all, management teams are places where different individuals who occupy the top levels of an organization’s hierarchy present and discuss information from various facets of an organization’s operations as part of a decision-making process in which each member’s voice may not carry equal weight. To understand the outcome of this decision-making process, we must account for both horizontal and vertical member differences and the dynamic interplay between them.

We summarize the state of the science with regard to horizontal and vertical differences (i.e., heterogeneity) in management teams, consider the interrelation between one and the other, and lay the groundwork for a research program that integrates the two. We begin by reviewing past research related to horizontal differences (i.e., the question of diversity) and vertical differences (i.e., the question of inequality) to capture the current state of the science on member heterogeneity in management teams. We then consider the folly of examining either diversity or inequality without accounting for the other. We next turn our attention to an examination of the often inconsistent ways that diversity and inequality have been conceptualized in past research, and propose an integrative typology of team heterogeneity. We conclude with a set of recommendations for advancing research on diversity and inequality in management teams.

Although our review focuses specifically on management teams, we draw liberally from the broader teams literature where questions of heterogeneity have long been of central interest. We especially wanted to be sure to build on and leverage any past studies within the broader teams literature that review or integrate research on horizontal and vertical member differences. There was very little to be found. Thus, although our conclusions and recommendations about team diversity and inequality were drawn from our review of research on management teams, they should be useful in advancing research on heterogeneity in any type of team.

HORIZONTAL AND VERTICAL DIFFERENCES IN TOP MANAGEMENT TEAMS

In reviewing the literature on heterogeneity in management teams, we focused on leading peer-reviewed academic journals in the fields of strategic management, organizational psychology, and organizational behavior, including *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *Journal of Applied Psychology*, *Journal of Management*, *Management Science*, *Organization Science*, *Organizational Behavior and Human Decision Processes*, *Personnel Psychology*, and *Strategic Management Journal*. We identified articles by searching for keywords (e.g., “management team/group,” “leadership team/group,” “upper echelons,” “TMT”) and by looking for articles that cited Hambrick & Mason’s (1984) seminal article on the upper echelons

perspective or Pfeffer's (1983) article on organizational demography. We reviewed articles published from 1984 to March of 2016, when we conducted our review. We identified a total of 108 articles. Sixty of these papers (56%) examined team heterogeneity in some fashion (53 empirical papers). We supplemented this review of individual articles with a consideration of past reviews and meta-analyses that examine heterogeneity within management teams (Hambrick 1994, Finkelstein & Hambrick 1996, Carpenter et al. 2004, Nielsen 2010, Homberg & Bui 2013).

We also consulted research within the broader teams literature to understand how horizontal and vertical differences have been conceptualized and studied beyond just the top team. We paid particular attention to reviews and meta-analyses that have attempted to review and summarize the state of the science with regard to member differences within teams (e.g., Williams & O'Reilly 1998, Webber & Donahue 2001, Mannix & Neale 2005, Horwitz & Horwitz 2007, van Knippenberg & Schippers 2007, Joshi & Roh 2009, Jackson & Joshi 2011, Bell et al. 2011). The majority of these reviews and meta-analyses did not discriminate between management teams and other organizational work teams in identifying articles, and they included at least some research on management teams within their scope.

Horizontal Differences in Top Management Teams: The Question of Diversity

Horizontal differences are those differences that emerge from the horizontal differentiation of people based on specializations, social categories, cohorts, or backgrounds. The most commonly studied horizontal differences in management team research include gender, age, ethnicity, tenure, educational background, and functional or disciplinary background (Williams & O'Reilly 1998, van Knippenberg & Schippers 2007). These demographic differences between members are presumed to correlate with more fundamental differences in knowledge, expertise, preference, skill, loyalty, and belief (Hambrick & Mason 1984, Pfeffer 1983), and it is these differences that are presumed to be of ultimate importance in predicting the effects of diversity. In other words, the study of horizontal differences is ultimately about the promise and problems of divergent capabilities and perspectives within teams, or with the classic question of team diversity (Mannix & Neale 2005). Research on diversity is generally agnostic about the extent to which these differences also correlate with rank or position in formal or informal social hierarchies.

In studying horizontal differences, researchers have generally adopted two different theoretical perspectives to account for the promise of diversity on the one hand and the challenges of diversity on the other (see Williams & O'Reilly 1998). To account for the promise of diversity, researchers typically draw on an information processing and decision-making logic (Hambrick & Mason 1984, Burgelman 1983) in predicting that teams will make more comprehensive decisions when a broader range of relevant information and knowledge is brought to bear during discussion and deliberation (Simons et al. 1999, Fredrickson 1984). In addition, it is expected that more comprehensive decision making will be particularly important in more complex environments (Ashby 1956). To account for the challenges of diversity, researchers typically draw on similarity attraction (Byrne 1971) or social categorization (Tajfel 1981) perspectives, which acknowledge that whereas differences in member backgrounds may indeed be associated with different knowledge and information, those differences also signal membership in different social categories with which TMT members may identify to greater or lesser degrees. And identification with different social groups can complicate information exchange through ingroup favoritism and outgroup bias (Brewer & Brown 1998).

Of the 53 empirical articles we identified that examine management team differences, 45 (or 85%) focused exclusively on horizontal differences. Functional diversity was the most frequently examined diversity variable across these studies (27 studies), followed by tenure (24 studies),

educational specialization or level (16 studies), age (11 studies), work history (8 studies), and nationality (3 studies). These numbers point to a preference among management teams researchers for diversity variables that are based on work experiences (functional background, tenure, work history) rather than social categories (nationality, race, gender). Articles tended to focus on one or more of the following dependent variables: firm performance (27 articles), strategic action (10 articles), team climate (6 articles), or strategic decision processes (4 articles). Moreover, researchers varied in where they positioned diversity in their models and hypotheses. Some articles positioned diversity as having a direct effect on the outcome in question (21 articles), others examined how the effects of diversity on some outcome are moderated by another variable (25 articles), and a handful examined how diversity moderates the relationship between an independent variable and some outcome (7 studies). Diversity rarely appeared as a mediator or as the key dependent variable (1 study each). In the following sections, we briefly summarize past research examining the direct and moderated effects of diversity for each of the above outcome variables.

Firm performance. By far, the most commonly studied outcome variable in TMT research on horizontal member differences is firm performance. Measures of firm performance vary, but common performance measures include return on investment, sales growth, survival, investment performance, or innovation. Of the 23 articles we identified that examine performance outcomes, 9 examine the direct effects of diversity, 13 examine moderated effects, and 5 examine diversity as the moderator.

Research examining the direct effects of diversity on TMT performance has generated inconsistent and often contradictory results. Several studies have documented positive performance effects of diversity in work experience, educational background, and tenure (Smith et al. 1994, Krishnan et al. 1997, Higgins & Gulati 2006, Beckman & Burton 2008), whereas other studies or even other diversity variables within the same studies have reported negative or null effects (Hambrick & D'Aveni 1992, Kor 2003, Bunderson & Sutcliffe 2002). In examining performance effects, several scholars have suggested that diversity in characteristics that relate to the possession of work-relevant information should relate most strongly to performance, because those characteristics should enable the decision-making benefits of diversity without triggering social categorization tensions. Consistent with this prediction, two management team studies (Simons et al. 1999, Hutzschenreuter & Horstkotte 2013) found that informational diversity (e.g., tenure, functional background, education) was positively associated with financial performance, whereas social category diversity (e.g., age, gender, nationality) had negative or null performance effects. However, a meta-analysis of the broader teams literature found little support for the positive effects of informational diversity and the negative effects of social category diversity (Webber & Donahue 2001). And after summarizing the equivocal evidence for the advantages of informational diversity over social category diversity, van Knippenberg & Schippers (2007, pp. 520–21) concluded that “all dimensions of diversity may in principle elicit social categorization processes as well as information/decision-making processes, because all dimensions of diversity in principle both provide a basis for differentiation and may be associated with differences in task-relevant information and perspectives.”

Given the equivocal support for a direct relationship between diversity and performance, several scholars have suggested that we should be focusing our attention on understanding the conditions under which TMT diversity might be positively or negatively related to performance. In fact, the largest number of studies examining the relationship between diversity and performance in our review examined moderated relationships. Results from those studies point to several variables that appear to moderate the relationship between diversity and performance. For example, scholars have suggested that diversity should be more positively associated with performance when the

task and competitive environment is changing, complex, or uncertain, because greater diversity should provide the requisite variety needed to deal with that complexity (Ashby 1956). Researchers have examined that proposition using work history diversity and diversity measures that combine functional background, tenure, education, and age. The majority of the empirical evidence has been supportive (Murray 1989, Keck 1997, Carpenter 2002, Higgins & Gulati 2003, Eesley et al. 2014, Cannella et al. 2008), but with a few exceptions (West & Schwenk 1996, Cooper et al. 2014).

There is also some evidence that diversity has more positive effects on performance in teams where members have more frequent or intensive interactions that provide an opportunity for members to better understand differences and work through disagreements. For example, diversity is more positively related to performance when members are interdependent (Hambrick et al. 2015), when they are colocated (Cannella et al. 2008), and when they engage in more frequent debate and information exchange in a decentralized team environment (Simons et al. 1999, Boone & Hendriks 2009). A few studies have also suggested that functional background, education, and tenure diversity relate more positively to performance in shorter-tenured management teams (Keck 1997, Carpenter 2002), although Nielsen & Nielsen (2013) found the opposite effect for nationality diversity.

Finally, a few studies have examined the role of diversity as a moderator of the relationship between TMT actions or characteristics and firm performance. The expectation across these studies is that TMT diversity is a team resource that enables more adaptive responses and therefore allows a team to benefit from strategic actions or resource opportunities. Support for this argument is, however, inconsistent, suggesting that the greater coordination challenges of diverse TMTs sometimes get in the way. So, for example, Nadolska & Barkema (2014) found that the acquisition experience of a top team had a stronger relationship with acquisition performance for diverse TMTs (in terms of tenure and education). Marcel (2009) found that the inclusion of a COO on the TMT was more positively related to performance when the TMT was more diverse (in terms of tenure and functional background). And Bermiss & Murmann (2015) found that the simultaneous departure of multiple TMT members was more damaging to a firm when those departing were functionally diverse. Ndofor et al. (2015) found, however, that novel strategic actions were less likely to lead to firm performance when the TMT was heterogeneous (in terms of age, tenure, and functional background), presumably because the implementation of novel actions required levels of coordination that diverse teams struggled to reach. And Mihalache et al. (2012) found that an inverted U-shaped relationship between offshoring and firm innovativeness was steeper when TMTs were more diverse (in terms of education and work experience), suggesting that diverse TMTs are quicker to leverage the learning opportunities presented by increased offshoring but that coordination challenges impede learning at higher levels of offshoring.

Strategic action. After firm performance, the most commonly studied dependent variable in research on the effects of TMT diversity is strategic action. Research in this area has been largely interested in testing one key proposition, namely, that the diversity of backgrounds and experiences within a top team provides a set of knowledge and information resources that enable bolder and more divergent strategic action, e.g., change, reorientation, and innovation. Empirical results from studies examining this proposition have been largely supportive. For example, greater diversity on a TMT has been shown to predict a greater propensity for change (Hambrick et al. 1996), more radical innovation (West & Anderson 1996), more divergent competitive actions (Ndofor et al. 2015), changes in diversification levels (Wiersema & Bantel 1992), strategic reorientations (Gordon et al. 2000), and greater international diversification (Sambharya 1996, Tihanyi et al. 2000).

In addition to these direct effects, a few studies have examined potential moderators of the diversity-action relationship. For example, Carpenter & Fredrickson (2001) found that educational and functional diversity were more strongly associated with global expansion when uncertainty was high. They also found, however, that the relationship between tenure diversity and global expansion became weaker when uncertainty was high, so the effect of uncertainty on the diversity-action relationship is not entirely clear. Additionally, Barkema & Shvyrkov (2007) found that a positive relationship between tenure diversity and new market entry was weaker when tenures overlapped. Results of these studies confirm that diversity is generally associated with novel strategic action, and they raise possible moderators of that effect. In contrast to this general pattern, however, Kor (2006) found that firms opt for lower levels of R&D investment (a more conservative strategy) when their TMT is functionally diverse (and the board includes more outsiders).

Team climate. Another common dependent variable in research on horizontal diversity within TMTs is team climate, or the quality of the social environment within the team itself. Recognizing that member differences within a team can lead to misunderstandings and ingroup favoritism, these researchers have examined the relationship between heterogeneity in member characteristics and indicators of a negative team climate such as turnover, low behavioral integration, and intrateam conflict. For example, research suggests that TMT diversity (particularly in terms of age and tenure) increases turnover (Wagner et al. 1984, Wiersema & Bird 1993), especially when members are more interdependent (Hambrick et al. 2015) or come from more collectivist cultures (Wiersema & Bird 1993). Smith et al. (1994) and Bunderson & Sutcliffe (2002) both found negative relationships between diversity (tenure and function) and intrateam communication. Simsek et al. (2005), however, found no relationship between TMT diversity in terms of function and tenure and the level of behavioral integration within a TMT, and Qian et al. (2013) found no direct relationship between functional diversity and either cognitive or affective conflict. In sum, research examining the team climate effects of diversity has produced an unclear pattern of results.

Strategic decision processes. Four studies in our review examined the relationship between horizontal diversity in TMTs and specific aspects of a team's strategic decision-making process. The core hypothesis underlying these studies is that greater demographic diversity within a TMT should lead to greater cognitive diversity, which should enhance strategic decision making by, for example, improving the accuracy of environmental scanning and enhancing decision comprehensiveness. Empirical results not only fail to support this proposition but actually contradict it. Greater demographic diversity does not necessarily lead to greater cognitive diversity (Kilduff et al. 2000), although it does lower strategic consensus (Knight et al. 1999). Moreover, TMTs with greater diversity were actually less accurate in reading their environment (Sutcliffe 1994) and less comprehensive in their decision making (Miller et al. 1998), perhaps due to coordination problems. In short, the extant literature offers little direct evidence that diversity promotes more effective decision processes in TMTs.

Summary of research on diversity in management teams. In summary, research on the effects of diversity (i.e., horizontal differences) in TMTs has generated an often inconsistent pattern of results. Nevertheless, a few themes can be discerned. Specifically, diversity appears to promote more aggressive and divergent action, which may explain why diverse teams seem to perform better in dynamic and changing environments (where bolder action is needed). However, diversity on a TMT can lead to higher turnover, lower communication, and poorer decision making. Finally, there is some evidence that team processes (debate, information exchange) can mitigate the negative effects of diversity.

Vertical Differences in Top Management Teams: The Question of Inequality

Vertical differences include those differences between members that emerge from the vertical differentiation of members within formal or informal hierarchies of power, status, prestige, or privilege. In an early paper on vertical differences within management teams, Finkelstein (1992) identified four different sources of “power” among top managers: structural (e.g., titles, compensation), ownership (e.g., shares), expert (e.g., experience in strategically critical functions), and prestige (e.g., elite education, membership on boards). These various sources of vertical differentiation, with their associated indicators, signal differences between members in their control over valued resources (i.e., “power”; see Emerson 1962) or in the prestige, respect, and deference that members receive from one another (i.e., “status”; see Magee & Galinsky 2008). Thus, whereas the study of horizontal differences in TMTs is the traditional domain of diversity, the study of vertical differences in management teams is fundamentally the study of inequality (see Blau 1977)—where it comes from and how it impacts the strategic decisions, strategic actions, and performance outcomes of a top team. In studying inequality, researchers have used a variety of different terms such as hierarchy, disparity, and steepness (see Bunderson et al. 2016 for a summary).

As with research on horizontal differences, research on vertical differences in management teams tends to rely on two different theoretical perspectives to account for the promise of inequality on the one hand and its perils on the other. The promise of vertical differences is grounded in theories of social coordination and conflict reduction. Differences in power and status between team members are presumed to facilitate collective action by suggesting who should defer to whom when it comes to decisions and actions that affect the group, i.e., by suggesting a social hierarchy (Simpson et al. 2012). A group with a strong social hierarchy should be better able to move forward in spite of disagreements that might otherwise lead to conflict and stalemate (Bunderson et al. 2016). Vertical differences can also motivate effort by suggesting that one can “move up” through hard work and superior performance, as tournament theory (Lazear & Rosen 1981) suggests. However, whereas inequality may lead to deference and effort, it can also lead to envy, competition, political maneuvering, or disenfranchisement. To account for these more negative effects of vertical differences, TMT researchers often draw from theories of social comparison (Suls & Wills 1991), which provide insight into how individuals react to upward and downward social comparisons.

Only six (or 11%) of the empirical articles we identified that examine management team differences focused specifically on the question of vertical inequality. And of these studies, all but one examined the performance consequences of pay inequality within a top team. Most of these studies began with the social comparison assumption that greater pay inequality would lead to lower performance because pay inequality leads to invidious social comparisons that compromise team collaboration. Consistent with this prediction, Carpenter & Sanders (2004) and Fredrickson et al. (2010) both found that pay inequality in management teams was associated with lower firm performance, and Patel & Cooper (2014) found that pay and status inequality between family and nonfamily TMT members led to lower performance in family firms. Siegel & Hambrick (2005) also found that pay inequality was negatively related to firm performance, but only in high-technology firms where, they hypothesized, there would be a greater need for intensive collaboration within the team. This interpretation contradicts several studies in nonmanagement teams, which find that pay inequality is associated with higher performance when team tasks require greater collaboration (e.g., basketball and hockey teams) and with lower performance when less intense collaboration is required (e.g., baseball and football teams) (see Frick et al. 2003, Halevy et al. 2011).

Moreover, Ridge et al. (2015) noted that several studies within an economics tradition, building on tournament theory, have found positive performance effects for pay inequality in management

groups (e.g., Eriksson 1999, Leonard 1990). One explanation they offer for these divergent findings is that the relationship between pay inequality and performance may actually be U-shaped. Whereas low levels of pay inequality should indeed be associated with higher performance by eliminating barriers to collaboration, high levels of pay inequality could also lead to higher performance by motivating individual team members to work hard in an attempt to achieve (or retain) higher pay. Moreover, this effect will be stronger when there are clear opportunities to increase one's pay. This prediction was supported in a study of TMTs within Fortune 500 firms.

The remaining study of inequality in TMTs that emerged in our review focused on how the balance of power between a TMT and its board affects the selection of new TMT members. Specifically, Boone et al. (2004) found that as a TMT's power increases relative to its board (measured as TMT insiders relative to board insiders), new TMT members tend to be more like existing TMT members, especially when competition is intense.

In sum, although research on vertical differences in management teams has focused largely on pay inequality, questions remain about the extent to which and the conditions under which pay inequality is harmful or beneficial for management teams. Clearly, more work is needed both on the specific issue of pay inequality and on the broader question of how different forms of inequality in management teams affect team decisions and outcomes.

On the Folly of Studying Diversity Without Accounting for Inequality (and Vice Versa)

For the most part, research on diversity in teams and research on inequality in teams have proceeded independently of one another—both in the management teams literature and in the broader teams literature. Studies tend to focus on one or the other, and they draw on different theoretical perspectives and speak to different academic subcommunities in doing so. This is unfortunate given that diversity and inequality are fundamental and coexistent realities in virtually all teams—and perhaps especially in management teams where horizontal and vertical differentiation are built into the structure and function of the team. To fully understand how member heterogeneity affects team process and performance in management (and other) teams, therefore, we need to think about the dynamic interplay between horizontal and vertical member differences. Fortunately, a few scholars—some within the management teams literature and some outside that tradition—have begun to grapple with this question. We review that literature here and explore its implications for research on heterogeneity in management teams.

The interplay of diversity and inequality. As noted earlier, Finkelstein's (1992) paper on different forms of power in management teams (structural, ownership, expert, and prestige) was one of the first to consider vertical differences in TMT research and has been widely cited in research on top managers. In citing this paper, however, researchers often overlook one of its most important points. In an attempt to validate his typology, Finkelstein demonstrated that a measure of knowledge diversity on a management team—the percentage of members with a finance background—was unrelated to strategic action (diversification) unless one accounts for the power of those TMT members. In other words, he found that there was no effect of horizontal member differences (diversity) unless one accounts for vertical member differences (inequality).

Pitcher & Smith (2001) reached a similar conclusion in their eight-year, multimethod study of diversity and power within the TMT of a multidivisional financial services company. They found that the cognitive diversity of the entire top team (e.g., functional heterogeneity) was less relevant for strategic actions and outcomes than was the cognitive diversity of the more powerful executives within the team (i.e., the firm's "inner circle" as per Thompson 1967), especially when the team

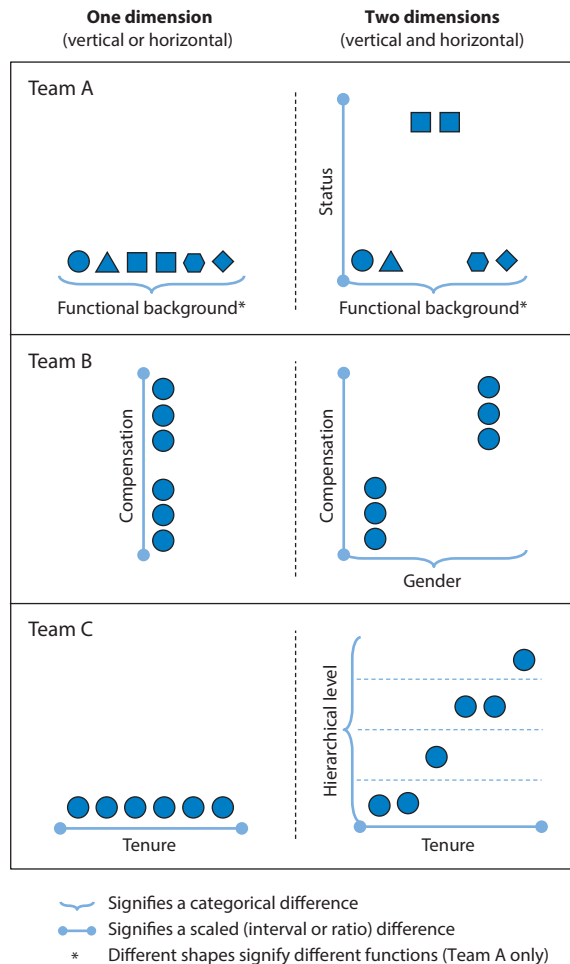


Figure 1

Three hypothetical teams along one (horizontal or vertical) versus two (horizontal and vertical) dimensions of difference.

operated in a centralized manner. Eisenhardt & Bourgeois (1988) reported similar results in their study of power dynamics within the top teams of eight computer firms. Moreover, Hambrick et al. (2015) found that tenure heterogeneity within a TMT was more strongly associated with turnover and performance when there was higher “vertical interdependence” within the team (i.e., number of hierarchical levels). In other words, these studies all suggest that we cannot fully capture the effect of horizontal differences on management team processes and outcomes unless we account for vertical differences.

To better appreciate why it is important to account for vertical differences when examining the effects of horizontal differences, and vice versa, consider **Figure 1** and its three hypothetical teams. The first column describes each team along one dimension, either horizontal or vertical, whereas the second column describes each team along both horizontal and vertical dimensions. In each case, the predictions we might feel justified in making about the team based on just one dimension (horizontal or vertical) seem much less plausible when we also consider the other dimension.

Take, for example, Team A. The different members of Team A come from very different functions (as represented by different shapes), with the exception of just two members who come from the same function. This team would therefore score highly on functional (horizontal) diversity, and we might predict that this team will be more innovative or less cohesive. However, when we account for a vertical difference (i.e., status), we see that there are two high-status members in this team and that they both come from the same function. We would therefore expect that the functional biases of these two members will be disproportionately reflected in team decisions, and that this functionally diverse team will end up making functionally narrow decisions because of status inequality.

Now consider Team B. When we look at the first column for Team B, we see a team with moderate pay inequality (a vertical dimension) in which each member occupies a different rank in the pay hierarchy. Given this one-dimensional view, we might draw from tournament theory to predict that this team will encourage greater member effort as members seek to move to the next pay position or retain their current position. But when we add the horizontal dimension, we see that pay is highly correlated with gender in this group, suggesting that something besides effort may be needed to increase one's pay, which has clear implications for member motivation and effort. Finally, when we examine the first column for Team C, we find a team with members distributed across the tenure continuum, leading us to predict that the perspectives of different tenure cohorts should be reflected in decision making. However, when we add the vertical dimension, we see that tenure is strongly related to hierarchical level in this team, suggesting that the perspectives of shorter-tenured members may not carry as much weight.

In sum, these three examples illustrate the folly of examining one dimension of member difference (horizontal or vertical) in management teams without accounting for the other. Given these examples, we might even argue that vertical equality should be viewed as a boundary condition for theories of diversity and that group homogeneity should be viewed as a boundary condition for theories of inequality. But, given that few (if any) management teams have either equal power or absolute homogeneity, we must, at a minimum, acknowledge and anticipate how differences in the dimension (vertical or horizontal) we are not directly studying can affect our results. And in doing so, we need to acknowledge the added complication that a given member difference may have both horizontal and vertical implications. We turn now to that key issue.

When horizontal differences have vertical implications (and vice versa). We have thus far treated horizontal and vertical differences as distinct and mutually exclusive, i.e., as if a characteristic were unequivocally either horizontal or vertical. We must now acknowledge that a given member characteristic can be simultaneously a horizontal characteristic (i.e., an indicator of differences in knowledge or perspective) and a vertical characteristic (i.e., a characteristic that signals power or status). For example, functional background was the most commonly studied horizontal characteristic in our earlier review, with nearly 30 studies conceptualizing functional background diversity as a key indicator of the breadth of knowledge and expertise on a team. However, as Finkelstein (1992) and Bunderson (2003b) suggest, functional background can also be an important source of power within management teams when it signals the possession of knowledge and expertise that other group members depend on for achieving their strategic objectives. Power, after all, is a function of control over resources that others depend on (Emerson 1962).

The notion that horizontal member characteristics can also serve as vertically valued characteristics and therefore shape intragroup hierarchies of status and influence is the central insight of status characteristics theory (Berger et al. 1972). Status characteristics theory recognizes that within groups, individuals form expectations of each other's relative ability to contribute to group performance based on an assessment of differentiating member characteristics. In doing so, they

consult their a priori assumptions about the characteristics that signal capability and competence, assumptions that are grounded in personal or societal presumptions and biases. Status characteristics researchers distinguish between those characteristics that are presumed to signal general competence or capability (i.e., diffuse status cues) and those characteristics that signal competence or expertise within a specific domain (i.e., specific status cues). The expectations that members form about one another's capability from these various characteristics then shape patterns of influence and deference within the group.

In other words, status characteristics theory evaluates all member differences in terms of their status value—i.e., as potentially vertical characteristics—and therefore illuminates the inequality (i.e., vertical differentiation) that exists within diversity. Although applications of status characteristics theory within the management teams literature are scarce, Bunderson (2003a) used status characteristics theory to examine vertical differentiation within a sample of high-tech manufacturing teams. He found that both specific status cues (tenure, certifications) and diffuse status cues (gender, ethnicity) predict ratings of member expertise and influence but that diffuse status becomes more predictive when the team is centralized, whereas specific status becomes more predictive when the team is decentralized, since centralization promotes coalition-building based on similarity. Bunderson (2003b) reported similar results in a sample of management teams.

In status characteristics theory, member differences that are traditionally viewed as horizontal sources of diversity are examined as sources of vertical inequality. In many cases, however, we remain primarily interested in member differences not as the basis for vertical inequality but as sources of diverse knowledge, perspective, and insight. As noted earlier, if we ignore possible vertical implications—as most of the existing research on member differences in teams has done—we will never have a clear picture of which differences are actually brought to bear in strategic decisions. We therefore need a way to explicitly account for the fact that “some executives have much more say than others, and their biases should accordingly be given more weight when trying to predict TMT actions” (Hambrick 2007, p. 336).

But how does one begin to quantify the vertical value of a given member characteristic in order to assign weights? One approach is to assign weights based on the extent to which a given characteristic is valued by others and/or helps the group to achieve key objectives. For example, Finkelstein (1992) and Bunderson (2003b) assigned weights to each manager's functional background by examining the extent to which that manager's functional experiences related to the key strategic imperatives of the firm. In another approach, Bunderson (2003a) asked a sample of managers to evaluate the extent to which different characteristics were sources of valuable expertise in their firm and then used those responses to assign weights to different member characteristics.

Finally, just as traditionally horizontal member differences can have vertical implications, there may also be cases where a vertical member difference has horizontal implications. For example, Fredrickson et al. (2010) viewed variation in stock ownership not as a source of vertical differentiation in their study but as a predictor of member similarity to other members, which they expected would have implications for pay inequality. In short, although the distinction between horizontal and vertical member differences may be convenient and, in many cases, appropriate, we must be prepared to acknowledge that any given member difference can conceivably have both horizontal and vertical implications and that researchers should be prepared to account for both in their theories and analyses.

Do diversity and inequality covary? That any member characteristic—including traditionally horizontal characteristics—can be vertically valued has several important implications for research

on team heterogeneity. One implication is that inequality and diversity may actually covary or, more accurately, that inequality may reduce diversity. Several studies within the management teams literature support this hypothesis. For example, Eisenhardt & Bourgeois (1988), Pitcher & Smith (2001), and Bunderson (2003b) all found strong evidence that in management teams where members had unequal access to decision making (i.e., where there was high vertical inequality), team members who were demographically similar to higher-ranking team members were more likely to gain influence.

There are several explanations for this effect. The most straightforward is that power holders are simply exhibiting preferences for homophily (McPherson et al. 2001) in forming their “inner circle,” favoring people who are like them along salient demographic dimensions as their trusted advisors. As a result, inner circles “tend to be characterized by similarity of personal characteristics, background and experience, and ideologies” (Ibarra 1992, p. 171). When those TMT members who are dissimilar find themselves getting shut out of key decision processes, they become disillusioned and leave for greener pastures, reducing overall TMT heterogeneity. Gruenfeld & Tiedens (2010) further suggest that inequality fosters homogeneity “by inciting conformity among those who wish to emulate leaders and move into their ranks”, or simply be accepted by them. Decentralization (lower vertical inequality) mitigates these effects by minimizing the need to align oneself with a few key power-holders in order to have impact.

AN INTEGRATIVE TYPOLOGY OF VERTICAL AND HORIZONTAL DIFFERENCES IN TOP MANAGEMENT TEAMS

Our review has suggested that one reason for the equivocal pattern of results in research on heterogeneity in management teams may well be the failure to simultaneously consider both horizontal and vertical member differences. But progress in understanding management team heterogeneity has also been hampered by lack of conceptual clarity about different forms of heterogeneity and how they are similar to and different from one another (Harrison & Klein 2007, van Knippenberg & Schippers 2007, Gruenfeld & Tiedens 2010). In studying diversity and inequality in teams, researchers often use the same broad labels (e.g., “diversity” or “hierarchy”) to refer to constructs that are different in both conceptualization and operationalization. As a result, it can be difficult to discern whether divergent results between studies are due to differences in theory or research setting, or simply to differences in conceptualizations of heterogeneity. Our recommendation here that we pay greater attention to the simultaneous effects of horizontal and vertical differences will only add to this confusion unless we have a way to think clearly about which form of diversity or inequality we are examining in a particular study.

In an attempt to address conceptual confusion about forms of diversity, Harrison & Klein (2007) proposed a typology of diversity that has been widely cited in the team diversity literature. Their typology includes two forms of horizontal diversity (variety and separation) and one form of vertical diversity (disparity). Variety is concerned with qualitative or categorical differences between group members (e.g., function, gender, ethnicity) and focuses on the extent to which members are equally distributed across categories (e.g., a balance of males and females indicates greater gender variety). Separation is concerned with differences that can be examined along an interval or ratio scale (e.g., age, tenure) and focuses on the extent to which member scores vary along that scale (e.g., higher variance in members’ ages indicates greater age separation). Disparity is similarly concerned with interval or ratio differences, but is specifically focused on vertical differences between members (e.g., status, pay) and focuses on the extent to which those differences are concentrated with just a few members at higher levels (e.g., one highly paid member with all others at low pay indicates greater pay disparity).

Although Harrison & Klein's (2007) typology was an important step forward in research on diversity, it does not fully account for the various forms of heterogeneity that emerged in our review of the management teams literature, particularly when it comes to vertical differences. Their typology recognizes just one form of vertical differentiation—disparity, which focuses on the concentration of vertical differences and presumes scaled (interval or ratio) differences such as compensation or ownership stake. Yet, several TMT studies in our review focused on inequality across distinct, vertically differentiated categories such as hierarchical level (Hambrick et al. 2015), title (Patel & Cooper 2014), or pay level (Siegel & Hambrick 2005). Harrison & Klein's typology does not account for heterogeneity across vertically differentiated categories. Moreover, some studies (e.g., Fredrickson et al. 2010) have focused on the dispersion rather than the concentration of vertical differences, a distinction that was also observed by Bunderson et al. (2016) in a recent examination of conceptualizations of hierarchy within teams. Bunderson et al. (2016) refer to the dispersion of vertical differences within a team as steepness, which they distinguish from the concentration of vertical differences or centralization (what Harrison & Klein call disparity). Again, the concept of steepness does not appear in Harrison & Klein's typology.

In other words, we need a typology of member differences in groups that acknowledges that, similar to horizontal differentiation, vertical differentiation can be grounded in different configurations of (vertical) member differences that are based on either categorical (e.g., title, pay grade) or scaled (e.g., compensation, ownership) differences. We propose such a typology in **Table 1**. **Table 1** organizes different types of team heterogeneity in terms of two dimensions. The first dimension distinguishes between horizontal and vertical member differences. And the second dimension distinguishes between three conceptually distinct forms of heterogeneity that were implied in Harrison & Klein's (2007) typology: differentiation, dispersion, and concentration. Differentiation is concerned with qualitative or categorical differences between members and views heterogeneity as variability in member representation across categories. Dispersion and concentration are both concerned with scaled differences between members and focus on how member scores diverge within that scale. But whereas heterogeneity as dispersion is specifically concerned with the magnitude of the variance in member scores, heterogeneity as concentration is concerned with the concentration of members at different (e.g., high or low) scores. Crossing these two dimensions results in six conceptually distinct types of horizontal and vertical heterogeneity.

Types of Diversity in Groups

In the following sections, we briefly describe and differentiate the three types of team diversity (i.e., horizontal differentiation) in our typology, and provide examples of each. The three types are variety, separation, and skew.

Variety. Variety is concerned with the distribution of TMT members across the distinct categories of a horizontal characteristic that is categorically differentiated such as gender, ethnicity, functional background, academic major, or disciplinary specialization. A team has higher variety when there is equal representation of TMT members within each possible category of the horizontal difference in question and lower variety when all TMT members come from the same category. For example, a management team with six members whose dominant functional backgrounds are in different functional categories (i.e., marketing, finance, operations, sales, legal, accounting) has higher functional background variety than a six-person management team where every member's dominant functional background is in finance (Bunderson & Sutcliffe 2002).

Table 1 Conceptualizing heterogeneity in management teams: a typology of horizontal and vertical member differences

	Differentiation concerned with the distribution of members across the distinct categories of a categorical member difference	Dispersion concerned with variance in member scores along a scaled member difference	Concentration concerned with the uneven distribution of member scores at high versus low levels of a scaled member difference
Diversity concerned with horizontal differences between members, i.e., heterogeneity in specializations, social categories, cohorts, or backgrounds	Variety: distribution of members across the distinct categories of a horizontal difference (e.g., gender, ethnicity, functional background, academic major); example: Smith et al.'s (1994) functional heterogeneity	Separation: variance in member scores on a scaled horizontal difference (e.g., age, tenure, years of education); example: Knight et al.'s (1999) age diversity	Skew: uneven distribution where all but one or a small subset of member scores are concentrated at the higher or lower values of a scaled horizontal difference (e.g., age, tenure, years of education)
Inequality concerned with vertical differences between members, i.e., heterogeneity in power, status, prestige, or privilege	Stratification: distribution of members across the distinct categories of a vertical difference (e.g., hierarchical level, pay grade, title); example: Hambrick et al.'s (2015) number of hierarchical levels	Steepness: variance in member scores on a scaled vertical difference (e.g., status rankings, compensation, board appointments); example: Fredrickson et al.'s (2010) compensation dispersion	Centralization: uneven distribution where all but one or a small subset of member scores are concentrated at the lower values of a scaled vertical difference (e.g., status rankings, compensation, board appointments); example: He & Huang's (2011) board membership inequality
Operations	Blau index, Teachman index	Standard deviation, mean Euclidean distance, coefficient of variation	Skew: skewness Centralization: Gini coefficient, Freeman index
Maximum heterogeneity	Equal distribution of members across categories	Half the group scores at the maximum and half at the minimum	Skew: all but one member score at the highest or lowest value Centralization: all but one member score at the lowest value

Separation. Separation is concerned with variance in member scores on a scaled horizontal difference such as age, tenure, or years of education.¹ Separation is higher when team members are spread across a wider range of some horizontal difference, i.e., when there is greater separation between their scores on that difference. As an example, a management team of five people in which members range in age from 24 to 26 will have lower age diversity than a team of five people in which members are 21, 31, 41, 51, and 61 years old.

Skew. Finally, skew is concerned with the uneven distribution of members across higher and lower scores on some scaled horizontal difference such as age, tenure, or years of education. A management team is more skewed when a majority of its members cluster at the higher or lower ends of the scale with just a few members at the other extreme, and is less skewed when members are more or less evenly distributed around the group mean. For example, a team in which the majority of members have longer team tenure with just a few short-tenured members is negatively

¹Whereas Harrison & Klein (2007) specifically applied the concept of separation to diversity in values, beliefs, and attitudes, the concept is relevant for any scaled difference.

skewed, whereas a team in which the majority of members have shorter tenure with just a few longer-tenured members is positively skewed.

The concept of skew as a diversity conceptualization was implied by our typology rather than suggested by our literature review; skew emerges when we apply a diversity-as-concentration lens to horizontal member differences. We did not find studies of management teams that explicitly examined diversity as skew. We did, however, find TMT studies where the concept of skew may have provided additional insight. For example, several studies suggested that diversity is more beneficial in shorter-tenured management teams (Keck 1997, Carpenter 2002), although other research finds just the opposite (Nielsen & Nielsen 2013). It may be that the effects of shorter tenure become clearer when we differentiate between those teams in which all members have shorter tenure (low average, low skew) and those teams in which a majority of members have shorter tenure but one or two have longer tenure (low average, high positive skew). The concept of diversity as skew raises several intriguing possibilities for examining horizontal differences in management teams.

Types of Inequality in Groups

In the next sections, we briefly describe and differentiate the three types of team inequality (i.e., vertical differentiation) in our typology, and provide examples of each. The three types of inequality are stratification, steepness, and centralization.

Stratification. Stratification is concerned with the distribution of TMT members across the distinct categories of a vertical characteristic that is categorically differentiated, i.e., where categories are ranked such that some categories are presumed to have more social value than others. Examples include hierarchical level, pay grade, or title. A team is more highly stratified when there is equal representation of TMT members within each possible category of the vertical difference in question and less stratified when all TMT members come from the same category. For example, a TMT with six non-CEO members including two C-level (e.g., COO, CTO) members, two Senior VPs, and two VPs would be more vertically stratified than a team in which all six non-CEO members are Senior VPs. Hambrick et al. (2015) provide an example of stratification within the TMT literature with their examination of the distribution of TMT members across hierarchical levels.

Steepness. Steepness is concerned with variance in member scores on a scaled vertical difference such as compensation, ownership, or number of board appointments. The term steepness is often used in the literature on social hierarchy (Anderson & Brown 2010, Bunderson et al. 2016) to capture the height or spread of a given hierarchy. In a steeper hierarchy, member scores on a given vertical difference are spread across a wider range. Thus, a TMT in which some members own many company shares and other members own very few is steeper than a team in which all members own basically the same number of shares. As an example, Leonard (1990) looked at the performance implications of the standard deviation of executive pay within the management teams of 439 large US corporations.

Centralization. Centralization is concerned with the extent to which one member (or a small subset of members) scores high on some scaled vertical difference such as compensation, ownership, or number of board appointments, whereas all others score low. For example, a management team in which one team member is much more highly compensated than all other team members (Siegel & Hambrick 2005, Carpenter & Sanders 2004), has more board appointments than all other

team members (Boone et al. 2004), or has significantly more equity than all other team members (Finkelstein 1992) would be more centralized than a team in which members have similar scores on these vertical differences. Harrison & Klein (2007) used the term disparity to describe what we are referring to here as centralization. We use the term centralization, following Bunderson et al. (2016), to emphasize that in this form of inequality, vertical differences are not just disparate across members, they are concentrated.

Applying the six types. The two dimensions and six types described in **Table 1** provide a conceptual framework that accounts for conceptualizations of horizontal and vertical heterogeneity in the management teams literature. They can therefore facilitate greater clarity, precision, and consistency in how we conceptualize member differences in management teams, how we think about the theoretical implications of those differences, and how we evaluate and compare findings from different studies. As an example, we might use this framework to more precisely describe the different forms of horizontal and vertical heterogeneity in the three hypothetical teams described above (see **Figure 1**). Team A has high functional variety (members evenly spread across different functional background categories) and high status centralization (a few high-status members with a majority of low-status members). Team B has high gender separation (half male and half female) and moderate compensation steepness (members spread fairly evenly across different levels of compensation). And Team C has moderate tenure separation (members evenly spread across the tenure range), low tenure skew (no concentration of members at high or low levels of tenure), and moderately high hierarchical stratification (members mostly spread evenly across different hierarchical levels). Once we are clear about the precise forms of diversity we are considering in a given situation, we can more appropriately apply existing research and theory to make predictions about the implications of heterogeneity in that situation.

Operationalizing Diversity and Inequality Types

Clarity about which conceptualization of heterogeneity one is examining in a given situation is not only critical in guiding theoretical predictions, it is also a critical prerequisite for selecting an appropriate operationalization. In their paper on diversity types, Harrison & Klein (2007) provided a useful roadmap for understanding which operationalizations are appropriate for each of their three diversity types. Because their examination was essentially concerned with how to quantify differentiation (variety), dispersion (separation), and concentration (disparity)—i.e., the columns in our **Table 1**—their discussion is mostly relevant for the framework we present here, with just a few exceptions that derive from the directional character of horizontal and vertical differences. In this section, we build on the groundwork laid by Harrison & Klein (2007) in order to provide suggestions for how one might operationalize each of the six heterogeneity types described in **Table 1** (see “Operations” row in **Table 1** for a summary).

Operationalizing differentiation: variety and stratification. Because differentiation is concerned with heterogeneity across qualitative categories, types of heterogeneity that are concerned with differentiation—variety and stratification—require measures that assess the extent to which a set of actors or objects is uniformly distributed across a set of mutually exclusive categories. The most common index of differentiation in the management teams literature is Blau’s (1977) heterogeneity index, which mirrors Herfindahl’s (1950) and Hirschman’s (1964) indices. It is calculated as $1 - \sum p_k^2$, where p is the proportion of the team in the k^{th} category. It ranges from 0 to $(k - 1)/k$, where higher values indicate more even distribution of members across categories. Shannon (1948) and Teachman (1980) suggest an alternative but related measure of

differentiation. It is computed as $-\sum [p_k \cdot \ln(p_k)]$, where p is defined as above. This index ranges from zero to $-1 \cdot \ln(1/k)$, where higher values again indicate more uniform distribution across categories. Scores on both indices are sometimes divided by their theoretical maximum so that values range from 0 to 1. Finally, in studies where researchers are examining the distribution of members across just two categories, the proportion of members in one of the categories is often used.

A few studies operationalized stratification as the number of levels reflected within the team (Hambrick et al. 2015). This measure has the benefit of simplicity but will miss much of the nuance in the distribution of members across levels. We therefore recommend the above measures when the required data are available.

Operationalizing dispersion: separation and steepness. Dispersion is about variation across a scaled (i.e., interval or ratio) dimension. Types of heterogeneity that are concerned with dispersion—separation and steepness—are therefore operationalized using measures of variation. Variation measures are maximized when half of a team scores at the minimum and the other half scores at the maximum on some difference. The most commonly used measures of dispersion in the management teams literature are the standard deviation, mean Euclidean distance, and, perhaps most frequently, the coefficient of variation (Allison 1978). The coefficient of variation divides the team standard deviation by the team mean to account for the expectation that a given standard deviation matters more in a team where members generally score low on the difference in question than when they score high. Although this is a reasonable expectation in many cases, it should not be assumed that the coefficient of variation is always the correct operationalization since researchers may be interested in absolute (unadjusted) dispersion in some cases.

Operationalizing concentration: centralization and skew. Concentration is about the extent to which a small subset of group members score at one end of a scale whereas the majority scores at the other end. In the case of centralization, we are specifically interested in whether one or a few members score high on the difference in question with the remainder of the team scoring low, whereas skew can accommodate cases where the small subset is at the high or low end of the scale.

Centralization. Centralization is typically measured using the Gini (1936) coefficient or the Freeman (1979) centralization index. The Gini coefficient is computed as the sum of all pairwise absolute differences between team members on dimension D , divided by $[2 \cdot \text{avg}(D) \cdot n^2]$, where n is the number of members in the group. The Freeman index is computed as $\sum (c_{\max} - c_i) / [(k - 1) * (c_{\max} - c_{\min})]$, where c_{\max} is the highest score on the team, c_{\min} is the lowest possible score, and c_i is the score for team member i of k total members. Both indices reach their maximum when all but one member score at the lowest possible value on the difference in question.

Several studies of pay inequality in management teams operationalized inequality in pay as the ratio between the CEO's pay and the average pay of other TMT members (e.g., the three to four next most highly paid management team members) (Carpenter & Sanders 2004, Fredrickson et al. 2010, Ridge et al. 2015). Although not explicitly presented as a measure of concentration, this operationalization clearly has the same basic goal, namely, to quantify the extent to which the CEO has disproportionately high pay relative to other team members. We therefore note it here as another possible measure of vertical concentration, although it is not as fine-grained as the measures noted earlier. We therefore recommend those measures when the required data are available.

Harrison & Klein (2007) view the coefficient of variation as a measure of disparity (i.e., centralization). Although we agree that the coefficient of variation gets at inequality, it does not explicitly capture the extent to which high scores are concentrated in one or a few members—which is the

key question in centralization. The coefficient of variation is at its largest when half of a group is at the maximum on some dimension while the other half is at the minimum, whereas concentration should be at its maximum when one member is at the maximum and all others are at the minimum. The coefficient of variation is therefore more appropriate for evaluating steepness than centralization.

Skew. Skew is measured using a standard skewness measure (Groeneveld & Meeden 1984). Large positive values of skewness indicate positive skew (e.g., one member at high values on the dimension in question with all other members at low values), whereas large negative values of skewness indicate negative skew (e.g., one member at low values with all other members at high values). As with centralization, skewness is at its maximum when all but one member score at the extreme (high or low) on the difference in question. Positive skew should therefore be correlated with centralization.

TOWARD A MULTIDIMENSIONAL ANALYSIS OF MEMBER DIFFERENCES IN TOP MANAGEMENT TEAMS

In sum, several key themes emerged from our review of the literature on heterogeneity in management teams, themes that may point to useful refinements and generative new directions for future research in this area. First, the pattern of empirical findings across studies of horizontal and vertical heterogeneity was often equivocal. We did find reasonable evidence that heterogeneity in horizontal member differences—i.e., team diversity—promotes more aggressive and divergent action that may be more adaptive in dynamic environments. But research on vertical member differences—i.e., team inequality—has focused largely on pay inequality with inconsistent results. In short, although a majority of the articles on management teams that we identified in our review focused on member heterogeneity in some way, we are still fairly limited in the confident conclusions we can draw from those studies about the robust effects of heterogeneity.

Second, past research has tended to focus largely on horizontal rather than vertical forms of heterogeneity, i.e., on diversity rather than on inequality. Moreover, those studies that have examined vertical differences have focused largely on pay inequalities. Given the pervasive reality of vertical differences within the structure and design of management teams, as well as the key role that inequality can play in shaping the key “product” of a management team, i.e., the decision, this seems to be a critical oversight. One implication of the present review, therefore, is that future research on management teams should pay closer attention to the key effect of member inequality—and not just diversity—on decisions and outcomes.

Third, this review has suggested that attention to either vertical or horizontal member differences in isolation when studying management teams can lead to incomplete or even misguided inferences about the effects of member heterogeneity. When inequality is high, for example, conceptualizations of diversity that treat all member backgrounds equally will fail to reflect the actual mix of backgrounds that are brought to bear in decision making. To fully understand how diversity or inequality might affect team decisions and outcomes, therefore, we need to consider both dimensions in our theories, models, and measures. This might mean controlling for one while studying the other, weighting our measures of one based on values of the other, or examining their interactive effects in our models. A research program that examines the simultaneous or interactive effect of horizontal and vertical member differences promises to yield important, robust, and novel insights into the antecedents and consequences of heterogeneity in management teams.

Finally, our review suggested that past research on heterogeneity in management teams has adopted a variety of different conceptualizations of both diversity and inequality, without clear or consistent terms, definitions, or operationalizations. As a result, it can be very difficult to

assess the comparability of any two theoretical arguments or the findings from any two empirical studies. In an attempt to promote greater clarity and consistency across studies, we organized these different conceptualizations into a simple typology. The typology characterizes different conceptualizations of member heterogeneity based on whether the conceptualization is concerned with horizontal member differences (diversity) or vertical member differences (inequality) and whether it is focused on the differentiation, dispersion, or concentration of member differences. The result is a framework with three types of diversity (separation, variety, and skew) and three types of inequality (stratification, steepness, and centralization), along with suggestions for how each type might be operationalized. This framework can be helpful both in comparing past research and in sharpening concepts and measures in future research.

Some Additional Recommendations for Future Research

In addition to the main points just summarized, our review of the literature on heterogeneity in management teams generated a few additional observations that may prove useful to future researchers who pursue this important domain of inquiry. To summarize, we suggest that research on management team heterogeneity could benefit from (*a*) considering strategic decisions and not just performance, (*b*) opening that pesky black box, (*c*) thinking differently about faultlines, (*d*) examining antecedents, and (*e*) contextualizing heterogeneity.

Considering strategic decisions and not just performance. As noted above, the most common dependent variable in studies of both diversity and inequality in management teams was firm performance, and by a wide margin in both cases. Although performance is often of ultimate interest in understanding the effects of TMT heterogeneity, performance outcomes have multiple determinants, many of which are outside the direct control of top managers. One way of sharpening the focus in research on the effects of member heterogeneity in management teams, therefore, is to examine outcome variables that are more proximally affected by the TMT dynamics that heterogeneity is presumed to engender. More specifically, if we assume that diversity and inequality will affect decision-making dynamics within a team, then more proximal dependent variables might be the specific strategic decisions made by a team. Hambrick & Mason (1984) provided a useful list of strategic choices that researchers might examine, such as diversification, acquisition, financial leverage, or R&D intensity. Other TMT research has looked at how heterogeneity affects the quality or comprehensiveness of strategic decisions (Sutcliffe 1994, Miller et al. 1998, Simons et al. 1999). Considering decisions and not just outcomes can sharpen our understanding of how management team characteristics translate into decision biases.

Opening that pesky black box. In stating their case for an upper echelons perspective, Hambrick & Mason (1984) suggested that demographic variables provide readily available and unbiased indicators of TMT knowledge and preferences (Pfeffer 1983). Consistent with this suggestion, all but a handful of the articles in our review of the literature on heterogeneity in management teams operationalized heterogeneity using demographic variables. Although demographic indicators clearly have several advantages for data collection and measurement, their use necessarily relies on assumptions about the effects of demography on individual biases and group processes—assumptions that have seldom been directly examined in TMT research. The lament in Hambrick's (2007, p. 337) retrospective on the upper echelons perspective therefore remains largely true today: "[T]he psychological and social processes by which executive profiles are converted into strategic choices still remain largely a mystery—the proverbial black box." As a result, our ability to draw precise conclusions from demographic studies of TMT heterogeneity about intervening processes

is limited, which necessarily limits our ability to provide suggestions for harvesting the benefits and avoiding the pitfalls of heterogeneity. As Hambrick (2007, p. 337) noted, looking inside the black box “is not just a matter of scholarly curiosity; it is essential for ultimately improving the insights we can provide executives. . . .”

We must, of course, acknowledge the reality that researchers studying upper echelons face unique challenges in gaining access to TMTs to collect high-quality data on team decision processes. But while gaining such access may be difficult, it is not impossible. Our review included several studies that obtained measures of team decision processes by surveying TMT members (Smith et al. 1994, Bunderson & Sutcliffe 2002, Knight et al. 1999, Qian et al. 2013). Bednar & Westphal (2006) offered a number of practical suggestions for collecting high-quality survey data from upper echelons. We believe that to make real progress in our understanding of how management team heterogeneity affects strategic decisions and performance outcomes, we need more research that takes on the challenge of getting inside the black box.

Thinking differently about faultlines. One of the more important advances in recent research on member differences in the broader teams literature is the notion of diversity faultlines (Lau & Murnighan 1998). Diversity faultlines are created when member differences are aligned such that differences on one dimension correlate with differences on another dimension, thereby deepening intragroup divides and complicating intragroup relations. Three studies in our review explicitly examined faultlines within management teams (Hutzschenreuter & Horstkotte 2013, Cooper et al. 2014, Ndofo et al. 2015). Each of these studies was specifically interested in faultlines that result from different combinations of horizontal member differences (education, tenure, functional background, age, nationality).

One opportunity for future research on heterogeneity in management teams, therefore, is to examine the faultlines that are created when horizontal and vertical member differences are aligned versus when they are misaligned. As noted earlier, traditionally horizontal characteristics often differ in their status value because of a priori biases and expectations, suggesting that the alignment of horizontal and vertical member differences may be the rule rather than the exception. Moreover, horizontal-vertical alignment would seem to be particularly problematic for a team’s ability to leverage member differences. We would expect, for example, that diversity will create more tension and conflict and will generate fewer decision-making benefits when certain demographic groups (e.g., functions, genders) consistently have lower power or status and others consistently have higher power or status. In line with this prediction, past research has suggested that teams in which power and status are more centralized also tend to be more demographically homogenous (Eisenhardt & Bourgeois 1988, Bunderson 2003a). When horizontal differences are unrelated to vertical inequality, however, groups may be better able to leverage the benefits of both diversity (i.e., richer decision making) and inequality (i.e., coordination and conflict resolution). This suggests one promising avenue for future research on faultlines and heterogeneity in management teams.

Examining antecedents. Few of the studies in our review examined management team heterogeneity as a dependent variable (Keck & Tushman 1993; but see Boone et al. 2004, Nielsen 2009). As a result, we know little about the factors that might lead a management team to become more or less diverse or more or less unequal, and we have little to say to those who might wonder how to foster diversity or equality in a team. The study of antecedents is therefore another important avenue for future work on management teams.

Contextualizing heterogeneity. Finally, research on heterogeneity in the management teams literature, as well as in the broader teams literature, has operated on the implicit assumption that the effect of a particular difference variable will be consistent across contexts. For example, if age heterogeneity undermines cohesion in the management teams of Midwestern manufacturing firms, we tend to assume that it will also undermine cohesion in the management teams of Swedish high technology companies. The problem with this assumption is that the salience and significance of any given difference variable are shaped by factors such as population demographics; societal, organizational or industry cultures; political and ideological discourse; or market and technology trends (e.g., Berger et al. 1998). As a result, a difference variable that is salient, valued, or ideologically charged in one setting may not even get noticed by top managers in a different context. Context therefore provides another possible explanation for why empirical findings across studies of management team heterogeneity may diverge, even when researchers are investigating the same difference variable and operationalizing it in the same way.

One way to begin addressing this concern is for researchers to be more explicit about the context of their studies, and how that context may be affecting the salience or significance of the specific difference variables they are examining. Tenure heterogeneity may be more salient in a stable industry, for example. Age heterogeneity may be more salient and significant in a young industry with cutting-edge technologies. Compensation heterogeneity may be more significant in an egalitarian culture. Explicit attention to the potential effects of context on the salience and significance of particular heterogeneity variables should allow for a better informed and more nuanced comparison of research results across studies.

Implications for Practice

The idea that a diversity of backgrounds and perspectives can help a team to make more informed decisions has become almost a truism in the practitioner literature (Rock & Grant 2016). Management gurus and consultants are quick to espouse the virtues of diversity and the evils of homogeneity, especially within top leadership ranks (Barta et al. 2012). As a result, many companies pursue diversity initiatives designed to broaden the heterogeneity of their top teams, especially on social category dimensions (e.g., Freda et al. 2017). One implication of the present review is that these initiatives will have little effect on the actual diversity reflected in team decisions if they ignore the realities of inequality within top teams. Diversity architects acknowledge this point, at least indirectly, when they suggest that diversity initiatives cannot succeed without inclusion, or a genuine appreciation for and valuing of each individual, regardless of their background or characteristics (Sherbin & Rashid 2017). Although fostering a climate of inclusion is clearly important, it does not address the vertical inequalities that can continue to result in some voices being heard and others ignored. In other words, by acknowledging that team heterogeneity has both horizontal and vertical dimensions, and that these dimensions are inter-related and affect one another, practitioners should be in a better position to design diversity initiatives that have a real chance of succeeding.

CONCLUSION

On the basis of our review of past research on heterogeneity in management teams, we have suggested that future research in this area can benefit from a more careful and systematic examination of vertical as well as horizontal member differences. The recommendations and organizing typology presented here can be helpful in facilitating that analysis—an analysis that promises to yield

important insights into our understanding of how, when, and why member differences matter for management teams, or teams of any type.

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Errata

An online log of corrections to *Annual Review of Organizational Psychology and Organizational Behavior* articles may be found at <http://www.annualreviews.org/errata/orgpsych>