

**REVIEW ARTICLE**

# The effects of diversity on creativity: A literature review and synthesis

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**Abstract**

In today's complex business world, the diversities within organizations, within teams, and of individual employees have emerged as a source of competitive advantage that can enhance creativity at multiple levels of analysis. However, the relationship between diversity and creativity at and across the individual, team, and organizational levels remains a topic of debate, despite ongoing scholarly interest. In this article, we address this debate by conducting a comprehensive multilevel review of 119 empirical studies that explores the effects of diversity on creativity. To structure this body of literature, we review studies based on their levels of analysis as well as the degrees of job-relatedness and the observability of diversity attributes they investigate. This approach helps to enable the discussion of the differential effects that numerous diversity attributes can have on creativity at the individual, team, and organizational levels, thus uncovering promising avenues for future research. Our multilevel perspective particularly points toward the heightened need for more cross-level and dynamic research designs and for extending conceptual ideas well known at one level of analysis to phenomena less understood at other levels of analysis. These

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approaches should improve the understanding of the complex, and therefore still puzzling, role of diversity for creativity.

#### KEYWORDS

creativity, diversity, literature review, multilevel

## INTRODUCTION

Scholarly interest in diversity and creativity has been increasing steadily over the last decades (Anderson et al., 2014; Roberson et al., 2017). It has also been acknowledged that both phenomena can emerge at different levels of analysis (e.g., Podsiadlowski et al., 2013; Woodman et al., 1993). The idea of diversity constituting a multilevel phenomenon is reasonable because it generally describes lower level entities (e.g., individuals) to make for a higher level entity (e.g., a team) being more or less diverse. But even creativity is of a multilevel nature because of its social-environmental component (Amabile, 1983; Csikszentmihalyi, 1988; Hennessey & Amabile, 2010), which makes it nearly impossible to see the creativity of an individual without (un)consciously also recognizing the role that his or her social environment plays in shaping it. It is therefore not surprising that a considerable amount of management research has looked at how diversity substantially influences workplace creativity at different levels of analysis (Bassett-Jones, 2005; Han et al., 2014; Shin et al., 2012).

However, despite extensive research on the impact of diversity on creativity, the effects of this relationship remain ambiguous (e.g., Bell et al., 2011; van Dijk et al., 2012). Prior findings indicate that different types of diversity, which can be categorized according to the two dimensions of job-relatedness (i.e., the degree to which a diversity attribute relates to the context of the job like the task at hand) and observability (i.e., the degree to which a diversity attribute is visible), may affect creativity differently (van Knippenberg & Schippers, 2007). For example, a meta-analysis by Wang et al. (2019) found team creativity to be positively affected by diversity in unobservable attributes and to be unaffected by diversity in readily observable attributes. Increasing the complexity of such diversity-creativity relationships, the extant literature also demonstrates that the same attribute can show ambiguous associations with creativity. For example, different studies have indicated that functional diversity (i.e., teams composed of members from different organizational functions, like research and development or marketing and sales) has positive (Mitchell & Boyle, 2015), negative (Cabral et al., 2008), or no direct effects on creativity (Cheung et al., 2016). Further contributing to this puzzle, the diversity arising from the same attribute seems to exert opposing effects on creativity depending on the level at which creativity is conceptualized. For example, the effect of ethnic/national diversity on creativity at the team level is different from its effect at the organizational level (Gibson & Gibbs, 2006; Parrotta et al., 2014). These findings illustrate the overall challenge of adequately understanding how diversity relates to creativity within and across levels of analysis.

Although very informative empirical and narrative literature reviews on the effects of diversity on creativity exist, they have either been restricted to a specific level of analysis (e.g., Horwitz & Horwitz, 2007) or to specific diversity attributes (e.g., Bell et al., 2011; Schneider et al., 2016). This is problematic for two reasons. First, because previous reviews and meta-analyses have limited their scope to a single level of analysis, a comprehensive multilevel

categorization of both the different diversity types and their effects on creativity at and across different levels of analysis is still missing. As creativity is a multilevel phenomenon that can evolve from the efforts of an individual, a team, or an entire organization (Hennessey & Amabile, 2010), a multilevel perspective on it is required to expand our understanding of the underlying processes that produce it (Anderson et al., 2014). Second, whereas some previous reviews focused on a single diversity attribute, such as on differences in culture (Cox & Blake, 1991; Stahl et al., 2010), intercultural experience (Dunne, 2017), or age (Schneid et al., 2016), others considered larger categories, such as demographic (Bell et al., 2011), bio-demographic and task-related (Horwitz & Horwitz, 2007), job-relevant and background (Hülshager et al., 2009), or demographic and job-related diversity attributes (van Dijk et al., 2012). In addition, some research followed a selective, rather than comprehensive, approach (Shalley & Gilson, 2004; Zhou & Hoever, 2014). This is unfortunate, as it does neither allow for considering the broad array of diversity categories at the different levels of analysis covered in the extant literature nor help to better understand their potential to affect creativity differently (e.g., Gibson & Gibbs, 2006; Mitchell & Boyle, 2015).

Therefore, a more holistic understanding of diversity–creativity relationships is needed. We aim to offer such an understanding through our comprehensive review and synthesis of the effects that different types of diversity have on creativity at and across the individual, team, and organizational levels. By doing so, we advance the literature in two ways. First, going beyond the selective efforts to systematize research on the effects of single diversity attributes as described above, our review offers a more comprehensive categorization of the numerous diversity attributes and their effects on creativity. This categorization allows for a better integration of previous research, as it illustrates the nomological network of the relationship between diversity and creativity. By exploring commonalities and differences of various origins of diversity, our approach enables a more comprehensive understanding of diversity's role in creative work and raises awareness of the organizational reality that multiple diversity attributes appear simultaneously (van Knippenberg et al., 2011).

Second, by reviewing the considerable diversity–creativity research from different analytical perspectives, we recognize the multilevel nature of diversity and creativity in organizations (Anderson et al., 2014; Corritore et al., 2019). Specifically, we structure our review according to studies applying either single-level or cross-level approaches. In particular, we integrate the upcoming perspective of individual diversity, because heterogeneity can also arise within individuals (Corritore et al., 2019). This line of work, however, has evolved separate from those on team and organizational diversities. Our review is thus particularly suited to identifying empirical findings at and across different levels of analysis, to uncovering analogies between those findings, and to synergistically deriving avenues for future research. As a prerequisite for this, our review enables a multilevel understanding of diversity–creativity relationships by reflecting upon divergent effects at different levels of analysis (Gibson & Gibbs, 2006; Parrotta et al., 2014).

## SCOPE AND METHOD OF THE LITERATURE REVIEW

### Literature research strategy

Drawing on best practice recommendations for conducting literature reviews (e.g., Rousseau et al., 2008; Short, 2009), we systematically reviewed the empirical research on diversity–

creativity relationships and identified relevant literature by using a Boolean topic search in Web of Science, EBSCO, and Google Scholar. We combined the term “divers\* OR heterogen\* OR faultline\* OR composition\* OR dissimilar\* OR differen\* OR leader-member exchange OR LMX OR leader-member exchange differentiation OR multucltural\* OR bicultural\*” with the term “creativ\* OR innovat\* OR problem solving\* OR divergent thinking” to search in the titles, abstracts, author keywords, and keywords plus of articles available in print or online before April 2021. This search resulted in a total of 24,351 hits. We then screened these research items based on their titles and abstracts. To complement our database search, we executed a forward and backward citation search of the identified articles, as well as of prior reviews and meta-analyses (e.g., Bell et al., 2011; Hülsheger et al., 2009; van Knippenberg, 2017). This approach helped us identify 36 additional articles that were potentially relevant to our review. Furthermore, to avoid publication bias, we also searched with the above keywords for relevant conference proceedings, book chapters, and dissertations in various databases such as SSRN, ProQuest, and Web of Science, as well as in relevant collections of management and psychology conference proceedings (e.g., Academy of Management). This approach put forth further 47 studies. We ultimately identified a total of 371 articles for further full-text screening.

With the aim of conducting a comprehensive but focused review, we adopted several inclusion criteria for the fine-grained screening process. First, we only included empirical articles and disregarded conceptual work (e.g., Gocłowska et al., 2018; West, 2002). Given its value, however, we considered conceptual work in the literature systematization, implications, and future research opportunities sections of our review. Second, we only considered research conducted at the individual, team, or organizational levels and disregarded macro-level research done at the industry or country levels (e.g., Chen et al., 2018; Zhan et al., 2015). Third, we intended to review research that investigated the effect of diversity on creativity. Because innovation, as a two-stage process, encompasses idea generation and idea implementation, we only included studies exploring the effect of diversity on creativity—that is, the generation of ideas during the innovation process (Woodman et al., 1993). Fourth, we integrated only studies that reported results for measures of creativity, excluding those that measured creativity as a subdimension of performance without reporting on the effects of this specific subdimension (Ancona & Caldwell, 1992; Kearney et al., 2009; Kearney & Gebert, 2009).

Based on these criteria, we excluded 252 studies. The remaining 119 empirical articles formed the foundation of our systematic literature review. According to the journals' categorization in the Social Science Citation Index, our literature base was interdisciplinary, with 50 articles published in business and management journals, 31 articles in psychology journals, 20 articles in organizational behavior journals, and 14 in journals from other categories. Four studies were unpublished. In terms of the research design, our sample included 112 quantitative, 4 qualitative, and 3 mixed-methods studies published from 1965 to March 2021. Finally, the body of research that we review below consisted of studies at the individual (26), team (62), and organizational (22) levels of analysis, as well as 11 studies with a cross-level design.

## Literature systematization

In our literature review, we applied the definition by Harrison and Klein (2007) and defined diversity as the differences within or among the members of an organization and its units with respect to a given attribute or multiple attributes. We looked specifically at how such a diversity within and across different entities influences their creativity, which we defined as

“the generation of novel and useful outcomes (i.e., ideas, solutions, processes, products, etc.)” (Acar et al., 2019, p. 97). Research has shown that creativity can arise from the creative efforts of individuals, teams, or entire organizations, which reinforces the multilevel nature of creativity in the organizational context (Zhou & Hoever, 2014). Due to the strong focus on generated outcomes when defining and measuring creativity in this literature (Hughes et al., 2018), we considered creativity as unidimensional across all levels of analysis in contrast to the multidimensionality of diversity. Diversity based on various attributes has been found to predict creativity at different levels.

To find common threads among inconclusive findings produced for the effects of different types of diversity, prior research has made several attempts to systematize diversity types into different categories such as task-related versus relations-orientated attributes (Jackson et al., 1995), job-relevant versus background attributes (Hülshager et al., 2009), or surface- versus deep-level attributes (Harrison et al., 1998). Attending to the complexity behind the phenomenon of diversity and its need to be discussed from multiple perspectives, some frameworks even integrate more than one dimension from which to view diversity attributes. As such, the idea to cluster attributes along the dimensions of job-relatedness and observability of differences between individuals has become most prominent. Whereas Jackson et al. (1995) discussed task-related versus relations-orientated attributes in terms of their (un)detectability, Pelled (1996) considered the (in)visibility of job-related versus job-unrelated attributes. To account for the complexity reflected in the different possibilities of structuring diversity attributes, we adopted the diversity typology developed by Weiss et al. (2018), which builds on these categorizations. Hence, we structured the different diversity types that may categorize individuals, teams, or organizations by two dimensions: job-relatedness and observability. Job-relatedness describes whether a diversity attribute involves experiences, skills, or perspectives that are relevant to cognitive work tasks (Pelled, 1996; Webber & Donahue, 2001). In contrast, job-unrelatedness refers to such attributes that tend to lack direct relevance to cognitive work tasks (Pelled, 1996; Weiss et al., 2018). In terms of observability, diversity attributes are categorized as either surface-level or deep-level diversity attributes. Surface-level diversity attributes are those that are almost immediately observable and often involve visible demographic differences (Harrison et al., 1998; Jackson et al., 1993). In contrast, deep-level diversity attributes include more psychological characteristics that are interpreted in light of and disclosed via verbal and nonverbal cues and that—in contrast to surface-level attributes—can only be discovered through prolonged individualized interaction and information collection (Jackson et al., 1993; Phillips & Loyd, 2006).

The relevance of both dimensions—that is, the degrees of job-relatedness and observability—evolves from theoretical arguments based on the information-processing and social-categorization perspectives, which are central to the understanding of how diversity attributes (differentially) influence desirable outcomes, such as creativity (Guillaume et al., 2017; van Knippenberg et al., 2004). We combined these two dimensions of diversity and divided the extant literature into four categories: job-related diversity attributes at the surface level; job-related diversity attributes at the deep level; job-unrelated diversity attributes at the surface level; and job-unrelated diversity attributes at the deep level. Because the degrees of job-relatedness and observability of diversity attributes differ across job and cultural contexts, some studies were less clearly assignable to one of those four categories. We therefore used two independent coders to assign the 119 studies to these categories based on the definitions presented above. We engaged in discussions with the coders to resolve discrepancies and to ensure that we reviewed studies in the category that most adequately captured their diversity

attribute of interest. Table 1 offers an overview of the identified diversity attributes and exemplary studies that were sorted into the four larger categories.

## A MULTILEVEL REVIEW OF DIVERSITY–CREATIVITY RELATIONSHIPS

Extant research has investigated the relationship between diversity and creativity either at distinct levels of analysis (i.e., individuals, their teams, or organizations) or across some of them. We followed these analytical perspectives and reviewed the findings related to the four categories of diversity attributes outlined above within each of them.

### Individual-level research on the role of diversity for creativity

#### Job-related diversities at the surface level

Prior research based on the notion that creativity is a result of combining different information and perspectives that emerge from social interactions (Baer et al., 2015) has highlighted the crucial role that *diversity within individuals' networks* (i.e., differences among the actors, ties, or contacts of a social network; e.g., Baer, 2010) plays in their creativity. For instance, Baer (2010) argued that individuals with highly diverse idea networks (i.e., social ties to individuals with different organizational affiliations) demonstrate higher creativity. He found this relationship to be contingent on a moderate idea network size, a weak network strength, and individuals' strong openness to experience. Likewise, when their social ties were strong, the diversity in functional backgrounds associated with those ties appeared to help employees be creative by enhancing their creative self-efficacy (Gong et al., 2019). Furthermore, individuals' creativity tends to benefit when they can seek feedback relevant to their own creative performance from diverse actors of their social network (Sijbom et al., 2018). These authors stressed the crucial role of two contextual contingencies: high-performance dynamism (i.e., the perceived rate of change in performance standards) and low creative time pressure (i.e., the perception of having insufficient time to develop creative ideas). Both tend to be required to enhance the positive effect that diversity in the sources of feedback has on creativity.

#### Job-related diversities at the deep level

In terms of *cognitive diversity* (i.e., differences in terms of expertise, experiences, perspectives, knowledge, thinking styles, and beliefs; e.g., Miller et al., 1998), the extant literature has demonstrated conclusively that individual creativity benefits from the diversity in the job-related cognitive resources of individuals, such as their professional expertise (Boh et al., 2014; Huang et al., 2014) and knowledge (Frey et al., 2011; Mannucci & Yong, 2018). Whereas Boh et al. (2014) found a direct, positive relationship between scientists' breadth of expertise and creative inventions, Frey et al. (2011) demonstrated that the knowledge diversity of contributors to online innovation platforms benefited their innovative ideas. Taylor and Greve (2006) found that comic creators' knowledge diversity had a similar effect on their creative output. Studies on moderators of such beneficial effects between cognitive diversity and individual creativity

TABLE 1 A structured approach to the extant literature on diversity–creativity relationships

Level of analysis	Diversity categories	Diversity types	Diversity attributes (examples)	Exemplary studies
Individual	Job-related, surface-level	Network	Social ties, network contacts	Baer (2010); Gong et al. (2019)
		Cognitive	Expertise, knowledge	Boh et al. (2014); Mannucci and Yong (2018)
	Job-related, deep-level	Network	Actors, social network	Chua (2018); Hirst et al. (2015)
		Identity	Organizational culture	Corritore et al. (2019)
		Language	Multilingualism	Kharkhurin (2010); Lee and Kim (2011)
	Job-unrelated, surface-level	Identity	Culture, group membership	Korzilius et al. (2017); Steffens et al. (2016)
		Contextual	Cultural exposure, values	Çelik et al. (2016); Leung et al. (2008)
Team	Job-related, surface-level	Background	Function, education	Mitchell and Boyle (2015); Shin and Zhou (2007)
		Network	Outside ties	Perry-Smith and Shalley (2014)
	Job-related, deep-level	Interaction style	Communication style, LMX	Li et al. (2016); Pesch et al. (2015); Zhao (2015)
		Identity	Work value, group	Tang and Naumann (2016); Tripathi and Ghosh (2020)
		Cognitive	Knowledge, thinking style	Han et al. (2014); Hoever et al. (2012)
	Job-unrelated, surface-level	Demographic	Gender, nationality	Pearsall et al. (2008); Spoelma and Ellis (2017)
		Geographic	Dispersion	Gibson and Gibbs (2006); Seo et al. (2020)
		Language	Directness of language	Winkler and Bouncken (2011)
	Job-unrelated, deep-level	Identity	Attitude, culture	Jang (2017); Lu et al. (2018)
		Personality	Openness, agreeableness	Pan et al. (2019); Schilpzand et al. (2011)
Cognitive		Cognitive style, affect	Emich and Vincent (2020); Miura and Hida (2004)	
Organization	Job-related, surface-level	Background	Function, education	Solheim and Herstad (2018); Talke et al. (2010)
		Resource	Technology	Huang and Chen (2010); Subramanian et al. (2016)
		Geographic	R&D activity	Lahiri (2010)
		Network	Collaboration partner, tie	Bahlmann (2014); Chung et al. (2019)

TABLE 1 (Continued)

Level of analysis	Diversity categories	Diversity types	Diversity attributes (examples)	Exemplary studies
		Contextual	Host country's technology	Almeida and Phene (2004)
	Job-related, deep-level	Cognitive	Knowledge, information	Caner et al. (2017); Godart et al. (2015)
	Job-unrelated, surface-level	Demographic	Gender, age	Diaz-Garcia et al. (2013); Parrotta et al. (2014)
	Job-unrelated, deep-level	-	-	-

Abbreviation: LMX, leader–member exchange.

showed them to be enhanced either when individuals shared their tacit knowledge with their team (Huang et al., 2014) or as the career seniority of those individuals increased (Mannucci & Yong, 2018).

Multiple studies investigated the effects of deep-level *network diversity* on individuals' creativity. For instance, Rese et al. (2021) provided empirical evidence for the positive role of diversity in knowledge that is exchanged within an individual's network for his or her creativity. Also, if creative tasks require knowledge resources from multiple cultures, cultural diversity in the job-related social network of individuals tends to benefit their creativity (Chua, 2018). Connecting to the positive creativity implications of knowledge diversity outlined in the preceding paragraph, Huang and Liu (2015) and Singh et al. (2016) discovered that the knowledge diversity of social networks (i.e., the contacts of employees) and collaboration networks (i.e., the indirect contacts of inventors) benefits the creativity of employees and inventors, which can be further increased through colleagues' help (Huang & Liu, 2015). Hirst et al. (2015) found that diversity in the indirect networks of individuals benefits their creativity, particularly for ties that depend on only one direct tie. Such social networks are crucial sources of feedback that individuals can access when in need.

### Job-unrelated diversities at the surface level

Increasing evidence suggests that individuals' *diversity in language capabilities* (i.e., differences in languages for which capabilities are possessed; e.g., Kharkhurin, 2009) increases their creativity (e.g., Kharkhurin, 2010; Lee & Kim, 2011). For example, Kharkhurin (2009) found that bilingual students appeared to be more creative than monolingual students. Cushen and Wiley (2011) highlighted the importance of when and to what extent these additional languages are acquired by showing that early bilinguals (i.e., individuals acquiring a second language by the age of 6) performed better in creative versus noncreative tasks than monolinguals. Balanced bilingualism (i.e., equal proficiency of different languages) tends to result in higher creativity than unbalanced bilingualism (Lee & Kim, 2011). In his examination of the moderators of this relationship, Kharkhurin (2010, 2011) emphasized that the effect of diversity in languages on individual creativity is contingent on the sociocultural context and the language proficiency of



individuals through their superior selective attention. The effects of bilingualism on creativity not only differ between the United States (i.e., better activation of unrelated and active concepts) and Iran (i.e., production of innovative and useful ideas) but are also greater for individuals with stronger language proficiency (Kharkhurin, 2010, 2011).

## Job-unrelated diversities at the deep level

Further research has investigated how *identity diversity* (i.e., differences in terms of social identities as well as values and attitudes) relates to individual creativity. This body of research argued that multiple social identities of individuals—particularly those related to their national cultures (Korzilius et al., 2017; Tadmor, Galinsky, et al., 2012) and salient group memberships (Steffens et al., 2016)—enhance individual creativity. Findings have suggested that the positive effect of social identities on individual creativity is mediated by cultural intelligence (Korzilius et al., 2017), integrative complexity (Tadmor, Galinsky, et al., 2012), and cognitive flexibility (Steffens et al., 2016) and that the blendedness of multiple cultural identities (i.e., Chinese–American biculturals) positively affects creativity via ideational fluency in bicultural rather than monocultural contexts (Saad et al., 2013).

Another stream of research explored how exposure to or the experience of *contextual diversity* (i.e., diversity in one's immediate social environment; e.g., Chua, 2013) affects individual creativity. Three empirical studies reported that multicultural experiences were positively associated with creativity (Cheng et al., 2011; Leung et al., 2008; Tadmor, Satterstrom, et al., 2012). Notably, these studies applied different scales to measure creativity, which might strengthen their implications. Further illuminating this relationship, Leung et al. (2008) revealed that the positive effect of multicultural experiences on creative outcomes was particularly strong either for individuals open to new experiences or when the creative context neglected both the need for closure (i.e., individuals' desire to follow a firm's answers to ambiguous problems without considering alternative solutions) and the salience of their mortality. In addition, Cheng et al. (2011) discovered that the positive effect of multicultural experience on creativity was mediated by less positive and more negative emotions, as well as by individuals' self-reflection. Focusing on contextual value diversity, Çelik et al. (2016) found that when individuals perceived that their values conflicted strongly with those of others in their environment, the relationship between the value diversity within the social environment tended to benefit individual creativity more than in cases where a low level of value conflict was perceived.

## Synthesis of individual-level research

Unfortunately, only 7 of 26 studies we examined explored the potential mediating mechanisms within the relationship between individual diversities and creativity (e.g., Gong et al., 2019; Korzilius et al., 2017). Although the current state of research at the individual level shows a strong emphasis on investigating direct effects, these studies exclusively examined the positive potential of diversity for creativity, which left open the questions of why and when individuals' diversities may backfire and cause them to struggle in their creative work. Furthermore, a brief review of the methodological aspects of individual-level research revealed several interesting insights. Creativity was measured in several ways, including assessments via creativity tests and

tasks (15 studies) (e.g., unusual uses test, Guilford, 1967), subjective scale-rated instruments (8), and objective data sources (3). With respect to the measurement of diversity, research generally differentiated between objective diversity measures (i.e., actual differences) and perceived diversity (i.e., the awareness of differences) (Shemla et al., 2016). At the individual level, a slightly higher number of studies relied on actual, objective diversity (14) than on measures of perceived diversity (12). All the studies applied quantitative methods, except for one that adopted a mixed-methods design combining qualitative and quantitative explorations.

## Team-level research on the role of diversity for creativity

### Job-related diversities at the surface level

The extant literature on *background diversity* (i.e., differences in terms of professional background such as function, education, and occupation; e.g., Reuveni & Vashdi, 2015) emphasizes the crucial role of team functional diversity for team creativity. Twelve of the 62 team-level studies that we reviewed were interested in this effect. A qualitative study by Watson (2018) found that a team's diversity in technical specialties had a positive effect on creativity. Likewise, Somech and Drach-Zahavy (2013), Lee et al. (2015), and Chae et al. (2015) all found a positive relationship between functional diversity and team creativity. The latter study showed that this effect was more positive for either high or low, rather than moderate, levels of functional diversity, which points to a curvilinear effect. The results obtained by Dayan et al. (2017) also supported the idea of such a nonlinear relationship. Other studies considered contingencies and mediating mechanisms in those complex relationships. Some studies showed that a team's functional diversity benefited its creativity more when either the uncertainty of the project (Dayan et al., 2017) or the quality of team processes, such as reflexivity, was high (Fay et al., 2006). Others demonstrated that the positive effect of functional diversity on team creativity was mediated by team leaders' external activities, such as relating, scouting, and persuading (Benoiel & Somech, 2015), and by the knowledge sharing of teams (Sung & Choi, 2019). Connecting to this crucial role of team dynamics, Post et al. (2009) found that diversity in functional and educational perspectives indirectly benefited team creativity through learning and psychological safety. However, the positive indirect effect of functional background diversity on team creativity via knowledge sharing was only found for teams with high status differentials (Sung & Choi, 2019), and Cheung et al. (2016) uncovered that this indirect effect became harmful to team creativity when low levels of affect-based trust were found within teams.

Another background diversity attribute is education. Shin and Zhou (2007) found that transformational leadership moderated the positive role of educational diversity for team creativity, such that team creativity benefited more strongly from educational diversity the more transformational leadership occurred within teams. This effect was shown to be mediated by teams' creative efficacy, because transformational leadership provoked teams to appreciate diverse cognitive resources and to be confident in their creative capability, which, in turn, facilitated team creativity (Shin & Zhou, 2007). In addition, the mediating mechanism of creative efficacy, teams' gathering of external information and openness to adapting strategies to this external information, also helped educational diversity in supporting team creativity (Henneke & Lüthje, 2007). Examining curvilinear effects, Luan et al. (2016) observed that the knowledge integration capability of teams moderated the curvilinear relationship between educational diversity and team creativity, such that a high integration capability enabled the

positive effect of educational diversity on team creativity, whereas a low capability to integrate knowledge produced a negative effect.

A last job-related diversity attribute at the surface level is the occupational diversity of teams. Reuveni and Vashdi (2015) showed that this type of diversity benefited team creativity via shared team mental models. Supporting this positive view on occupational diversity, Mitchell and Boyle (2015) found that, for teams strong in open-mindedness, it increased team creativity through the salience of professional identities, which they argued raised awareness, and hence made use, of the differences among team members. This argument supports the information-elaboration perspective, which describes the instances when diversity is beneficial. The authors also observed that when teams lacked open-mindedness, occupational diversity harmed team creativity through the salience of professional identities (Mitchell & Boyle, 2015). This finding connects to the social categorizing perspective, which helps researchers to understand when diversity becomes harmful. Conceptualizing team diversity with a composite measure (i.e., aggregating multiple diversity attributes to form a single index) comprising background diversity attributes such as function and education, Cabrales et al. (2008) also identified such a detrimental effect of diversity on team creativity. In contrast, Qu and Liu (2017) provided support for the idea that the positive indirect effect of diversity in terms of functional and educational backgrounds (i.e., composite measure) on team creativity via external knowledge acquisition and internal knowledge integration is conditioned by the prosocial motivation of teams.

One study investigated the effect of teams' *network diversity* on their creativity, arguing that national diversity within the informal network of teams benefits their creativity (Perry-Smith & Shalley, 2014).

## Job-related diversities at the deep level

Four studies examined the effect of teams' *diversity in interaction style* (i.e., differences in interaction and communication patterns pursued in interpersonal relationships; e.g., Hambley et al., 2007) on their creativity. In these studies, the diversity in communication styles within teams seemed to be positively related to team creativity through fostering a creative team environment and negatively related through enhanced relationship conflict (Pesch et al., 2015). Although the diversity in leader–member exchange (LMX) relationships that differed between team members first appeared to generally harm team creativity because of causing elevated relationship conflicts (Zhao, 2015), Li et al. (2016) provided support for an inverted U-shaped relationship that was stronger when teams' median LMX was relatively low. Zhao (2015) also found such a moderating effect of median team–member exchange (TMX) relationships (i.e., “an employee's perception of his or her exchange relationship with the peer group as a whole”; Seers, 1989, p. 119), such that this diversity type's negative relationship with team creativity was stronger for low rather than high TMX. Chen and Liu (2020) extended this effect by the mediating role of team proactivity, showing that diversity in TMX relationships particularly harmed team creativity via team proactivity in teams with a low, rather than high, median LMX.

Team-level research has also produced notable findings related to *identity diversity*. Tang and Naumann (2016) demonstrated that a positive mood in teams effectively provided buffers against the negative impact that work value diversity had on team creativity, because teams

tended to share more knowledge when there was a positive team mood. Complementing team-level research on composite measures of deep-level diversity, Tripathi and Ghosh (2020) found that deep-level diversity (e.g., in terms of group and organizational identities) harmed team creativity through taxing perceptions of the creativity climate.

With approximately one third of the reviewed studies, those investigating *cognitive diversity* represented the largest share of team-level research. Underlining the important role of knowledge as expressed in the information-elaboration perspective, many scholars have found a positive relationship between knowledge diversity and creativity at the team level (Caniels et al., 2014; Huo et al., 2019; Lee et al., 2015; Lungeanu & Contractor, 2015; Park et al., 2009; 2018; Tang & Ye, 2015; Taylor & Greve, 2006). This positive effect also extends to the dyadic level (Sosa, 2011).<sup>1</sup> Further studies have shown that team creativity increases with diversities in information (Kim & Song, 2020), problem-solving approaches (Kurtzberg, 2005), and cognition (Wang et al., 2016), which comprise components such as thinking styles and knowledge. Moreover, Harvey (2013) found that diversity in teams' perspectives on task goals benefits the uniqueness of ideas evolving from divergent creativity (i.e., creativity with a focus on novelty) and harms that of ideas evolving from convergent creativity (i.e., creativity with a focus on the quality of ideas by combining or building on ideas). Her study also uncovered that these latter convergent processes (i.e., building on and combining extant ideas) come along with a more negative affective tone, which points to the crucial role of emotions in diverse teams.

Beyond this research on the immediate team-creativity effects of different attributes of cognitive diversity, numerous studies have started to investigate important contingencies and mediating mechanisms in these effects. In terms of contingencies, Hoever et al. (2012) found that the perspective taking abilities of teams enhance the positive relationship between diversity in perspectives and team creativity. In contrast, status inequality (Park et al., 2018) and the betweenness centrality of a team's knowledge network (i.e., difference in knowledge transfer within the team; Tang & Ye, 2015) may derogate the positive relationship between knowledge diversity and team creativity.

In terms of mediating mechanisms that are apt to illuminate the processes via which cognitive diversity relates to team creativity, team creativity tends to be increased by cognitive diversity through both the learning and inclusion processes of teams (Chow, 2018), their information sharing (Park et al., 2009), and intrinsic motivations (Wang et al., 2016). With regard to studies combining contingencies with mediating mechanisms, the findings from Han et al. (2014) suggested that knowledge diversity increases team creativity via team-bridging social capital when knowledge disparity is low and team-bonding social capital is high. Finally, the information elaboration of teams tends to transmit the interactive patterns between both perspective diversity and team perspective taking (Hoever et al., 2012) and team mental model diversity and goal orientation (Toader & Kessler, 2018) on team creativity.

## Job-unrelated diversities at the surface level

Twelve of the 62 team-level studies we considered addressed the ways *demographic diversity* (i.e., differences in demographic characteristics such as age, ethnicity, or gender; e.g., Riordan & Shore, 1997) relates to team creativity. Teams' national diversity seemed to facilitate their creativity, partly because of mechanisms involving cognitive styles, knowledge

diversity, and cohesion (Bouncken et al., 2016). These positive, indirect relationships seem to be reinforced by either the past experiences teams have had with different cultures or their members' openness to other cultures, and they tend to be alleviated by either cultural distance among team members or a salient dominating culture within teams (Bouncken et al., 2016). A psychologically safe communication climate may help to prevent teams from suffering in their creativity due to national diversity (Gibson & Gibbs, 2006). The greater the differences in technical experience among team members are, the more likely the downturn potential of national diversity is to manifest (Martins & Shalley, 2011).

Researchers have shown heightened interest in the role of ethnic diversity for team creativity. In one study, ethnic diversity appeared to stimulate team creativity (McLeod et al., 1996), partly via a team's perception of itself as unified and inclusive when its superordinate identity was salient (Salazar et al., 2017). This positive effect was also found for teams that used either computer-mediated communication or a nominal group technique (i.e., a structured method for group brainstorming) (Giambatista & Bhappu, 2010). Cady and Valentine (1999) found a positive effect of racial diversity on quantitative, but not qualitative, aspects of team creativity. The extant literature is rather inconclusive with regard to the role of the gender composition of teams on their creativity. On the one hand, research has shown that gender diversity enhances the quantitative, but not qualitative, aspects of creative team efforts (Cady & Valentine, 1999) and that this positive potential is particularly well leveraged when the political correctness norm within those teams is salient (Goncalo et al., 2015). On the other hand, gender diversity appeared to reduce team creativity because it leads to emotional team conflict (Pearsall et al., 2008). Furthermore, making teams aware of such gender differences by activating gender-based faultlines will cause their creativity to suffer when there is no external threat that may require them to remain united (Spoelma & Ellis, 2017). The effects of age diversity on team creativity also appear to be rather mixed. On the one hand, Bodla et al. (2018) showed that surface-level diversity, consisting of age, gender, racial, and national diversity attributes, was positively related to team creativity via team knowledge sharing. On the other hand, Sung and Choi (2019) provided evidence that this desirable indirect effect via knowledge sharing turns negative when teams have a low status differential, which points to the crucial role of moderators in the relationship between age diversity and team creativity. In this regard, age diversity tends to benefit team creativity when there is stronger rapport, equal participation in virtual work, little process conflict, or smaller differences in technical experiences, and it seems to harm creativity when there is less established rapport, more unequal participation, elevated process conflict, or larger differences in technical experiences (Martins & Shalley, 2011).

Research on the role of *geographic diversity* (i.e., differences in terms of geographic location; e.g., Seo et al., 2020) in team creativity has proliferated because collaboration within teams over larger distances has increased (Johnson et al., 2009). Geographic dispersion may be particularly harmful for team creativity when teams lack a safe communication climate (Gibson & Gibbs, 2006). Further research showed that the relationship between geographic diversity and team creativity took an inverted U-shape and that highly dispersed teams may uphold performance when there is homogeneity in experiences and more instances of past collaboration in such teams (Seo et al., 2020).

One study showed interest in the effect of teams' *language diversity* on their creativity. The findings of Winkler and Bouncken (2011) suggested that the diversity in the directness of language within innovation teams taxed their creativity during the ideation phase of the innovation process.

## Job-unrelated diversities at the deep level

Several scholars have investigated the team-creativity effects of attributes pertaining to *identity diversity*. Triandis et al. (1965) found that diversity in attitudes toward social issues has a positive effect on dyadic creativity. This effect seemed to be stronger when the dyads were also homogeneous regarding their abilities than when they were heterogeneous in both their attitudes and abilities. Similarly, Bodla et al. (2018) showed that teams increased their creativity through knowledge sharing that is stimulated by perceptions of deep-level diversity, which the researchers operationalized as a composite measure comprising different attributes ascribable to identity diversity (e.g., the attitude toward one's work). Other studies explored the effects of cultural diversity<sup>2</sup> on team creativity. Jang (2017), for example, found that the presence of multicultural team members enhances the creative performance of teams. This positive effect seems to be moderated by cultural diversity, such that teams with greater cultural diversity benefit more from the presence of multicultural team members than culturally homogeneous teams. This strand of research also indicated that cultural diversity has a positive effect on team creativity via a serial mediation from teams' intercultural communication to their openness and information elaboration (Lu et al., 2018) as well as via a simple mediation of their information exchange (Li et al., 2017). The latter appeared to be more positive when teams perceived their climate for inclusion to be stronger.

Another group of studies has examined the relationship between teams' *personality diversity* and their creativity. Evidence from these studies suggested that diversity in degrees of openness to experience spurs team creativity (Schilpzand et al., 2011), particularly when teams use either computer-mediated communication or a nominal group technique (i.e., a structured method for group brainstorming) (Giambatista & Bhappu, 2010). While the diversity in degrees of agreeableness also tended to support team creativity in teams applying a nominal group technique, it seems to inhibit team creativity in teams using face-to-face or computer-mediated communication (Giambatista & Bhappu, 2010). In addition, a quantitative study found that the diversity of a team's chronotype (i.e., the timing of peaks and ebbs in physical and psychological energy; Preckel et al., 2011) had a positive effect on team creativity when team temporal leadership was high and a negative effect when this was not the case (Pan et al., 2019). This interactive pattern was also suggested to indirectly effect the creativity of teams via their work engagement (Pan et al., 2019).

When examining attributes pertaining to *cognitive diversity*, scholars found diverging effects on team creativity. Supporting the positive perspective, Miura and Hida (2004) indicated that a more similar idea pool strengthened the positive relationship between the diversity in thought categories and team creativity, and Aggarwal and Woolley (2019) revealed a positive indirect effect of diversity in cognitive style on team creativity through the enhancement of the transactive memory system of teams. Finally, Emich and Vincent (2020) provided evidence that a team's diversity in affective states differentially affected team creativity, such that team creativity increased when this type of diversity activated promotion-focused affective states and decreased when prevention-focused affective states were activated.

## Synthesis of team-level research

Research on diversity–creativity relationships at the team level reflects the double-edged nature of diversity (Milliken & Martins, 1996), which has both positive and negative effects on team

creativity due to diversities that arise from the same attributes. This is particularly true for surface-level differences in function (Cheung et al., 2016; Fay et al., 2006), education (Luan et al., 2016; Shin & Zhou, 2007), occupation (Mitchell & Boyle, 2015; Reuveni & Vashdi, 2015), nationality (Bouncken et al., 2016; Martins & Shalley, 2011), and gender (Goncalo et al., 2015; Pearsall et al., 2008). These complex associations point to the importance of simultaneously considering the two prevailing mechanisms within diversity–outcome relationships and support arguments that the information-processing and social-categorization perspectives are equally relevant for understanding the effects of diversity at the team level (van Knippenberg et al., 2004). Although some scholars considered both of these perspectives in their research on the diversity–creativity link (e.g., Martins & Shalley, 2011; Mitchell & Boyle, 2015), most studies concentrated on only one of these perspectives (e.g., Shin & Zhou, 2007; Somech & Drach-Zahavy, 2013). This is unfortunate because the information-processing perspective is the overarching idea behind beneficial mediating mechanisms via knowledge sharing (e.g., Bodla et al., 2018; Cheung et al., 2016; Park et al., 2009) and information elaboration (e.g., Hoever et al., 2012; Lu et al., 2018; Toader & Kessler, 2018), whereas the social-categorization perspective constitutes its counterpart that conceptualizes arguments for the detrimental mediation mechanism via team conflict (e.g., Pearsall et al., 2008; Pesch et al., 2015; Zhao, 2015). The majority of the team-level studies reviewed relied on perceived creativity assessments (49); only a limited number used objective (5) or test-based assessments of creativity (6) or a combination of perceived and objective measures (2). Most studies measuring team diversity were based on actual diversity (48), including manipulated diversity in experimental settings (10), but few considered perceived diversity (10) or integrated actual and perceived diversity (2). Two qualitative studies did not clarify how diversity was assessed. In terms of the research design, 56 studies were of quantitative nature, 4 were of qualitative nature, and 2 studies relied on a mixed-methods approach.

## Organizational-level research on the role of diversity for creativity

### Job-related diversities at the surface level

Six of the 23 organizational-level studies that we review below focused primarily on the effects that attributes pertaining to *background diversity* have on organizational creativity. Organizational creativity tended to benefit from both the educational and functional diversities of companies' top management teams (TMTs) (Yoon et al., 2016) and boards (Sarto et al., 2019).<sup>3</sup> In particular, Sarto et al. (2019) showed that these effects are more positive when CEOs possess expertise in the domain of creativity. Organizations also appeared to benefit in their creativity due to the diversity of the professional experiences of their workforces (Solheim & Herstad, 2018). In organizations with strong interfunctional coordination, organizational creativity has been shown to suffer from functional diversity and to profit from educational diversity (Auh & Menguc, 2005). Faems and Subramanian (2013) found this positive effect of educational diversity on organizational creativity to be mitigated by the gender diversity of an organization's R&D workforce to such an extent that it even turned negative at particularly high levels of gender diversity. Exploring a composite conceptualization of background diversity, Talke et al. (2010) examined a construct that consisted of educational, functional, industrial, organizational, and board backgrounds to form a task-oriented diversity measurement of TMTs. They showed that this type of diversity positively predicted organizational creativity via organizations' strategic choice to focus on innovation fields.

When considering *resource diversity* (i.e., differences in terms of organizational resources; e.g., Cui & O'Connor, 2012), Y. F. Huang and Chen (2010) found an inverted U-shaped relationship between the technological diversity of organizations and their creativity. This relationship appeared to be moderated by both absorbed and unabsorbed organizational slack (i.e., “the cushion of actual or potential resources that allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in technologies or markets”; Huang & Chen, 2010, p. 421), such that high levels of absorbed slack enhanced, whereas high levels of unabsorbed slack mitigated the relationship between technological diversity and organizational creativity. Adding to this complex relationship, Subramanian et al. (2016) found that technological diversity stimulated organizational creativity when the research and engineering workforces were similar in their educational level—particularly at lower levels of education—and harmed organizational creativity when this workforce was more diverse.

Studies on diversity in geographic location showed nonlinear relationships between *geographic diversity* in different organizational aspects and the creativity of organizations. Lahiri (2010) demonstrated that the geographic distribution of the R&D activity of organizations had an inverted U-shaped relationship with organizational creativity. An increasing level of technological diversity resulted in less desirable consequences of R&D distribution for organizational creativity, whereas stronger intraorganizational linkages made this relationship more desirable.

Research on the effects of organizations' *network diversity* on their creativity provided distinct findings. Whereas Bahlmann (2014) found an inverted U-shaped relationship between entrepreneurs' geographic network diversity and the creativity of ventures, Chung et al. (2019) provided support for the claim that the positive effect of the industry diversity of collaboration partners on organizational creativity was strengthened by organizational search routines and turned negative as a function of internal technological capabilities. Furthermore, Bahlmann (2014) found that the considered relationship is inverted U-shaped at low levels of network tie strength and becomes positively linear at high levels of network tie strength.

In terms of attributes pertaining to *contextual diversity*, Almeida and Phene (2004) found that technological diversity in the host country benefits the creativity of an organization's subsidiaries operating in this country.

## Job-related diversities at the deep level

Numerous scholars have explored the effects that attributes pertaining to *cognitive diversity* have on organizational creativity. As such, it tends to benefit from knowledge diversities within both an entire organization (Chung et al., 2018) and its TMT (Del-Corte-Lora et al., 2016). Whereas Caner et al. (2017) found that the positive effect of knowledge diversity on organizational creativity was enhanced when external knowledge from familiar rather than unfamiliar knowledge domains is accessed, Chung et al. (2018) demonstrated the contingent roles of organizational search scope and managerial discretion. In contrast, Faems and Subramanian (2013) showed that the beneficial potential of knowledge diversity for organizational creativity turned negative under elevated levels of national diversity in the R&D workforce. Godart et al. (2015), who examined the effects of attributes pertaining to experiential diversity at the organizational level, found an inverted U-shaped relationship between leaders' professional experience diversity and their organizations' creativity, such that moderate knowledge diversity was related to the highest levels of creativity. Moreover, Auh and Menguc (2005) demonstrated that the diversity in experiences of TMTs benefited organizational creativity when interfunctional coordination was strong and harmed organizational creativity when it was weak, respectively. Research



exploring such effects with help of composite conceptualizations of cognitive diversity showed that the diversities in the technology and business knowledge of new ventures' founding teams stimulate organizational creativity and that this effect is stronger when teams' decision-making is based more on causation logic (Kristinsson et al., 2016).

## Job-unrelated diversities at the surface level

Research has also started to consider the creativity consequences of attributes pertaining to *demographic diversity* at the organizational level. The gender diversities of R&D workforces (Diaz-Garcia et al., 2013), of TMTs (Huang, 2021), and of boards (Ain et al., 2021), just as the age diversity of TMTs (Yoon et al., 2016), were all shown to stimulate organizational creativity. More specifically, the positive effect of a TMT's gender diversity on firm innovation was found for a female-to-male ratio of .25 to .30 but became insignificant and even turned negative for a ratio below .25 (Huang, 2021). Adding to this organizational-level research, the national diversity of TMTs also tends to stimulate organizational creativity by offering a greater variety in external knowledge sourcing strategies, a mediating mechanism that has been shown to be stronger for organizations that had TMTs possessing lower social stratification or that were located in countries characterized by low power distance (Boone et al., 2019). Finally, organizational creativity even tends to profit from the ethnic diversity of entire workforces (Parrotta et al., 2014).

## Synthesis of organizational-level research

Our review of the research on diversity–creativity relationships at the organizational level shows that the extant literature lacks insights into both the effects of job-unrelated diversities at the deep level and the negative consequences that diversity may have at the organizational level of analysis, with only approximately one fifth of the 22 studies reviewed above exploring negative effects on creativity. However, in some of the studies interested in the benefits of diversity, positive effects were found to turn negative as a function of particular moderators, such as organizational demographics (e.g., Faems & Subramanian, 2013; Subramanian et al., 2016) or coordination and search processes (e.g., Auh & Menguc, 2005; Chung et al., 2019). It is still striking that almost no study at the organizational level has investigated the underlying processes by which diversity affects creativity at this level, perhaps partly because the social mechanisms identified in the original diversity literature done in teams are difficult to replicate at the more abstract level of organizations. At the organizational level, more objective (15) than perceptual (7) measures of creativity were utilized, and all of the 22 studies were concerned with actual diversity and relied on research designs of quantitative nature.

## Cross-level research on the role of diversity for creativity

### Job-related diversities at the surface level

One focus of cross-level research concerned with the relationship between diversity and creativity has been on the effect that background team diversity has on individual creativity,

with 4 of the 11 cross-level studies reviewed below dealing with such effects across the team and individual levels. Individual creativity tended to be stimulated by attributes pertaining to the *background diversity* of teams, in particular by both the functional (Choi, 2007) and composite background diversities of teams (Perry-Smith, 2006), with the latter consisting of diversity in tenure and function. In contrast to these positive effects on individual creativity, the diversities of teams in both hierarchical status and performance levels were shown to harm team members' creativity (Choi, 2007). Likewise, the diversity in organizational tenure of teams also restricts their members in individual creativity, which was shown to be mediated by the explicit knowledge of team members, such that this negative indirect effect turns positive with elevated levels of knowledge sharing within teams (Gilson et al., 2013). Finally, the informational diversity of teams (i.e., a composite construct that comprises diversities in tenure, functional affiliation, educational level, and educational specialization) increased the creativity of their individual members, because it also increased the number of communication ties among team members (Zhang & Huai, 2016).

### Job-related diversities at the deep level

In terms of *cognitive diversity*, Shin et al. (2012) found that this type of team diversity was particularly beneficial to team member creativity either when team members possess strong creative self-efficacy or when their leaders exhibit strong transformational leadership. Further research provided empirical support for a positive effect of teams' cognitive diversity on their members' creativity when the idea-generation teams showed either higher collectivism (Ye & Robert, 2017) or low power-distance orientation (Suzue, 2020). Moreover, when investigating *diversity in interaction style*, Xie et al. (2019) showed that the diversity in LMX relationships within teams was positively related to the individual creativity of their members and indirectly taxed their creativity via an interactional justice climate when team interdependence was high rather than low. To date, Corritore et al. (2019) have presented the only study examining a bottom-up effect of diversity on creativity by linking the *identity diversity* of individuals to creativity at the organizational level of analysis and showing that employees' diversity in terms of organizational culture has a positive effect on the creativity of their entire organization.

### Job-unrelated diversities at the surface level

Cross-level research on the relationship between the *demographic diversity* of teams and the creativity of their members has reported a number of different effects. For example, while the creativity of team members tends to benefit from the gender diversity of their teams, it also seems to suffer when teams are quite diverse in age (Choi, 2007). In terms of the ethnic diversity of teams, Cordero et al. (1996) provided empirical support for an inverted U-shaped relationship with the creativity of technical professionals, such that these individuals appear to be more creative when their teams' composition of whites and nonwhites is balanced (i.e., high diversity) than when the composition is unbalanced (i.e., low diversity). Furthermore, it has been shown that the ethnic diversity (i.e., termed as cultural diversity in their study) of teams helps to stimulate individual creativity via the information elaboration of team members, an effect that becomes particularly desirable when there is a strong climate of inclusion (Li et al., 2017).

## Synthesis of cross-level research

Synthesizing the research on cross-level diversity–creativity relationships, our review highlights the weak focus on research with conceptual models spanning multiple levels of analysis. Only 11 of the 119 studies that form part of our literature review investigated the relationship between diversity and creativity across multiple levels of analysis (e.g., Shin et al., 2012; Zhang & Huai, 2016). More specifically, this scarce cross-level literature was restricted to 10 studies investigating the top-down effects of team-level diversity on individual-level creativity and one study interested in a bottom-up effect of individual-level diversity on organizational creativity. Given that such cross-level research offers support for positive, negative, and nonlinear creativity effects of diversity evolving from different attributes, it can be concluded that the magnitude and direction of such effects seem to be particularly subject to contingencies, such as team processes (e.g., Gilson et al., 2013). A review of the methods used in cross-level research uncovered a greater reliance on perceptual (9) than objective (1) measures of creativity with one study including both subjective and objective measurements of creativity. In measuring diversity, most of the studies adopted actual diversity measures (7), and only four studies opted for perceptual measurements of diversity. All the cross-level investigations used a quantitative research design.

## SYNTHESIS OF FINDINGS ACROSS THE LEVELS OF ANALYSIS

### Convergent findings across different levels of analysis

Reviewing the effects of diversity on creativity at and across the three levels of analysis reveals several converging findings. When the findings at the team level are compared with the findings at the individual level, research is consistent with regard to the beneficial role that diversity in national culture plays in creativity (Korzilius et al., 2017; Li et al., 2017). This positive effect is also supported across levels, because the cultural diversity of teams tends to stimulate their members' creativity (C.-R. Li et al., 2017).

Contrasting research at the team and organizational levels, it can be noted that creativity was consistently affected by numerous diversity attributes. The positive effect of ethnic diversity on creativity has been found at both the team and organizational levels (Parrotta et al., 2014; Salazar et al., 2017). Similarly, research at both the team (Henneke & Lüthje, 2007; Shin & Zhou, 2007) and organizational levels (Sarto et al., 2019; Yoon et al., 2016) has almost always presented a positive view of educational diversity for creativity. At both levels, the rare negative effects have surfaced solely due to contingencies, such as the characteristics of teams and their organizations (Faems & Subramanian, 2013; Luan et al., 2016). Furthermore, research also appears to be coherent with regard to the positive role that functional diversity plays in the creativity of teams (e.g., Chae et al., 2015; Somech & Drach-Zahavy, 2013) and their entire organizations (e.g., Sarto et al., 2019; Yoon et al., 2016). This positive effect has also been observed across different levels of analysis that linked the functional diversity of teams to their members' individual creativity (Choi, 2007). Support for any negative effects has rarely been provided and done so solely in the presence of specific moderators (Auh & Menguc, 2005; Cheung et al., 2016). Another convergent finding at both team- and organizational-level studies is the nonlinear effects of geographic diversity on creativity (e.g., Lahiri, 2010; Seo et al., 2020).

When team-level and cross-level studies are contrasted, it becomes apparent that the diversity in LMX relationships within teams taxes both individual creativity via interactional justice climate and team creativity via relationship conflict (Xie et al., 2019; Zhao, 2015). These effects are stronger when there is greater team interdependence (Xie et al., 2019) and weaker TMX (Zhao, 2015). When considering the findings from all levels of analysis, knowledge diversity has consistently been shown to benefit creativity at the individual (e.g., Taylor & Greve, 2006), team (e.g., Han et al., 2014; Sosa, 2011), and organizational levels (e.g., Chung et al., 2018). Even a cross-level investigation supported this optimistic view by showing that the knowledge diversity of teams stimulated the individual creativity of their members (Shin et al., 2012). However, it should be mentioned that the beneficial effects of organizations' diversity of knowledge may turn negative in the presence of elevated levels of national diversity (Faems & Subramanian, 2013).

## Divergent findings across different levels of analysis

Despite the numerous converging findings at and across the three levels of analysis, the review also uncovers diverging findings. Age diversity has tended to show mixed effects on creativity at the team level (Martins & Shalley, 2011; Sung & Choi, 2019) and a more detrimental cross-level influence on the individual creativity of team members (Choi, 2007). However, it has been shown to benefit creativity at the organizational level (Yoon et al., 2016). Mixed findings were also evident for gender diversity. The positive creativity effects of gender diversity revealed in research at the organizational level (Diaz-Garcia et al., 2013) and across the individual and team levels (Choi, 2007) have conflicted with the results of team-level research highlighting predominantly detrimental effects on team creativity (Pearsall et al., 2008; Spoelma & Ellis, 2017), with the exception of teams with salient political correctness norms (Goncalo et al., 2015).

Moreover, quantitative studies have shown negative effects of national diversity on creativity (Gibson & Gibbs, 2006; Martins & Shalley, 2011), whereas organizational-level research has indicated positive effects of national diversity (Boone et al., 2019). At the team level, only the findings from qualitative research appear to follow this positive view of organizational-level research (Bouncken et al., 2016).

Research on interaction style diversity at the team and across levels does not only point to converging but also diverging findings. Whereas cross-level research has found a positive effect for diversity in the LMX relationships of teams on their members' creativity when team interdependence is high (Xie et al., 2019), team-level research has provided support for an inverted U-shaped effect on team creativity (Li et al., 2016). When research findings across the individual, team, and organizational levels are compared, it can be concluded that diversity in professional expertise at both the individual and team levels benefits creativity at those levels (Boh et al., 2014; Huang et al., 2014; Lee et al., 2015). At the organization level, in contrast, this effect may become negative under low levels of interfunctional coordination (Auh & Menguc, 2005).

## Methodological synthesis

Our brief methodological review likewise illuminated the similarities and differences between levels of analysis directed toward the measurement of key constructs and research designs.

How creativity was measured at different levels of analysis differed widely between levels. Individual creativity measurements exhibited the greatest variety, with these assessments ranging from test- or task-based options (including objective and subjective elements) to objective data sources and scales meant to determine perceived creativity. The studies at the team level were most frequently anchored in perceived and survey-based creativity measures, whereas the organizational and cross-level research heavily relied on objective measurements. Surprisingly, only three studies were grounded in both perceived and objective creative evaluations. A considerable number of studies at all levels used actual diversity measures. Whereas the individual, team, and cross-level studies considered measures of perceived creativity, no study at the organizational level included this aspect. As was found for the measurement of creativity, only two studies incorporated both perceived and actual diversity into their analyses.

The research designs applied in the reviewed studies were compared to examine the effects of diversity on creativity. The results reflected that the vast majority of the studies used a quantitative design, which encompassed a multitude of forms and included laboratory and experimental studies conducted at the individual and team levels, secondary data studies carried out at the organizational level, and survey-based questionnaires administered at all the levels under study. In contrast, the use of qualitative research designs was very limited and restricted to the individual and team levels. Having pointed to the similarities and differences in research on diversity–creativity relationships across all levels, the following section will provide recommendations for both theoretical and methodological advancements.

## **AGENDA FOR FUTURE RESEARCH**

Our synthesis reveals several important areas that should be addressed by future research. While focusing on identifying opportunities for conceptual and theoretical advancements, we also briefly point to opportunities for methodological advancements. With regard to conceptual and theoretical future research avenues, our multilevel perspective not only enables scholars with more micro- or macro-oriented foci to learn from and connect to findings leveraged at other levels of analysis but also offers a theoretical basis for more cross-level research on the relationship between diversity and creativity. Harnessing the synergistic potential of conceptual approaches known from one level—like the idea that multiple diversity attributes align to form faultlines within teams—points to research opportunities that significantly advance this stream of research. In terms of methodological advancements, we discuss the measurement of creativity and diversity and the improvement of research designs as important avenues for future research.

### **Opportunities for conceptual and theoretical advancement**

#### **Advancing cross-level approaches**

Our literature review highlights the dominance of conceptual models spanning only one level of analysis. There is a need for complex research designs that can accommodate cross-level investigations, as research on diversity–creativity relationships has thus far rarely accounted for the organizational reality that individuals are embedded in both team and organizational

structures and that teams, in turn, are nested in organizations (Hitt et al., 2007; Klein & Kozlowski, 2000). Research on relationships across multiple levels of analysis is imperative to facilitate a better understanding of social behavior in organizations (Anderson et al., 2014; Hitt et al., 2007). This is particularly necessary for an understanding of how diversity may benefit or tax creative work in organizations. As a compositional property of different entities, diversity can exert contextual influences on processes and outcomes at multiple levels (Roberson et al., 2017). Conceptualized as a multilevel phenomenon, creativity can also evolve from different actors (i.e., individuals, teams, and organizations) that are influenced by their own and contextual characteristics (Anderson et al., 2004; Zhou & Hoever, 2014).

To extend the understanding of how individuals may respond creatively to elevated levels of diversity at work, further research on the interface between organizations and their individual employees appears promising. Our review has highlighted the important role of knowledge diversity for creativity at the individual, team, and organizational levels. However, the understanding of how the diverse knowledge of organizations made accessible to individuals may help them in their creative work appears to be incomplete. Rich knowledge exposure in the work environment should be expected to enhance cognitive flexibility and thus stimulate creativity by building on the information-processing perspective of diversity (West, 2002). Because previous research has suggested that diversity in cognitive perspectives is greater across different units of an organization than within such units, individuals may strongly benefit from the diverse knowledge foundations of their entire organizations (Perry-Smith & Shalley, 2003). Thus, the knowledge diversity of organizations may have a positive effect on the creativity of individuals. However, because individuals tend to respond differently to their organizational context, it is crucial to investigate the contingencies that may prevent this desirable role of organizational diversity for individual creativity from surfacing (Shin et al., 2012). Attending to the interactional approach followed in the creativity literature (George & Zhou, 2001), further considering how diversity–creativity relationships across levels are conditioned by individual characteristics is important. For example, individuals' openness to experience may help them to better seize the knowledge and informational resources potentially accessible in their organization (Baer, 2010). Individuals open to experiences should be motivated to strive for diverse cognitive resources and be able to use these resources for inherent creative processes (Baer & Oldham, 2006). Future research may thus want to answer the question of how individuals' personalities may help them in, or prevent them from, increasing their creativity through the diversities inherent in their social environments.

## Illuminating mechanisms explaining the controversial role of diversity in creativity

The literature reviewed above (e.g., for age and occupational diversity; Mitchell & Boyle, 2015; Reuveni & Vashdi, 2015; Sung & Choi, 2019; Yoon et al., 2016) provides support for the idea that diversity evolving from the same attribute can have both positive and negative effects on creativity at different levels of analysis. These opposing effects are often determined by moderators that turn the desirable potential of diversity into a more detrimental one. This, in turn, has surely contributed to the controversial role of diversity that manifests in its description as a double-edged sword. In keeping with several meta-analyses (e.g., Bowers et al., 2000; Webber & Donahue, 2001), our review underscores that the effects of diversity on creativity are not (solely) dependent on the type of attribute investigated.

As the conceptual work by van Knippenberg et al. (2004) suggests, it is important for research on diversity–creativity relationships to investigate the conditions under which either positive information-elaboration or negative social-categorization processes are elicited.

Unfortunately, the extant creativity literature has paid little attention to joint considerations of both processes (except the work by, e.g., Cheung et al., 2016), which has arguably contributed to the limited explanatory power of the underlying mechanisms (Joshi & Roh, 2009). Better integrating both perspectives in future research will help to advance a more comprehensive understanding of the complex role that diversity plays in the creative work of individuals, teams, and organizations. Scholars may want to consider the interactive effect between the elaboration of task-relevant information and the intergroup biases evolving from social categorization. Considering these mechanisms may be particularly informative when studying diversity–creativity relationships at levels different from that of teams, because making use of team-level theories and mechanisms can offer promising insights. For example, because teams are nested within organizational structures (Hitt et al., 2007), mechanisms connecting diversity to creativity known from the team level largely seem applicable to research at the organizational level as well. The research on knowledge sharing as a mediating mechanism (e.g., Cheung et al., 2016) is a worthwhile exemplar, particularly because knowledge transfer within organizations contributes to their innovative output (e.g., Tsai & Ghoshal, 1998). How organizations may miss leveraging the benefits of knowledge diversity when their work units hold biases against the knowledge accessible through other units, which is expected to affect organizational creativity via information-elaboration processes, seems to be an important question in this regard. Scholars should therefore be encouraged to address the question of which contingencies are apt to simultaneously enhance the elaboration of information and avoid categorization based on social differences.

## Extending conceptual ideas from one level of analysis to another

Such biases between organizational units, which prevent organizations from profiting in their creativity by diverse workforces, can be understood as a faultline between these units. This points to the promise of leveraging important knowledge when extending concepts and ideas well known from one level of analysis to phenomena less understood at other levels of analysis. In this regard, the idea of faultlines originates in the team diversity literature (Lau & Murnighan, 1998) and describes the extent to which different diversity attributes align among team members to form relatively homogeneous subgroups (Thatcher & Patel, 2012). Hypothetical dividing lines result that may initiate social-categorization processes between such subgroups and impair the elaboration of information across such subgroups due to the biases the members of one subgroup likely hold toward the members of other subgroups (Jehn et al., 2008). Although the idea of faultlines has seldom been used to explain how creativity is affected by diversity (except, e.g., Pearsall et al., 2008), we believe there is promise in further applying it at levels different from those of teams. At the organizational level, strong faultlines could indicate that members from one organizational unit (e.g., research and development) are quite similar, but more different from those from other units (e.g., marketing and sales). During cross-functional creative work, however, members from such different units are required to share information and collaborate (Zhang & Guo, 2019). How highly diverse organizations suffer in their creative performance when differences between employees align with their function is thus an important question. By addressing this question, practice can be better assisted in terms

of how to counteract such threats without feeling pressured to abstain from diversifying their workforces.

At the individual level, the logic of faultlines can be equally applied, for example, when studying multiculturalism or intersectionality. In terms of multiculturalism, research highlights that the cultural diversity of individuals can involve conflicts between distinct cultural identities that ultimately result in identity stress (e.g., Baumeister et al., 1985; Fitzsimmons et al., 2011). A better understanding in which social contexts multicultural individuals can be particularly creative is thus important. This may be explained by the degree to which the different identities of multicultural individuals align with the different identities of monocultural coworkers in culturally diverse workforces. It should be expected that a stronger alignment allows them to better tap into the informational resources of monocultural individuals with whom they share at least one identity due to the weaker biases that accompany larger similarities between them.

Likewise, how relatively unfavorable categories of different diversity attributes (e.g., in terms of gender, age, or race) align within individuals can also be understood from a faultlines perspective and help to illuminate whether some individuals are kept away from the informational resources held by others. Although it has not considered the consequences for creativity thus far, the literature on intersectionality (e.g., Fitzsimmons et al., 2020; Nicolas et al., 2017; Rosenthal, 2016) may still offer important insights into social-categorization processes that cause individuals to more likely share information with individuals who are assumed—based on their belonging to specific demographic groups—to be more prototypical for the context or task at hand (Purdie-Vaughns & Eibach, 2008). Given the ubiquitous gender gap in innovation (Carrasco, 2014), scholars may want to investigate how the alignment of social categories, for which biases exist in a specific context, influences the creativity of those individuals who are particularly at risk of being discriminated subliminally (e.g., by being kept away from the informational resources held by others) or overtly (e.g., by earning less than comparable coworkers from more favored social groups). In stereotypically male employment contexts such as management and innovation, individuals from socially disadvantaged groups have been shown to be treated less unfavorably when they also belong to a social group that is seen more positively (Rattan et al., 2019). Whether low-status versus high-status categories of multiple demographic attributes cut across or align within individuals to influence their creativity is an important question to address, particularly because such an additive model of intersectional benefits and barriers entails relevant implications for individual behavior in teams and organizations.

## **Opportunities for methodological advancement**

### **Measuring creativity and diversity**

Our review revealed that there are several inconsistencies regarding how creativity is operationalized. The creativity measures that are adopted differ widely not only across but also within the various levels of analysis. This variability across studies at the same level and between levels results in a lack of standards for assessing creativity and thereby raises concerns about the external validity of such studies (Barbot et al., 2019). Although there is no single best measure for creativity in the literature, a better integration of measures across levels and increased specificity regarding what facet of creativity is studied should be considered in future research endeavors. For instance, the measurement framework proposed by Batey (2012), which distinguishes between person, process, product, and press (i.e., environment) facets of



creativity, could be used as a guiding framework when specifying the creativity measures under study (Hughes et al., 2018). Another challenge is to adopt a creativity measure that is comparable across different levels. Some measures, particularly object and test-based measures, cannot easily be transferred to other levels of analysis. For instance, the Unusual Uses Test (Guilford, 1967) measures creativity independent of context-specific knowledge and expertise. Therefore, this test may be difficult to administer at the organizational level, as it is unlikely both to engage the whole workforce in its completion and to assess the specific creativity needed within the respective organizational context. On the other hand, archival objective measures, such as the number of patents, capture only a small percentage of ideas that are officially registered. Therefore, future research should consider creativity measures that could be adopted more easily at different levels of analysis. One way forward would be to examine organizations that have implemented organization-wide suggestion systems (i.e., systems that allow employees to communicate and capture their ideas) to measure creativity by assessing the number and originality of ideas submitted by an individual, a group of individuals, or the entire organization.

In prior research, diversity has been predominately captured using actual diversity instead of perceived measures. Not a single study reviewed at the organizational level adopted a perceived diversity measure. Furthermore, only two studies (both at the team level) of all articles included in this review considered both actual and perceived diversity. However, particularly within team-level diversity research, scholars have acknowledged the importance of considering perceptions of diversity as individuals' behaviors and attitudes, based on their perceptions rather than the objective reality (Shemla et al., 2016). Furthermore, perceived diversity has been found to mediate the relationship between actual diversity and outcomes (Harrison et al., 2002). These considerations at the team level are also likely to translate to other levels of analysis. For example, an entire organization may be highly diverse, but if its employees work in relatively homogeneous subunits or departments, their perception of diversity within the organization may be completely different from what is in the records. Therefore, we call on researchers to include actual and perceived measures of diversity within the same studies to further disentangle the interdependence between and influence of actual and perceived diversity at different levels of analysis to develop a more refined understanding of the relationship between diversity and creativity. Placing a greater emphasis on perceived diversity also introduces a temporal perspective, as interactions between members of an organization reveal underlying diversity attributes over the course of time, thereby potentially changing individuals' perceptions of diversity (Shemla et al., 2016).

## Dynamic research designs

Our review identified that all but 7 of the 119 studies applied a quantitative research design. Although quantitative research designs span experimental, archival, and survey-based studies, most studies were of a cross-sectional nature and did not capture the dynamic nature of both diversity and creativity. This uncovers the need for future research to complement these rather theory-testing designs with more dynamic, qualitative research designs. Qualitative research designs are beneficial in exploring complex social interactions. They foster our understanding of how perceptions, behaviors, and processes unfold over time and how individuals, teams, or organizations interpret reality (Suddaby, 2006). For example, qualitative designs may help shed light on the conditions under which the negative social-categorization or the positive information-elaboration perspectives are more or less likely to shape team or organizational processes and impede or drive creativity.

Connecting to our discussion on actual and perceived diversity above, qualitative studies could also examine how and why perceptions of diversity change over time with increased interactions between organizational members. As both creativity and perceptions of diversity change dynamically over time (e.g., Binnewies & Wörnlein, 2011; Shemla et al., 2016), research designs that capture this dynamic and complex process, such as experience sampling methods, offer a promising avenue for future research. For example, experience sampling methods could help in examining how individual diversity (such as multiculturalism) becomes salient when interacting with diverse organizational members on a given day and may shed light on how the immediate team and organizational context helps activate the creative potential of individual-level diversity. Our literature review hopefully stimulates research directed toward such a more holistic understanding of how the diversities of individuals, teams, and organizations benefit or tax creativity at and across these levels of analysis.

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### CONFLICT OF INTEREST

The authors declare no conflict of interest.

### DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

### ENDNOTES

- <sup>1</sup> We categorize dyadic-level studies as team-level studies because of the definitory and conceptual similarity of these levels. Like members in teams, individuals embedded in dyads also share a common purpose or goal (Katzenbach & Smith, 1999).
- <sup>2</sup> Despite their conceptual proximity, our review distinguishes between cultural and national diversities. Because cultural differences with regard to norms, values, or behaviors can arise at various levels beyond national culture (Gibson & Gibbs, 2006), we categorize cultural diversity as a deep-level diversity attribute that cannot be easily observed. In contrast, nationality is more obviously determined and thus systematized as a surface-level diversity attribute (Earley & Mosakowski, 2000).
- <sup>3</sup> Although we are aware that some of the studies on organizational creativity presented in this section may be argued to relate to the team level, we classify the impact of diversities on the most distinguished teams of organizations (e.g., TMTs and founding teams) as a single-level effect at the organizational level of analysis.

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