



## Past, present, and potential future of team diversity research: From compositional diversity to emergent diversity



Daan van Knippenberg<sup>a,\*</sup>, Julija N. Mell<sup>b</sup>

<sup>a</sup> Erasmus University Rotterdam, The Netherlands

<sup>b</sup> ESSEC Business School, France

### ARTICLE INFO

#### Article history:

Received 10 September 2015

Revised 22 May 2016

Accepted 30 May 2016

#### Keywords:

Teams

Groups

Team composition

Group composition

Diversity

Team processes

Group processes

Group dynamics

Emergent states

### ABSTRACT

We review research in team diversity to take stock of the current state of the science, the trajectory that led to this state, and a potential way forward that would lead to more integrative theory in diversity research. We outline how diversity research has developed into the current state of the science with growing consensus on key mediating processes in the diversity-performance relationship and growing consensus that this relationship is contingent on moderating influences. We see important challenges in moving the field forward in two key areas: first, in integrating diversity research with its emphasis on diversity in relatively stable attributes – *trait diversity* – with research in more state-like composition variables – *state diversity*; second, in integrating research in compositional diversity with research on *emergent diversity* – diversity in team interaction processes and team emergent states. We propose that meeting these challenges will result in more broad-ranging theory that has for instance the potential to bridge research in team diversity and individual-team dissimilarity (relational demography).

© 2016 Elsevier Inc. All rights reserved.

### 1. Introduction

Two interrelated trends have unalterably changed organizational work over the past fifty years. On the one hand, work is increasingly organized in team-based structures, taking advantage of the increased potential of teams to leverage synergies and address complex and dynamic tasks and challenges (Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Mathieu, Hollenbeck, van Knippenberg, & Ilgen, in press). On the other hand, demographic changes in the workforce, employee mobility, and growing specialization are rendering societies and organizations more and more heterogeneous (Jackson & Joshi, 2011; Mor Barak & Travis, 2013). These two trends are interrelated insofar as many of the benefits associated with team-based work – the ability to mobilize a greater range of informational resources in pursuit of synergistic benefits to decision making, problem solving, flexibility, creativity, and innovation – in fact call for teams whose members bring diverse knowledge, expertise, information, and perspectives to the table. Thus, team diversity – whether by design or as a consequence of societal change – increasingly is a reality of

organizational life. These developments make an understanding of the effects of team diversity on team performance more relevant than ever before.

To assess where we stand in our understanding of team diversity effects, we provide a review in broad strokes of research on team diversity effects on team process and performance. We do this both with an eye on the historical development of the field and with an eye on the future development of the field. Space constraints make an exhaustive review not feasible, but we can anchor our review on three earlier reviews that build upon each other and allow us to paint a picture of the historic development of team diversity research. The first of these reviews is the seminal review by Williams and O'Reilly (1998) that captured the first 40 years of diversity research in organizational behavior. This review forms something of a watershed in that the work they reviewed was largely characterized by main effect approaches yielding inconsistent results, whereas work after their review increasingly engaged with moderation and mediation in team diversity effects on team performance. The second of the three reviews is van Knippenberg and Schippers' (2007) review that was explicitly pitched to follow up on the Williams and O'Reilly review. This review put a premium on the study of moderation in the team diversity-team performance relationship – a conclusion confirmed by the most comprehensive meta-analysis of the diversity-performance relationship to

\* Corresponding author at: Rotterdam School of Management, Erasmus University Rotterdam, PO Box 1738, 3000 DR Rotterdam, The Netherlands.

E-mail address: [dvanknippenberg@rsm.nl](mailto:dvanknippenberg@rsm.nl) (D. van Knippenberg).

**Table 1**  
Three forms of diversity.

Diversity form	Definition	Examples	Potential causal relation with other forms
Trait diversity	Variation in team member stable characteristics	Gender diversity Personality diversity	Potential cause of state diversity and emergent diversity
State diversity	Variation in team member malleable characteristics defined independently from the team and/or team processes	Distributed information Preference diversity	Potential cause of emergent diversity
Emergent diversity	Variation in team processes and psychological states defined in reference to the team	Diversity of dyadic interactions Diversity (low sharedness) of team cognition	

date (van Dijk, van Engen, & van Knippenberg, 2012). The third review by Guillaume, Dawson, Otaye-Ebede, Woods, and West (2015) arguably is the successor of the van Knippenberg and Schippers review. These authors framed their review around van Knippenberg and Schippers' earlier call for a focus on moderation and prioritized moderation evidence in their review of the field. It is also the most recent review of the diversity field at the time of writing. This set-up allows us to present a representative picture of well over 50 years of research on team diversity and team performance culminating in what we propose are two important but so far underrepresented conclusions.

First, team diversity research in practice is the study of what we might call *trait diversity* – diversity in stable characteristics such as demographic background, functional or educational background, or personality. It has drawn little on research on what might be called *state diversity* – differences in more malleable attributes such as decision preferences (Davis, 1973), task-relevant information (Stasser & Titus, 1985), or moods (George, 1996). Variation in such attributes can be treated as a composition variable in that such attributes are defined independently from the team and differences are typically present at the onset of the teamwork. Yet, such attributes are malleable in the sense that they cannot be assumed to stay the same during team interaction. Whereas the streams of research that speak to how such state diversity influences team process and performance are not typically linked to trait diversity research, they hold valuable lessons from which the latter can benefit. Seeing trait diversity as precursor to state diversity is a reasonable jumping off point to integrate insights from the two research traditions into more sophisticated models of team process and performance.

Second, team diversity research has largely neglected the possibility that diversity in team composition may result in diversity in team process and states that are defined in reference to the team (e.g., team cognition; Salas & Fiore, 2004) – what we call “emergent diversity” here. Indeed, there is a longstanding tradition in research in groups and teams (terms we use interchangeably; see also Kozłowski & Bell, 2003) to treat group/team processes as largely homogeneous in the sense that all members experience them and participate in them roughly equally (see, e.g., Ilgen et al., 2005; Mathieu, Maynard, Rapp, & Gilson, 2008; Mathieu, Tannenbaum, Donsbach, & Alliger, 2014; for major reviews of this literature). It is this perspective that thus far has predominantly guided research linking team diversity to team processes (e.g., van Knippenberg & Schippers, 2007). Yet, the recent years have seen a surge of interest in conceptions of team processes as not necessarily homogeneous or homogeneously perceived patterns of member interactions and relations (Crawford & LePine, 2013; Humphrey & Aime, 2014), which is a perspective that we expect to find strong resonance in future team diversity research. Diversity theory and research in particular points to the possibility of heterogeneity in team process, but such heterogeneity need not be uniquely diversity-driven. In that sense, the conclusions from our review have implications for research in groups and teams

more broadly in championing the study of heterogeneity of team process to complement the dominant focus on homogeneous team processes.

To provide an “anchor” for the following review, Table 1 captures these notions of trait, state, and emergent diversity with illustrative examples. Note that the notions of trait, state, and emergent diversity differ from distinctions previously used such as deep-level versus surface-level diversity (Harrison, Price, & Bell, 1998) and job-related versus demographic diversity (Webber & Donahue, 2001): Trait diversity includes both easily discernable (i.e., surface-level) attributes such as demographics (i.e., demographic diversity) and far less discernable (i.e., deep-level) attributes such as personality, and can also reflect what are typically seen as job-related attributes such as formal education. In a related vein, neither state diversity nor emergent diversity overlaps completely with any of these previously suggested categorizations. Considering how these previous categorizations have not helped much in capturing diversity effects (van Dijk et al., 2012), we see more hope for the distinctions proposed here.

Importantly, a closer look at emergent diversity in team interaction patterns and emergent states also suggests that it pays off for diversity research to look beyond diversity as a team characteristic and to seek greater integration with research in relational demography – individual dissimilarity to the team (Tsui, Egan, & O'Reilly, 1992). Incorporating insights about how individual members' (dis) similarity to their teammates influences the patterns of emergent diversity that may be observed may help further explain diversity influences on team performance.

## 2. Team diversity, team process, team performance: a review in broad strokes

Team diversity refers to variation among team members on any attribute on which individuals may differ, such as demographic background, functional or educational background, and personality. In principle this could also include diversity on more state-like attributes like cognition and emotions (an issue we revisit later), but in practice the term diversity tends to be largely reserved for relatively stable attributes like demographics, education, functional area, and personality. The vast majority of diversity studies concentrates on diversity in gender, cultural background (including race/ethnicity), age, tenure, functional background, and educational background (van Dijk et al., 2012) – attributes that are stable enough to see them as characteristics individuals bring to the team and that will not change in the course of the teamwork. The question that then arises quite naturally is how team diversity as a team composition variable (an “input” variable; Ilgen et al., 2005) may affect team performance, and, related to that question, which mediating process may explain diversity influences on performance.

We aim to capture the answers as they arose throughout the history of diversity research in broad strokes by focusing on the state of the science at the time of three major reviews of the

**Table 2**

State of the science as captured by the Williams & O'Reilly, van Knippenberg & Schippers, and Guillaume et al. reviews.

Review	State of the science
Williams and O'Reilly (1998)	Predominant type of studies: Main effect studies with inconsistent effects and little attention to mediating processes Main conclusions: Diversity bad for interpersonal relations but good for performance; negative effects of demographic diversity vs. positive effects of functional diversity
van Knippenberg and Schippers (2007)	Predominant type of studies: Shift to moderation and mediation studies Main conclusion: All dimensions of diversity may have positive as well as negative effects contingent on moderating influences
Guillaume et al. (2015)	Predominant type of studies: Proliferation of moderation studies Main conclusion: Stronger confirmation of the contingency perspective on diversity effects

literature. Table 2 captures the main conclusions from this “review of reviews” as an additional guide to the reader.

### 2.1. The first 40 years: the Williams and O'Reilly (1998) review

Williams and O'Reilly (1998) outline how the first 40 years of team diversity research in organizational behavior are characterized by two research streams that were by and large isolated from each other: the social categorization perspective (including the notion of similarity/attraction) that saw diversity as a disruptive influence, and the information/decision making perspective that saw diversity as a factor stimulating team performance.

At the core of the social categorization perspective lies the notion that dissimilarities between people may invite differentiation between individuals seen as ingroup (“us”) and individuals seen as outgroup (“them”). Such social categorizations may invite intergroup biases – more positive responses to ingroup than to outgroup members. Intergroup biases may express themselves negatively both in individuals' psychological linkage to the team (e.g., identification, commitment, team cohesiveness) and in the quality of interpersonal relationships (e.g., lowered communication and cooperation, heightened relational conflict). Diversity research indeed shows evidence for disruptive effects on such process variables, for instance, in lower group cohesiveness (O'Reilly, Caldwell, & Barnett, 1989) and higher relational conflict (Jehn, Northcraft, & Neale, 1999).

In contrast to this pessimistic perspective on team diversity, the information/decision making perspective pointed to the potential benefits of diversity. Core to this perspective is the notion that diversity can be an informational resource. Differences between people can be associated with differences in knowledge, expertise, experience, information, etc., that affect the perspective they may bring to the team task. Greater team diversity may thus be associated with a broader, more diverse pool of task-relevant information and perspectives that teams can draw from. In knowledge work, such informational resources may add to the quality of team decision making, team creativity and innovation, and, more broadly speaking, team performance. Consistent with this perspective, diversity research also yielded evidence of positive performance and innovation effects of diversity (Bantel & Jackson, 1989; Cox, Lobel, & McLeod, 1991).

A first blush conclusion at the time was that diversity would be good for performance, but bad for interpersonal relationships (cf. Williams & O'Reilly, 1998). The problem with this conclusion was – and still is – that team theory and research suggest that

factors that negatively affect interpersonal relationships and affective-evaluative responses to the team are also detrimental to performance. And indeed, there was also ample evidence of negative performance effects of diversity (e.g., Jehn et al., 1999; Murnighan & Conlon, 1991; Simons, Pelled, & Smith, 1999). Indeed, at the time Williams and O'Reilly (1998) published their seminal review, the state of the science was roughly that of a field with substantially diverging findings, some consistent with the disruptive social categorization processes perspective, others with the informational resource perspective, and yet others showing no evidence of diversity effects on team process or performance.

An intuitively appealing way of making sense of these diverging findings seemed to be to propose that different effects of diversity were linked to different dimensions of diversity: Demographic forms of diversity would elicit disruptive social categorization processes because of their relatively strong association with stereotypes favoring ingroup over outgroup. On the other hand, more functional-educational dimensions of diversity with presumably stronger linkages to underlying informational resources would elicit performance-stimulating informational processes (Jehn et al., 1999). The Jehn et al. (1999) study was also influential in advancing a conflict perspective on the mediating processes: Relational conflict would explain the disruptive influence of demographic diversity, whereas task conflict would explain the positive effects of more informational dimensions of diversity. Intuitively appealing as these propositions may seem, they are not supported by the data (van Knippenberg, De Dreu, & Homan, 2004). Even though it may be true that it is easier to benefit from functional/educational forms of diversity than from demographic forms of diversity, for both forms of diversity the evidence ranged from positive to negative effects and displayed clear heterogeneity of effect sizes. Illustrative in this respect are early meta-analyses that did not reliably link either demographic diversity or more information-based diversity to performance (Bowers, Pharmed, & Salas, 2000; Webber & Donahue, 2001). Such observations of heterogeneity of effect sizes that was not explained by the intuitively appealing notion of “good” and “bad” diversity attributes were instrumental in shifting the focus in diversity research to the state of the science as reviewed by van Knippenberg and Schippers (2007).

### 2.2. Prioritizing moderation and mediation: the van Knippenberg and Schippers (2007) review

The state of the science around the time of the Williams and O'Reilly (1998) review begged one question more than any other: What determines whether diversity has positive or negative performance effects? Findings for all dimensions of diversity studied with some frequency showed evidence of positive as well as negative effects. Studies of moderation of the diversity-performance relationship started to emerge, as well as an integrative conceptual model to capture the contingencies of diversity's effects on performance – the Categorization-Elaboration Model (CEM; van Knippenberg et al., 2004). At the time van Knippenberg and Schippers reviewed research on the diversity-performance relationship, the evidence had just amassed more against simple main effects models of diversity – i.e., either the negative effects of the social categorization perspective or the positive effects of the information/decision making perspective. Van Knippenberg and Schippers concluded that the evidence against such main effects models was so strong, that it was time to declare the bankruptcy of main effect approaches and to prioritize the study of moderation in the diversity-performance relationship. They also concluded that diversity research in its first 40 years had been held back by lack of attention to mediating team processes. Accordingly, in their assessment of the state of the field, they prioritized moderation

and mediation evidence – evidence that by that time had grown enough to draw a number of conclusions.

One conclusion van Knippenberg and Schippers drew was that the only integrative model of moderation and mediation in the diversity-performance relationship, the CEM, was well-positioned to integrate evidence of positive and negative performance effects. In a nutshell, the CEM proposed that both the social categorization and the information/decision making perspective were correct in that diversity had the potential to invite disruptive intergroup biases as well as synergetic benefits through team information processing. Moreover it suggested that this was true for all dimensions of diversity – demographic, functional/educational, and otherwise. At the same time, the CEM proposed that both perspectives were too simplistic in the way they had been advanced – as main effects of diversity. Rather, the CEM proposed that disruptive social categorization effects and synergetic information processing effects interact and that both have their contingencies – neither inevitably follows from diversity.

The CEM posits that what is required to create synergy from diversity as an informational resource is a process of team information elaboration – the exchange, discussion, and integration of task-relevant information. It requires motivation and ability to engage in this process of information elaboration as well as a task with some complexity to make elaboration a meaningful activity that adds value for task performance. Follow-up research inspired by the CEM illustrates this in, for instance, evidence that member traits associated with the motivation to process and integrate information carefully (need for cognition; Kearney, Gebert, & Voelpel, 2009; learning orientation; Nederveen Pieterse, van Knippenberg, & van Dierendonck, 2013) moderate the diversity-performance relationship, and that these interactive effects are mediated by information elaboration. From this perspective, intergroup biases are problematic because they disrupt information elaboration (e.g., Homan, van Knippenberg, van Kleef, & De Dreu, 2007a; Homan et al., 2008).

The CEM also outlines how intergroup biases do not inevitably follow from diversity, noting both that social categorization – “us-them” distinction – does not inevitably follow from dissimilarity, and that intergroup bias (as evident in, e.g., lowered cohesiveness and higher relationship conflict) does not inevitably follow from social categorization. Key to the relationship between diversity and social categorization are the factors that influence the extent to which a categorization is cognitively activated – or categorization salience. Categorization salience is seen as driven by comparative fit and normative fit (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). Comparative fit refers to the extent to which a categorization results in high within-group similarity and between-group difference. For example, a gender categorization has higher comparative fit when it also captures differences in age. The principle of comparative fit has come to be known under the label faultlines (Lau & Murnighan, 1998). Consistent with the notion that stronger faultlines are associated with more salient categorizations, meta-analytic evidence supports this disruptive influence of diversity faultlines (Thatcher & Patel, 2011). This evidence is further supported by direct comparison of single attribute diversity and faultline influence that is based on the convergence of two or more attributes (van Knippenberg, Dawson, West, & Homan, 2011). Normative fit refers to the extent to which a categorization makes sense within individuals’ subjective frames of reference – the extent to which it seems to capture meaningful difference. An example illustrating this influence is Pearsall, Ellis, and Evans’ (2008) study, showing that gender diversity disrupted team process and creativity on a gender-biased task (i.e., where a gender categorization was subjectively meaningful) but not on a gender-neutral task. In other words, it was the task context that made the gender categorization salient.

The CEM furthermore posits that social categorization only invites intergroup bias to the extent that dissimilar others are seen as a threat to a valued ingroup identity, for example by changing valued elements of team or organizational identity. This influence is illustrated by research showing that when team members have a stronger intrinsic interest in dissimilar perspectives – for instance, because of trait openness to experience or because they believe in the value of diversity – they respond more favorably to salient categorizations (Homan et al., 2007a, 2008).

Development of theory about moderators of the diversity-performance relationship also stimulated research about mediating processes. This research by and large focused on factors that could be seen as indicators of disruptive social categorization processes (e.g., relational conflict; Jehn et al., 1999; lack of team commitment; Kearney et al., 2009) and of team information processing (e.g., information elaboration; Kearney et al., 2009; team information use; Dahlin, Weingart, & Hinds, 2005). The mediation evidence more firmly established the notion that social categorization and information elaboration processes are the key mediating mechanisms through which team diversity affects team performance.

The mediating evidence also helped address a pervasive tendency in the team literature to see task conflict as a positive influence – a tendency also witnessed in diversity research in the proposition that task conflict mediates positive effects of diversity (Jehn et al., 1999). This conclusion was discredited by meta-analytic evidence that identified task conflict as a negative influence (De Dreu & Weingart, 2003).<sup>1</sup> Diversity research added a direct comparison of information elaboration and task conflict as mediating processes to this discussion to show that it is elaboration rather than task conflict that is associated with positive diversity effects (Hoever, van Knippenberg, van Ginkel, & Barkema, 2012; see also Homan, van Knippenberg, van Kleef, & De Dreu, 2007b).

Diversity research also helped clarify that the focus should not just be on information exchange but on information elaboration, i.e., including information discussion and integration. Team research, and specifically group decision making research, has a rich tradition in studying information exchange (e.g., Mesmer-Magnus & DeChurch, 2009; Stasser, Vaughan, & Stewart, 2000). Experimental research in decision making with distributed information (Gruenfeld, Mannix, Williams, & Neale, 1996; Stasser & Titus, 1985), however, also revealed that information exchange cannot be equated with information use. Distributed information that is exchanged often remains under-used (Winquist & Larson, 1998). In championing the information elaboration concept, research in team diversity and distributed information has also shown that elaboration is more predictive of team performance than information exchange per se (Hoever et al., 2012; van Ginkel & van Knippenberg, 2008).

At the time of the van Knippenberg and Schippers review, there seemed to be what could be called an implicit consensus on mediating processes, and this seems to be true to date. Information integration processes are understood to underlie positive effects of team diversity, while social categorization processes are seen to cause negative effects of team diversity. For moderation, the issue was, and is, not so clear, however. The CEM notion of moderators as affecting categorization or elaboration processes is consistent with the shared understanding of mediation processes, but the available evidence at the time of the van Knippenberg and Schippers review was much more scattered when it came to moderators studied. Many moderators were studied only once, thus posing a challenge

<sup>1</sup> A newer meta-analysis qualified this conclusion, suggesting that under some conditions – most prominently when task conflict is not accompanied by relationship conflict – task conflict may have a positive influence (De Wit, Greer, & Jehn, 2012). Such conditions, however, presumably rarely occur as task conflict typically goes hand in hand with relationship conflict (Simons & Peterson, 2000).

to integrative conclusions about moderators when they did not directly follow from the CEM, and some of those that were studied over a few studies or dimensions of diversity tended to yield inconsistent results (e.g., time together; Harrison et al., 1998; Watson, Johnson, & Merritt, 1998; cooperative team cultures; Jehn & Bezrukova, 2004). Even though the need to focus on moderation was uncontested, the state of the science clearly demanded further development of the moderation perspective. Illustrative of this need, the Guillaume et al. (2015) review was explicitly framed around moderation evidence, taking the CEM as its guiding framework.

### 2.3. The state of the science: the Guillaume et al. (2015) review

The Guillaume et al. (2015) review by and large captures the current state of the science. One element in this is that the number of diversity studies available has grown rapidly over the last 10 years, rendering meta-analysis an increasingly useful tool to draw conclusions about moderation. Part of what Guillaume et al. could do therefore was to draw on recent meta-analytical evidence by van Dijk et al. (2012) that was explicitly framed as including qualifications of the conclusions of earlier less inclusive and smaller meta-analyses (i.e., Horwitz & Horwitz, 2007; Hülshager, Anderson, & Salgado, 2009; Joshi & Roh, 2009). Several conclusions regarding moderation emerged from the van Dijk et al. (2012) meta-analysis.

First, their analysis yielded evidence that the effects of demographic and job-related diversity depend on how team performance is assessed. Neither objective performance indicators nor subjective performance ratings provided by members or internal leaders suggested any difference in the effects of demographic and functional diversity. On the other hand, subjective performance ratings provided by external leaders – individuals that can be presumed to have less contact with the team than members or internal leaders – suggested negative effects of demographic diversity and positive effects of job-related diversity. Van Dijk et al. discuss how these findings are consistent with an interpretation in terms of a subjective bias against demographic diversity and in favor of functional diversity that disappears as people have more experience with the team. In other words, they suggested that the notion of “good” versus “bad” types of diversity may lie in the eye of the beholder.<sup>2</sup>

Second, their results showed that performance in terms of creativity and innovation showed evidence of positive diversity effects overall whereas in-role task performance did not. This is consistent with the notion that it is open-ended, non-routine tasks with creative demands in particular where the integration and recombination of diverse perspectives yields benefits (see also van Knippenberg & Hoever, *in press*).

Third, findings indicated that for complex tasks, functional/educational forms of diversity were more positively related to performance than demographic diversity. A reason for this may be that the more complex a task, the more it benefits from task-specific expertise – and thus potentially also from diversity in perspectives arising from different task expertise rather than from diverse perspectives less rooted in expertise. At the same time, and probably as important a conclusion, they observed substantial heterogeneity of effects that could not be attributed to the moderators identified. Indeed, other than the task characteristics pointed to by the CEM (i.e., complexity and creative demands), there were insufficient data points to analyze moderators highlighted by the CEM or other analyses. In that sense, then, the van Dijk et al. (2012) meta-

analysis underscored the need to develop our understanding of the contingencies of team diversity effects much more than that it conclusively addressed these contingencies.

The focus of the Guillaume et al. (2015) review was thus well-chosen, and the review captured the growing evidence for moderation of team diversity effects. Even so, any review is bounded by the available evidence, and the state of the science captured by Guillaume et al. has many of the qualities of that reviewed by van Knippenberg and Schippers (2007). The number of moderator studies has grown since then, but so has the number of moderators studied, and it is often challenging to see how different findings may be integrated into evidence-based conclusions. There are, for instance, different studies of the moderating role of climate and culture that yield mixed results that might or might not be attributable to differences between studies in the conceptualization and operationalization of climate and culture. Similar observations hold for the study of diversity training, leadership, interdependence, etc. Clearer conclusions emerge for moderators that are more explicitly and directly linked to social categorization processes – e.g., diversity faultlines (see Thatcher & Patel, 2011) – and to information elaboration processes. Moderators related to the latter include, for instance, team composition on personality attributes related to information processing and openness to new experiences (Homan et al., 2008; Kearney et al., 2009; Nederveen Pieterse et al., 2013) and an explicit focus in the group on benefiting from (informational) diversity (Homan et al., 2007a; see also van Knippenberg, van Ginkel, & Homan, 2013).

Considering how the field has developed in this respect since the van Knippenberg and Schippers (2007) review, an important conclusion probably is that whereas we do need more research on moderation of team diversity effects, we do *not* need more proliferation of moderator studies or variety in conceptualization and operationalization of moderators going under identical or highly similar labels. Moderator research would benefit from a more integrative approach to help us understand how partly overlapping moderators identified in earlier research relate in their influence on diversity effects, and how to understand what seem at first blush inconsistent findings. Put differently, we do not so much need further evidence of moderation as we need evidence for integrative theory that reliably predicts moderation over studies. A good example here is the inconclusive evidence on time together as a moderator of diversity effects (see van Knippenberg & Schippers, 2007, who elaborate on this issue) that would benefit from theory to capture when time together attenuates or enhances negative effects and when it helps bring out positive effects. In a related vein, there are a number of studies touching on issues of cooperative climate and interdependence that seem to tap into substantially overlapping conceptual domains without yielding clearly integrated conclusions as to the moderating role of cooperation-related variables (Guillaume et al., 2015). More integrative theory and conceptual clarity would be important here too.

As per the Guillaume et al. review, the CEM still provides a strong conceptual anchor in the focus on moderation of social categorization and information elaboration processes. Guillaume et al. do suggest, however, to complement this focus with the study of influences on how people cope with the uncertainty associated with working in a diverse team – and particularly with being dissimilar to the team (Chattopadhyay, George, & Ng, 2011, 2015; Guillaume, van Knippenberg, & Brodbeck, 2014).

A first and obvious way forward that our review thus identifies is to prioritize programmatic research on moderation of diversity effects. Casting a wider net in how we understand diversity, however, to include state diversity and emergent diversity, we would also advocate that diversity research develops towards more integrative treatments of what arguably all are aspects of team diversity. In the next two sections, we briefly outline these perspectives

<sup>2</sup> It may be noted, however, that the available evidence does not directly speak to such biases and that their conclusion is a conceptual interpretation of the empirical evidence.

and their potential to add to not only more integrative diversity theory but to more integrative team theory more broadly.

### 3. Moving forward: linking trait and state diversity

Research in groups and teams has identified a range of issues that could well be labeled diversity but are typically not recognized as such in diversity research, presumably because they concern what we call state diversity rather than trait diversity: variation in more malleable member attributes such as cognition and affect. These attributes are malleable in the sense that – unlike stable traits such as demographic or personality variables – they cannot be assumed to remain unchanged during team interaction, even though they can be treated as composition variables in the sense that they exist independently from the team. Much of this is related to the notion of groups as information processing systems (De Dreu, Nijstad, & van Knippenberg, 2008; Hinsz, Tindale, & Vollrath, 1997) – a notion that aligns well with the informational resource perspective in diversity research. Research in group decision making in particular has a long history of studying how groups deal with decision-related state diversity.

Diversity in decision preferences as a composition variable, for instance, is a key factor in research in social decision schemes, which aims to understand how group decisions arise from individual member preferences and decision rules (Davis, 1973; Stasser, 1999). Part of this research speaks to how what initially is a minority position (reflecting diversity of perspectives) can come to be the group decision, e.g., through “truth wins” or “truth supported wins” decision schemes (Laughlin, 1980). This is complemented by research in minority influence that aims to capture the conditions under which a minority position can change the majority opinion (Nemeth, 1986).

Group decision making research also has a rich tradition in studying groups’ use of distributed information – information initially not known to all members (Gruenfeld et al., 1996; Stasser & Titus, 1985; Stasser et al., 2000). In an interesting counterpoint to research on diversity in decision preferences, this research shows that it can often be similarity in decision preferences based on information known to all that stands in the way of arriving at a superior decision suggested by distributed information. One way to think about this research is that it pertains to how groups deal with informational diversity.

A third tradition that is relevant here is research in expertise diversity. This research suggests that teams can struggle to identify their most expert members, and, as a consequence, perform worse than they would if they made better use of their members’ expertise (e.g., Laughlin & Branch, 1972; Littlepage & Silbiger, 1992). Even when there is evidence that more expert members have more influence on team performance (Sniezek & Henry, 1989), there is also evidence that dominance is mistaken for expertise (Littlepage, Schmidt, Whisler, & Frost, 1995) and that for teams to accurately recognize member expertise supporting conditions need be in place such as accurate feedback on relative expertise (Bonner, Baumann, & Dalal, 2002). A particularly interesting notion in relationship to bridging trait and state diversity research is that visible trait diversity may help identify member expertise. For example, research by Phillips and Lloyd (2006) suggests that demographic differences may alert teams to underlying knowledge differences within the team.

It is also not too difficult to see how trait diversity could relate to state diversity – and thus how an integration of research in trait and state diversity may advance the field. The very notion of trait diversity as an informational resource that derives from differences in information and perspectives implies the notion of distributed information and possible differences in decision preferences.

Research in distributed information and decision preferences may thus enrich our understanding of trait diversity effects. Following from these observations, we may propose more broadly that diversity research may benefit more than it has done to date from insights from research in state diversity. State diversity research may further inform our understanding of the influences of trait diversity on information elaboration and social categorization processes.

As an illustration to that effect, a conceptual analysis by van Knippenberg et al. (2013), for instance, drew heavily on research in distributed information (van Ginkel & van Knippenberg, 2008, 2009, 2012) to develop theory about team cognition that would be conducive to synergetic diversity benefits, and about leadership influences that could give rise to such team cognition. They suggested, for example, that leaders could engender and guide a process of team reflexivity (West, 1996) that is conducive to overcoming state diversity in task approaches (van Ginkel, Tindale, & van Knippenberg, 2009; see also Nederveen Pieterse, van Knippenberg, & van Ginkel, 2011). Speaking to the interplay of trait diversity and state diversity, Homan et al. (2007a, 2007b) showed that trait diversity and distributed information may form diversity faultlines that stand in the way of the elaboration of distributed information that could dissolve state diversity. Similarly, minority influence research by Clark and Maass (1988) suggests that social categorization as ingroup rather than outgroup is conducive to minority influence on majority opinions. There is clear untapped potential here in developing our understanding of the interplay between trait and state diversity – and thus a clear challenge to future research in team diversity.

Casting a wider net in diversity research does not only include seeking growing integration between the study of trait diversity and the study of state diversity as different team composition perspectives. It also includes connecting research in diversity in team composition with diversity in team process and emergent states.

### 4. Moving forward: linking composition diversity and emergent diversity

Like team research at large, diversity research predominantly takes a perspective on team processes as shared team properties, conceptualizing them as homogenous experiences (cf. Klein & Kozlowski, 2000). Recent years, however, have seen an emergence of interest in configural conceptualizations of these constructs (Crawford & LePine, 2013; Humphrey & Aime, 2014), exploring within-team heterogeneity in team processes. For emergent states, the fact that these can be more or less shared has received larger acknowledgement (e.g., Salas & Fiore, 2004; Schneider, Salvaggio, & Subirats, 2002), but the field is mostly agnostic about the form diversity in emergent states would take.

In this section, we review exemplary evidence examining the effects of heterogeneity in team processes and emergent states, and link these perspectives to the study of team diversity to propose that the development of our understanding of diversity will benefit when we link diversity in team composition to diversity in team interaction processes and emergent states. This discussion touches on the previous discussion of trait diversity-state diversity linkages – most obviously in the observation that greater trait diversity may make state diversity more likely. But whereas the previous discussion was anchored on state diversity as a composition variable in terms of malleable attributes that are defined independently from the team, there is also a clear case that diversity of team processes and psychological states defined in reference to the team may emerge in the course of team interaction. The key point here for the present discussion is that there is integrative potential for theory development around trait (and state) diversity as

predictors of emergent diversity, and that such theory in turn benefits from insights from research in emergent diversity that links these variables to team outcomes.

#### 4.1. Social networks: diversity in team interaction processes

Although only fairly recently explicitly integrated into the study of team processes (Crawford & LePine, 2013; Katz, Lazer, Arrow, & Contractor, 2004), the study of heterogeneity in member interactions from a social networks perspective has probably the longest tradition among the streams of research reviewed in this section. Conceptualizing teams as small networks of interlinked members, this line of inquiry has examined the effect of different patterns of interactions related to information processing (e.g., communication, advice seeking, and information sharing), help giving, and interpersonal relations (e.g., friendship ties).

Much of this research has focused on the effects of the density of intra-team relations (see Balkundi & Harrison, 2006, for a meta-analysis), which largely corresponds to the mean level of member interactions. Numerous studies have also examined diversity in member interaction patterns, however. The main body of work in this respect concerns network centralization (but as Cummings & Cross, 2003, show, impactful diversity in interaction patterns can also be captured by other concepts such as hierarchical or core-periphery structures). This research has not only shown that within-team diversity in interaction patterns exists, but also that it affects team performance contingent on such factors as task complexity (Shaw, 1964), network density (Zhang & Peterson, 2011), and – of particular interest to the present discussion – team diversity (albeit with inconsistent results, more diverse teams sometimes suffering (Huang & Cummings, 2011), sometimes benefiting (Tröster, Mehra, & van Knippenberg, 2014) from higher centralization). Other research addressing the interplay of team composition diversity and team diversity in interaction patterns shows that ties that span subgroups can help or hurt team performance. For example, Reagans and Zuckerman (2001) showed that the presence of communication ties cutting across demographic differences made teams more productive. In a similar vein, Ren, Gray, and Harrison (2014) found that diversity faultlines had a positive impact on performance when there were many friendship ties bridging the faultline but a negative impact when there were many animosity ties breaching the divide.

Social networks do not only interact with diversity, however – they are also influenced by diversity. One of the long-standing findings in social networks research concerns homophily – the tendency that more similar people are more likely to form a tie (McPherson & Smith-Lovin, 2001; Zenger & Lawrence, 1989). The notion of homophily effectively implies that team diversity – state as well as trait – may invite diversity in team interaction patterns. For instance, the configuration of compositional attributes may result in identity-based, resource-based, or knowledge-based subgroups, with interaction patterns being quantitatively and qualitatively different within and between such subgroups (Carton & Cummings, 2012). This also begs the question whether team diversity research in which team processes have typically been treated as homogeneous (e.g., information elaboration; Kearney et al., 2009; team conflict; Jehn et al., 1999) would benefit from developing theory about diversity in team process as invited by diversity. Investigating such process diversity may, for instance, show that some distributed information is more or less likely to be elaborated depending on who is holding it or that some team members are more likely targets of relational conflicts than others (e.g., individuals' dissimilarity from their team on sex and tenure has been linked with higher relational conflict; Pelled, 1996; Randel & Jaussi, 2008). Showing how state diversity may play in here, some studies looked at different patterns of information distribution, and

found that greater overlap in information was conducive to using information and insights from each other, leaving members that are more peripheral in the information distribution out of the loop (Jones & Kelly, 2013; Kameda, Ohtsubo, & Takezawa, 1997).

#### 4.2. Diversity in emergent states

Team research points to not only team interaction process variables, but also to emergent states as mediating mechanisms to understand team performance. Emergent states are conceptualized as psychological states that arise during team interaction and that become shared (i.e., similar) among members at least to some degree (Mathieu et al., 2008). The notion of sharedness here essentially captures the opposite of diversity. Echoing earlier research on group norm formation as convergence on initial member tendencies (Sherif, 1936), research in emergent states outlines how through team interaction members may mutually build and reinforce certain cognitions or affect, and thus invite a convergent, shared cognitive or affective state (Mathieu et al., 2008; Morgeson & Hofmann, 1999). Such emerging consensus can take on normative aspects that guide team decisions or team behavior. This is, for instance, well-articulated in research in team cognition, which recognizes that teamwork is guided by members' (implicit) understanding of the team and the task – captured by such concepts as mental models, task representations, and transactive memory (Klimoski & Mohammed, 1994; van Ginkel & van Knippenberg, 2008; Wegner, 1987). One of the key propositions in this research is that such team cognition exerts a stronger influence the more it is shared (see DeChurch & Mesmer-Magnus, 2010, for a meta-analysis). In a similar vein, team members may share affective states – moods and emotions – to a greater or lesser extent (George, 1996).

Most research in this domain focuses on the role of overall sharedness and is not concerned with specific patterns in which deviations from full sharedness may occur. Some studies, however, consider less uniform patterns of cognitions in groups, focusing on how there may be within-team differences in member knowledge about other members' expertise (transactive memory; Baumann & Bonner, 2013; Mell, van Knippenberg, & van Ginkel, 2014) and about other members' mental models (cross-understanding; Huber & Lewis, 2010). This research showed, for instance, that teams are more likely to use an individual member's distributed knowledge when a majority of teammates are aware of the individual's expertise (Baumann & Bonner, 2013), and that teams are more likely to integrate their distributed information when expertise knowledge is concentrated in one member than when it is distributed homogeneously among members (Mell et al., 2014).

Team composition diversity would be an obvious influence to consider in predicting diversity in team cognition (Nederveen Pieterse et al., 2011; van Knippenberg et al., 2013), and team composition diversity effects may be mediated by emergent state diversity. There are also indications that trait diversity may stand in the way of the emergence of shared states by reducing the openness to dissimilar team members' expressions of cognition. An example of this is norm formation research showing that convergence is social categorization-based and focuses on the subgroup perceived as ingroup rather than the group as a whole (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990).

Intragroup trust is another area in which recent research has highlighted possible heterogeneity of experience within a team. For instance, Bergman, Small, Bergman, and Rentsch (2010) found that trust asymmetry increased group conflict and impaired group performance. Similarly, De Jong and Dirks (2012) suggested and found that trust asymmetries weakened the positive effect of mean trust levels on group performance. Composition diversity may be a predictor of such trust heterogeneity, for instance, because social

categorization processes may invite greater trust of similar than dissimilar teammates (Chattopadhyay, 1999), or because members differ in their propensity to trust (Bergman et al., 2010; Ferguson & Peterson, 2015). Adding another element to this consideration, work by Tröster and van Knippenberg (2012) shows that the psychological safety (Edmondson, 1999; a state akin to trust) of more culturally dissimilar team members was more strongly influenced by team leadership. An implication of these findings is that diversity in emergent states may also be predicted by the interactive influence of diversity attributes and social influences.

Future research may thus also extend diversity research by seeking integration between insights in composition diversity and heterogeneous patterns of emergent state variables that have typically been approached from the perspective of sharedness only. Whereas the evidence to the promise of this approach is primarily evident in team cognition research, there is no reason why it should not also apply to other emergent states like team cohesiveness, group affect, etc.

Emergent states concern what is conceptually an individual level variable for which sharedness is a team level complement, and the same can be argued for trust. There is also evidence for deviations from homogeneity in research in team climate and perceptions of team process – concepts that have a team level referent and should thus in theory at least invite shared perceptions of all team members. The fact that there is evidence that they do not always do so, indicates that such processes are not experienced homogeneously – either because not all team members partake in them to the same degree or because what is “objectively” the same information is subjectively experienced differently by different members.

#### 4.3. Diversity in team climate perceptions

Team climate captures the shared perception of team interaction patterns (e.g., Chan, 1998). From the recognition that climate perceptions can both have a shared component (team or organizational climate) and a more idiosyncratic individual component (psychological climate; Glick, 1985) followed the recognition that climates can differ in their “strength” – the extent to which climate perceptions are shared among members. Like team cognition, climate perceptions are expected to exert more influence the more they are shared (e.g., Colquitt, Noe, & Jackson, 2002; Schneider et al., 2002) – diversity in climate perceptions would thus weaken team climate influences. Whereas most research in climate strength may not speak to the form diversity in climate perceptions would take, recently González-Romá and Hernández (2014) introduced the notion of climate uniformity which captures the pattern of climate perceptions. They argued that multimodal or highly skewed distributions of climate perceptions indicate the formation of identity-based subgroups (Carton & Cummings, 2012) that may impede group communication and performance.

The notion of identity-based subgroups has an obvious link to composition diversity. Indeed, diversity research on psychological climate (i.e., with its individual level of analysis only indirectly speaking to sharedness of perceptions) shows that demographic background tends to be a reliable predictor of differences in perceptions of diversity climate: Members of underrepresented groups (e.g., women, cultural minority group members) tend to have less favorable climate perceptions than majority group members (for a review, see van Knippenberg, Homan, & van Ginkel, 2013). The study of such diversity in climate perceptions may be particularly helpful in understanding composition diversity effects, because they suggest that a focus on the mean perception of team members only (i.e., the more typical approach) might underestimate problematic issues with the team climate as experienced by what typically will be a minority of the team members.

#### 4.4. Diversity in process perceptions

Research also shows that there may be diversity in perceptions of processes that traditionally are seen as a shared experience within the team. A complicating factor here is that when such perceptions are assessed in survey research it remains unclear whether there are differences between team members in how they experienced the same event, differences between team members in their involvement in the event (cf. social network perspectives on team interaction patterns), or both.

Jehn, Rispens, and Thatcher (2010) argued and found that diverse perceptions of team conflict may inhibit constructive conflict resolution, thus impeding effective information exchange and impairing group outcomes. Taking a different perspective, however, Yong, Sauer, and Mannix (2014) argued that diversity in perceptions of relationship conflict may result in a situation in which the dissatisfaction of “high perceivers” with the status quo encourages the introduction of new ideas while the satisfaction of “low perceivers” creates a context in which such new ideas are heard. They suggested and found that such a configuration may be conducive to group creativity.

De Jong and Dirks (2012) put a similar focus on divergence of process perceptions, examining team monitoring dissensus. They suggested that monitoring dissensus in a team can indicate that members differ in how they attribute monitoring behavior, ranging from perceiving it as inappropriate behavior to perceiving it as normal mode of operation. They argued and found that monitoring dissensus weakens the negative relationship of mean team monitoring on group trust.

With the caveat in mind that differences in perceptions may reflect different interaction patterns, there is also some reason to expect that composition diversity may invite perceptual diversity, such as evidence that individuals’ cultural background influences their interpretation of conflict episodes (Gelfand et al., 2001). Like team climate research, this emerging research on differences in process perceptions thus extends an invitation to explore these issues more fully, and to develop theory about how different interpretations of the same experience may help understand composition diversity effects.

### 5. Moving forward: integrating diversity and relational demography research

Research on “emergent diversity” in team interaction processes and emergent states seems to have great potential to complement more traditional perspectives in composition diversity research. Diversity research holds clear indications that composition diversity may invite diversity in team interaction patterns, emergent states, and perceptions of team climate and team process. Research on these different forms of what we have called emergent diversity provides valuable knowledge on how emergent diversity may affect team performance. This is not just a matter of developing more sophisticated mediation models, but also of further developing our understanding of moderating influences that may speak to ways to manage diversity. To the extent that composition diversity leads to suboptimal performance because of differences in team cognition, for instance, there are indications that a focus on developing greater sharedness of understanding through a process of team reflexivity may address such disruptive influences (Nederveen Pieterse et al., 2011; van Ginkel et al., 2009) – and moreover that building concentrations of team knowledge in some members may provide a productive alternative to shared cognition (Mell et al., 2014).

We believe that a particularly interesting element in developing this line of inquiry is that the current knowledge base also allows



us to develop models that speak to the specific patterns that emergent diversity may take based on in particular individuals' (dis) similarity to the team. Such a focus on individual-team dissimilarity (i.e., relational demography extended beyond demographic attributes alone) would set the stage for the integration and extension of composition diversity research and relational demography research. This would not only help us to more accurately predict emerging patterns of team interaction, affect, and cognition, and thus to better predict team performance. Rather, it would also allow us to better understand how composition diversity can affect different team members differently by extending relational demography research – traditionally concerned with individual responses to dissimilarity (e.g., Chattopadhyay, Tluchowska, & George, 2004) – to more closely connect with the team processes that have been more core to understanding team composition diversity effects. In doing so, this would also allow us to bridge levels of analysis (cf. Klein & Kozlowski, 2000), connecting the individual level of analysis of relational demography research and the team level of analysis of diversity research by developing theory about how team level phenomena affect different individuals and, conversely, how different individual responses combine to affect team process and performance.

## 6. In conclusion

In taking stock of the state of the science in team diversity research, a first conclusion is that the current focus on moderators of team diversity effects is justified, but requires more integrative efforts (rather than “add moderator” efforts). Not to diminish the importance of developing more integrative moderator models in the current tradition of diversity research, however, we believe that the more novel and more important conclusions of the current review are that our understanding of team diversity effects would benefit from complementing and integrating the current focus on team composition in terms of trait diversity with research on composition in terms of state diversity and with analyses of emergent diversity in team interaction processes and team emergent states.

Developing theory and research to achieve such integration would also set the stage for the integration of research in team diversity at the team level of analysis and relational demography (i.e., individual-team dissimilarity) at the individual level of analysis. Moreover, it would not just speak to team diversity research, but to team research at large, which shares diversity research's emphasis on homogeneous team process and emergent states. Composition diversity need not be the only source of emergent diversity, and emergent diversity research thus also stands to yield insights that are relevant beyond composition diversity research.

## References

- Abrams, D., Wetherell, M., Cochran, S., Hogg, M. A., & Turner, J. C. (1990). Knowing what to think by knowing who you are: Self-categorization and the nature of norm formation, conformity, and group polarization. *British Journal of Social Psychology*, 29, 97–119.
- Balkundi, P., & Harrison, D. A. (2006). Ties, leaders, and time in teams: Strong inference about network structure's effects on team viability and performance. *Academy of Management Journal*, 49, 49–68.
- Bantel, K., & Jackson, S. (1989). Top management and innovations in banking: Does the composition of the team make a difference? *Strategic Management Journal*, 10, 107–124.
- Baumann, M. R., & Bonner, B. L. (2013). Member awareness of expertise, information sharing, information weighting, and group decision making. *Small Group Research*, 44, 532–562.
- Bergman, J. Z., Small, E. E., Bergman, S. M., & Rentsch, J. R. (2010). Asymmetry in perceptions of trustworthiness: It's not you; it's me. *Negotiation and Conflict Management Research*, 3, 379–399.
- Bonner, B. L., Baumann, M. R., & Dalal, R. S. (2002). The effects of member expertise on group decision-making and performance. *Organizational Behavior and Human Decision Processes*, 88, 719–736.
- Bowers, C., Pharmed, J. A., & Salas, E. (2000). When member homogeneity is needed in work teams: A meta-analysis. *Small Group Research*, 31, 305–327.
- Carton, A. M., & Cummings, J. N. (2012). A theory of subgroups in work teams. *Academy of Management Review*, 37, 441–470.
- Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology*, 83, 234–246.
- Chattopadhyay, P. (1999). Beyond direct and symmetrical effects: The influence of demographic dissimilarity on organizational citizenship behavior. *Academy of Management Journal*, 42, 273–287.
- Chattopadhyay, P., George, E., & Ng, C. K. (2011). An uncertainty reduction model of relational demography. In A. Joshi, H. Liao, & J. J. Martocchio (Eds.), *Research in personnel and human resource management* (Vol. 30, pp. 219–251). Bingley, UK: Emerald.
- Chattopadhyay, P., George, E., & Ng, C. K. (2015). Hearts and minds: Integrating regulatory focus and relational demography to explain responses to dissimilarity. *Organizational Psychology Review*. <http://dx.doi.org/10.1177/2041386615574540>.
- Chattopadhyay, P., Tluchowska, M., & George, E. (2004). Identifying the ingroup: A closer look at the influence of demographic dissimilarity on employee social identity. *Academy of Management Review*, 29, 180–202.
- Clark, R. D., & Maass, A. (1988). Social categorization in minority influence: The case of homosexuality. *European Journal of Social Psychology*, 18, 347–364.
- Colquitt, J. A., Noe, R. A., & Jackson, C. L. (2002). Justice in teams: Antecedents and consequences of procedural justice climate. *Personnel Psychology*, 55, 83–109.
- Cox, T. H., Lobel, S. A., & McLeod, P. L. (1991). Effects of ethnic group cultural differences on cooperative and competitive behavior on a group task. *Academy of Management Journal*, 34, 827–847.
- Crawford, E. R., & LePine, J. A. (2013). A configural theory of team processes: Accounting for the structure of taskwork and teamwork. *Academy of Management Review*, 38, 32–48.
- Cummings, J. N., & Cross, R. (2003). Structural properties of work groups and their consequences for performance. *Social Networks*, 25, 197–210.
- Dahlin, K. B., Weingart, L. R., & Hinds, P. J. (2005). Team diversity and information use. *Academy of Management Journal*, 48, 1107–1123.
- Davis, J. H. (1973). Group decision and social interaction: A theory of social decision schemes. *Psychological Review*, 80, 97–125.
- DeChurch, L. A., & Mesmer-Magnus, J. R. (2010). The cognitive underpinnings of effective teamwork: A meta-analysis. *Journal of Applied Psychology*, 95, 32–53.
- De Dreu, C. K. W., Nijstad, B. A., & van Knippenberg, D. (2008). Motivated information processing in group judgment and decision making. *Personality and Social Psychology Review*, 12, 22–49.
- De Dreu, C. K. W., & Weingart, L. R. (2003). Task and relationship conflict, team performance, and team member satisfaction: A meta-analysis. *Journal of Applied Psychology*, 88, 741–749.
- De Jong, B. A., & Dirks, K. T. (2012). Beyond shared perceptions of trust and monitoring in teams: Implications of asymmetry and dissensus. *Journal of Applied Psychology*, 97, 391–406.
- De Wit, F., Greer, L. L., & Jehn, K. (2012). The paradox of intergroup conflict: A meta-analysis. *Journal of Applied Psychology*, 97, 360–390.
- Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44, 350–383.
- Ferguson, A. J., & Peterson, R. S. (2015). Sinking slowly: Diversity in propensity to trust predicts downward trust spirals in small groups. *Journal of Applied Psychology*, 100, 1012–1024.
- Gelfand, M. J., Nishii, L. H., Holcombe, K. M., Dyer, N., Ohbuchi, K.-I., & Fukuno, M. (2001). Cultural influences on cognitive representations of conflicts: Interpretations of conflict episodes in the united states and japan. *Journal of Applied Psychology*, 86, 1059–1074.
- George, J. M. (1996). Group affective tone. In M. West (Ed.), *Handbook of work group psychology* (pp. 77–93). Chichester, UK: Wiley.
- Glick, W. H. (1985). Conceptualizing and measuring organizational and psychological climate: Pitfalls in multilevel research. *Academy of Management Review*, 10, 601–616.
- González-Romá, V., & Hernández, A. (2014). Climate uniformity: Its influence on team communication quality, task conflict, and team performance. *Journal of Applied Psychology*, 99, 1042–1058.
- Gruenfeld, D. H., Mannix, E. A., Williams, K. Y., & Neale, M. A. (1996). Group composition and decision making: How member familiarity and information distribution affect process and performance. *Organizational Behavior and Human Decision Processes*, 67, 1–15.
- Guillaume, Y. R. F., Dawson, J. F., Otaye-Ebede, L., Woods, S. A., & West, M. A. (2015). Harnessing demographic differences in organizations: What moderates the effects of workplace diversity? *Journal of Organizational Behavior*. <http://dx.doi.org/10.1002/job.2040>.
- Guillaume, Y. R. F., van Knippenberg, D., & Brodbeck, F. C. (2014). Nothing succeeds like moderation: A social self-regulation perspective on cultural dissimilarity and performance. *Academy of Management Journal*, 57, 1284–1308.
- Harrison, D. A., Price, K. H., & Bell, M. P. (1998). Beyond relational demography: Time and the effects of surface- and deep-level diversity on work group cohesion. *Academy of Management Journal*, 41, 96–107.
- Hinsz, V. B., Tindale, R. S., & Vollrath, D. A. (1997). The emerging conceptualization of groups as information processes. *Psychological Bulletin*, 121, 43–64.
- Hoever, I. J., van Knippenberg, D., van Ginkel, W. P., & Barkema, H. G. (2012). Fostering team creativity: Perspective taking as key to unlocking diversity's potential. *Journal of Applied Psychology*, 97, 982–996.

- Homan, A. C., Hollenbeck, J. R., Humphrey, S. E., van Knippenberg, D., Ilgen, D. R., & Van Kleef, G. A. (2008). Facing differences with an open mind: Openness to experience, salience of intra-group differences, and performance of diverse work groups. *Academy of Management Journal*, 51, 1204–1222.
- Homan, A. C., van Knippenberg, D., van Kleef, G. A., & De Dreu, C. K. W. (2007a). Bridging faultlines by valuing diversity: Diversity beliefs, information elaboration, and performance in diverse work groups. *Journal of Applied Psychology*, 92, 1189–1199.
- Homan, A. C., van Knippenberg, D., van Kleef, G. A., & De Dreu, C. K. W. (2007b). Interacting dimensions of diversity: Cross-categorization and the functioning of diverse work groups. *Group Dynamics*, 11, 79–94.
- Horwitz, S. K., & Horwitz, I. B. (2007). The effects of team diversity on team outcomes: A meta-analytic review of team demography. *Journal of Management*, 33, 987–1015.
- Huang, S., & Cummings, J. N. (2011). When critical knowledge is most critical: Centralization in knowledge-intensive teams. *Small Group Research*, 42, 669–699.
- Huber, G. P., & Lewis, K. (2010). Cross-understanding: Implications for group cognition and performance. *Academy of Management Review*, 35, 6–26.
- Hülsheger, U. R., Anderson, N., & Salgado, J. F. (2009). Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research. *Journal of Applied Psychology*, 94, 1128–1145.
- Humphrey, S. E., & Aime, F. (2014). Team microdynamics: Toward an organizing approach to teamwork. *The Academy of Management Annals*, 8, 443–503.
- Ilgen, D. R., Hollenbeck, J. R., Johnson, M. D., & Jundt, D. (2005). Teams in organizations: From I-P-O models to IMOI models. *Annual Review of Psychology*, 56, 517–543.
- Jackson, S. E., & Joshi, A. (2011). Work team diversity. In S. Zedeck (Ed.), *APA handbook of industrial and organizational psychology* (Vol. 1, pp. 651–686). Washington, DC: APA.
- Jehn, K. A., & Bezrukova, K. (2004). A field study of group diversity, workgroup context, and performance. *Journal of Organizational Behavior*, 25, 703–729.
- Jehn, K. A., Northcraft, G. B., & Neale, M. A. (1999). Why differences make a difference: A field study of diversity, conflict, and performance in workgroups. *Administrative Science Quarterly*, 44, 741–763.
- Jehn, K. A., Rispens, S., & Thatcher, S. (2010). The effects of conflict asymmetry on work group and individual outcomes. *Academy of Management Journal*, 53, 596–616.
- Jones, E. E., & Kelly, J. R. (2013). The psychological costs of knowledge specialization in groups: Unique expertise leaves you out of the loop. *Organizational Behavior and Human Decision Processes*, 121, 174–182.
- Joshi, A. A., & Roh, H. (2009). The role of context in work team diversity research: A meta-analytic review. *Academy of Management Journal*, 52, 599–627.
- Kameda, T., Ohtsubo, Y., & Takezawa, M. (1997). Centrality in sociocognitive networks and social influence: An illustration in a group decision-making context. *Journal of Personality and Social Psychology*, 73, 296–309.
- Katz, N., Lazer, D., Arrow, H., & Contractor, N. S. (2004). Network theory and small groups. *Small Group Research*, 35, 307–332.
- Kearney, E., Gebert, D., & Voelpel, S. C. (2009). When and how diversity benefits teams: The importance of team members' need for cognition. *Academy of Management Journal*, 52, 581–598.
- Klein, K. J., & Kozlowski, S. W. J. (2000). From micro to meso: Critical steps in conceptualizing and conducting multilevel research. *Organizational Research Methods*, 3, 211–236.
- Klimoski, R., & Mohammed, S. (1994). Team mental model: Construct or metaphor? *Journal of Management*, 20, 403–437.
- Kozlowski, S. W. J., & Bell, B. S. (2003). Work groups and teams in organizations. In W. C. Borman & D. R. Ilgen (Eds.), *Handbook of psychology: Industrial and organizational psychology* (Vol. 12, pp. 333–375). New York: Wiley.
- Lau, D. C., & Murnighan, J. K. (1998). Demographic diversity and faultlines: The compositional dynamics of organizational groups. *Academy of Management Review*, 23, 325–341.
- Laughlin, P. R. (1980). Social combination processes of cooperative problem-solving groups on verbal intellectual tasks. In M. Fishbein (Ed.), *Progress in social psychology* (Vol. 1, pp. 127–155). Hillsdale, NJ: Erlbaum.
- Laughlin, P. R., & Branch, L. G. (1972). Individual versus tetradic performance on a complementary task as a function of initial ability level. *Organizational Behavior and Human Performance*, 8, 201–216.
- Littlepage, G. E., Schmidt, G. W., Whisler, E. W., & Frost, A. G. (1995). An input-process-output analysis of influence and performance in problem-solving groups. *Journal of Personality*, 69, 877–889.
- Littlepage, G. E., & Silbiger, H. (1992). Recognition of expertise in decision-making groups: Effects of group size and participation patterns. *Small Group Research*, 23, 344–355.
- Mathieu, J. E., Hollenbeck, J. R., van Knippenberg, D., & Ilgen, D. R. (2016). A century of work groups. *Journal of Applied Psychology* (in press).
- Mathieu, J. E., Maynard, M. T., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997–2007: A review of recent advancements and a glimpse into the future. *Journal of Management*, 34, 410–476.
- Mathieu, J. E., Tannenbaum, S. I., Donsbach, J. S., & Alliger, G. M. (2014). A review and integration of team composition models: Moving toward a dynamic and temporal framework. *Journal of Management*, 40, 126–156.
- McPherson, M., & Smith-Lovin, L. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27, 415–444.
- Mell, J. N., van Knippenberg, D., & van Ginkel, W. P. (2014). The catalyst effect: The impact of transactive memory system structure on team performance. *Academy of Management Journal*, 57, 1154–1173.
- Mesmer-Magnus, J. R., & DeChurch, L. A. (2009). Information sharing and team performance: A meta-analysis. *Journal of Applied Psychology*, 94, 535–546.
- Mor Barak, M. E., & Travis, D. J. (2013). Socioeconomic trends: Broadening the diversity ecosystem. In Q. Roberson (Ed.), *The Oxford handbook of diversity and work* (pp. 393–418). New York, NY, USA: Oxford University Press.
- Morgeson, F. P., & Hofmann, D. A. (1999). The structure and function of collective constructs: Implications for multilevel research and theory development. *Academy of Management Review*, 24, 249–265.
- Murnighan, J. K., & Conlon, D. E. (1991). The dynamics of intense work groups: A study of British string quartets. *Administrative Science Quarterly*, 36, 165–186.
- Nederveen Pieterse, A., van Knippenberg, D., & van Dierendonck, D. (2013). Cultural diversity and team performance: The role of team member goal orientation. *Academy of Management Journal*, 56, 782–804.
- Nederveen Pieterse, A., van Knippenberg, D., & van Ginkel, W. P. (2011). Diversity in goal-orientation, team reflexivity, and team performance. *Organizational Behavior and Human Decision Processes*, 114, 153–164.
- Nemeth, C. (1986). Differential contributions of majority and minority influence. *Psychological Review*, 93, 23–32.
- O'Reilly, C. A., Caldwell, D. F., & Barnett, W. P. (1989). Work group demography, social integration, and turnover. *Administrative Science Quarterly*, 34(1), 21–37.
- Pearsall, M. J., Ellis, A. P., & Evans, J. M. (2008). Unlocking the effects of gender faultlines on team creativity: Is activation the key? *Journal of Applied Psychology*, 93, 225–234.
- Pelled, L. H. (1996). Relational demography and perceptions of group conflict and performance: A field investigation. *International Journal of Conflict Management*, 7, 230–246.
- Phillips, K. W., & Lloyd, D. L. (2006). When surface and deep-level diversity collide: The effects on dissenting group members. *Organizational Behavior and Human Decision Processes*, 99, 143–160.
- Randel, A. E., & Jaussi, K. S. (2008). Gender social and personal identity, sex dissimilarity, relationship conflict, and asymmetrical effects. *Small Group Research*, 39, 468–491.
- Reagans, R. E., & Zuckerman, E. W. (2001). Networks, diversity, and productivity: The social capital of corporate R&D teams. *Organization Science*, 12, 502–517.
- Ren, H., Gray, B., & Harrison, D. A. (2014). Triggering faultline effects in teams: The importance of bridging friendship ties and breaching animosity ties. *Organization Science*. <http://dx.doi.org/10.1287/orsc.2014.0944>.
- Salas, E., & Fiore, S. M. (2004). *Team cognition: Understanding the factors that drive process and performance*. Washington, DC: APA.
- Schneider, B., Salvaggio, A. N., & Subirats, M. (2002). Climate strength: A new direction for climate research. *Journal of Applied Psychology*, 87, 220–229.
- Shaw, M. E. (1964). Communication networks. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 1, pp. 111–147). Academic Press.
- Sherif, M. (1936). *The psychology of social norms*. New York: Harper.
- Simons, T., Pelled, L. H., & Smith, K. A. (1999). Making use of difference: Diversity, debate, and decision comprehensiveness in top management teams. *Academy of Management Journal*, 42, 662–674.
- Simons, T. L., & Peterson, R. S. (2000). Task conflict and relationship conflict in top management teams: The pivotal role of intragroup trust. *Journal of Applied Psychology*, 85, 102–111.
- Sniezek, J. A., & Henry, R. A. (1989). Accuracy and confidence in group judgment. *Organizational Behavior and Human Decision Processes*, 43, 1–28.
- Stasser, G. (1999). A primer of social decision scheme theory: Models of group influence, competitive model-testing, and prospective modeling. *Organizational Behavior and Human Decision Processes*, 80, 3–20.
- Stasser, G., & Titus, W. (1985). Pooling unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology*, 48, 1467–1478.
- Stasser, G., Vaughan, S. I., & Stewart, D. D. (2000). Pooling unshared information: The benefits of knowing how access to information is distributed among group members. *Organizational Behavior and Human Decision Processes*, 82, 102–116.
- Thatcher, S. M., & Patel, P. C. (2011). Demographic faultlines: A meta-analysis of the literature. *Journal of Applied Psychology*, 96, 1119–1139.
- Tröster, C., Mehra, A., & van Knippenberg, D. (2014). Structuring for team success: The interactive effects of network structure and cultural diversity on team potency and performance. *Organizational Behavior and Human Decision Processes*, 124, 245–255.
- Tröster, C., & van Knippenberg, D. (2012). Leader openness, nationality dissimilarity, and voice in multinational management teams. *Journal of International Business Studies*, 43, 591–613.
- Tsui, A. S., Egan, T. D., & O'Reilly, C. A. (1992). Being different: Relational demography and organizational attachment. *Administrative Science Quarterly*, 37, 549–579.
- Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group. A self-categorization theory*. Oxford, UK: Blackwell.
- van Dijk, H., van Engen, M. L., & van Knippenberg, D. (2012). Defying conventional wisdom: A meta-analytical examination of the differences between demographic and job-related diversity relationships with performance. *Organizational Behavior and Human Decision Processes*, 119, 38–53.
- van Ginkel, W., Tindale, R. S., & van Knippenberg, D. (2009). Team reflexivity, development of shared task representations, and the use of distributed information in group decision making. *Group Dynamics*, 13, 265–280.
- van Ginkel, W. P., & van Knippenberg, D. (2008). Group information elaboration and group decision making: The role of shared task representations. *Organizational Behavior and Human Decision Processes*, 105, 82–97.

- van Ginkel, W. P., & van Knippenberg, D. (2009). Knowledge about the distribution of information and group decision making: When and why does it work? *Organizational Behavior and Human Decision Processes*, 108, 218–229.
- van Ginkel, W. P., & van Knippenberg, D. (2012). Group leadership and shared task representations in decision-making groups. *Leadership Quarterly*, 23, 94–106.
- van Knippenberg, D., Dawson, J. F., West, M. A., & Homan, A. C. (2011). Diversity faultlines, shared objectives, and top management team performance. *Human Relations*, 64, 307–336.
- van Knippenberg, D., De Dreu, C. K. W., & Homan, A. C. (2004). Work group diversity and group performance: An integrative model and research agenda. *Journal of Applied Psychology*, 89, 1008–1022.
- van Knippenberg, D., & Hoever, I. J. (2016). Team diversity and team creativity: A categorization-elaboration perspective. In R. Reiter-Palmon (Ed.), *Team creativity*. New York: Oxford University Press (in press).
- van Knippenberg, D., Homan, A. C., & van Ginkel, W. P. (2013). Diversity cognition and climates. In Q. Roberson (Ed.), *The Oxford handbook of diversity and work* (pp. 220–238). New York: Oxford University Press.
- van Knippenberg, D., & Schippers, M. C. (2007). Work group diversity. *Annual Review of Psychology*, 58, 515–541.
- van Knippenberg, D., van Ginkel, W. P., & Homan, A. C. (2013). Diversity mindsets and the performance of diverse teams. *Organizational Behavior and Human Decision Processes*, 121, 183–193.
- Watson, W., Johnson, L., & Merritt, D. (1998). Team orientation, self-orientation, and diversity in task groups: Their connection to team performance over time. *Group & Organization Management*, 23, 161–188.
- Webber, S. S., & Donahue, L. M. (2001). Impact of highly and less job-related diversity on work group cohesion and performance: A meta-analysis. *Journal of Management*, 27, 141–162.
- Wegner, D. M. (1987). Transactive memory: A contemporary analysis of the group mind. In B. Mullen & G. R. Goethals (Eds.), *Theories of group behavior* (pp. 185–208). New York: Springer-Verlag.
- West, M. A. (1996). Reflexivity and work group effectiveness: A conceptual integration. In M. A. West (Ed.), *Handbook of work group psychology* (pp. 555–579). Chichester, UK: Wiley.
- Williams, K. Y., & O'Reilly, C. A. III, (1998). Demography and diversity in organizations: A review of 40 years of research. *Research in Organizational Behavior*, 20, 77–140.
- Winkvist, J. R., & Larson, J. R. Jr., (1998). Information pooling: When it impacts group decision making. *Journal of Personality and Social Psychology*, 74, 371–377.
- Yong, K., Sauer, S. J., & Mannix, E. A. (2014). Conflict and creativity in interdisciplinary teams. *Small Group Research*, 45, 266–289.
- Zenger, T. R., & Lawrence, B. S. (1989). Organizational demography: The differential effects of age and tenure distributions on technical communication. *Academy of Management Journal*, 32, 353–376.
- Zhang, Z., & Peterson, S. J. (2011). Advice networks in teams: The role of transformational leadership and members' core self-evaluations. *Journal of Applied Psychology*, 96, 1004–1017.