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ORIGINAL PAPER

Team Conscientiousness, Team Safety Climate, and Individual Safety Performance: a Cross-Level Mediation Model

Xiaohong Xu[1] · Nhan Le[1] · Yimin He[2] · Xiang Yao[3]

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Abstract

Responding to calls for studies to examine the cross-level influence of team personality composition, we hypothesized a cross-level mediation model of the effects of different operationalizations of team conscientiousness (i.e., mean, minimum, maximum, and variance) on individual safety performance through team safety climate. We tested our model using a three-wave longitudinal design with a sample of 451 employees and 70 supervisors nested within 70 teams from two branches of one hospital. The results of our multilevel path analyses indicated that the mean, minimum, and variance—but not maximum—operationalizations of team conscientiousness at time 1 were significantly related to team safety climate at time 2. Further, team conscientiousness (i.e., mean, minimum, and variance) at time 1 exerted a top-down influence on both self-ratings and supervisor ratings of individual safety compliance and safety participation at time 3 through team safety climate at time 2, suggesting that team personality composition can influence outcomes at different levels of analyses. Theoretical and practical implications of these findings are discussed.

Keywords Team composition · Conscientiousness · Safety climate · Safety performance · Cross-level analysis

Workplace safety has been an issue for organizations and their employees. In 2017, there were 5147 employees killed on the job and approximately 2.8 million nonfatal injuries reported in the USA (Bureau of Labor Statistics, 2018). Consequently, 882,730 workdays were lost with an average loss of 8 workdays per incident (Bureau of Labor Statistics, 2018). Worldwide, more than 374 million workplace accidents occur each year (International Labor Organization, 2017). Occupational injuries directly result in employees' lost wages and even long-term income disparities (Dong, Wang, Largay, & Sokas, 2015). Research has suggested that 40% of occupational accidents occurred due to improper implementation of safety practices (Zohar & Luria, 2003). Therefore, increased attention has been devoted to the identification of antecedents of employee safety behavior.

Although existing studies have greatly contributed to our understanding of employee safety behavior, they have largely overlooked the effect of team personality composition on individual safety behavior. This is a surprising gap because employee behaviors occur in social settings and might be influenced by the immediate work environment, namely the team context (Gonzalez-Mulé, DeGeest, McCormick, Seong, & Brown, 2014). On a daily basis, employees interact frequently and work closely with team members toward common goals, and consequently, they are inevitably influenced by other members and the team context created by these members. Indeed, scholars have proposed that team personality composition as a social context could exert top-down influences on individual attitudes and behaviors (for a review, see LePine, Buckman, Crawford, & Methot, 2011; Gonzalez-Mulé et al., 2014; Prewett, Brown, Goswami, & Christiansen, 2018). Beyond the cross-level influences on individual attitudes and behaviors, scholars (e.g., Beus, Munoz, & Arthur, 2015; Schneider, 1987; Schneider & Reichers, 1983) have also proposed that group personality composition could shape group-level climate. Empirically, Beus, Munoz, and Arthur (2015) demonstrated that team personality composition (i.e.,

✉ Xiaohong Xu
x3xu@odu.edu

[1] Department of Psychology, Old Dominion University, Norfolk, VA 23529, USA

[2] Department of Psychological and Brain Sciences, Texas A&M University, College Station, TX 77843, USA

[3] School of Psychological and Cognitive Sciences, Peking University, Beijing 100871, China

emotional stability and internal locus of control) influenced group-level safety climate (e.g., team safety climate)—employees' *shared* perceptions of organizational policies, practices, and procedures regarding safety that are rewarded, supported, and expected within a group (Zohar, 2003). Multiple meta-analytic studies have indicated that group-level safety climate is one of the strongest predictors of safety behaviors and safety-related outcomes (e.g., Beus, Payne, Bergman, & Arthur, 2010; Christian, Bradley, Wallace, & Burke, 2009; Nahrgang, Morgeson, & Hofmann, 2011).

Thus, research is needed to investigate the implications of team personality composition on outcomes across different levels of analyses and whether team safety climate plays a role in the cross-level influence of team personality composition on individual safety behavior. Addressing the question of how and why team personality composition influences individual safety behavior would advance our understanding of the linkage between personality and safety in team contexts and provide new insights into how to reduce injuries and accidents at the workplace from a multilevel perspective. This question becomes more crucial when considering that organizations have increasingly relied on team-based structures to maintain competitive advantage (Mathieu, Tannenbaum, Donsbach, & Alliger, 2014), and that personality is often used to design and compose teams (Moynihan & Peterson, 2001).

Consequently, we aim to contribute to the literature in three meaningful ways. First, we extend prior research by testing the theoretical linkage between team conscientiousness and team safety climate. In doing this, we respond to Beus, Munoz, and Arthur's (2015) call for studies to identify additional personality traits beyond emotional stability and internal locus of control that influence safety climate. Further, we examine how different operationalizations of team conscientiousness (i.e., mean, maximum, minimum, and variance) influence the relationship between team conscientiousness and team safety climate.[1] Previous research has suggested that there are inconsistent findings regarding the effects of different operationalizations of team personality composition on team outcomes (e.g., Barrick, Stewart, Neubert, & Mount, 1998; Bell, 2007). Given these equivocal results, our study informs research and practice with a more fine-grained analysis on team conscientiousness that is theoretically linked to team safety climate. The examination of research questions that link different operationalizations of team personality composition to team safety climate would significantly add to our knowledge of safety climate in team contexts and provide opportunities for the design of more effective interventions to improve safety climate. For instance, to the extent that different operationalizations of team conscientiousness reveal meaningful associations with team safety climate, employers may manipulate team safety climate in targeted ways by composing teams with specific configurations of individual conscientiousness.

Second, we contribute to the literature by studying the top-down influence of team conscientiousness on individual safety performance and its underlying mechanism (Kozlowski & Klein, 2000; LePine et al., 2011; Prewett et al., 2018). As organizations are hierarchically nested systems in nature, the study of team personality composition involves constructs at different levels, such as the individual level (Kozlowski & Klein, 2000). Consequently, a more complete understanding of team personality composition requires the investigation of cross-level relationships that involve the interplay (i.e., bottom-up or top-down influences) between higher-level constructs and lower-level constructs (Kozlowski & Klein, 2000; Prewett et al., 2018). For instance, personality can combine and emerge as a collective construct at the group level, whereas individuals embedded in teams can be influenced by the team context (Kozlowski & Klein, 2000). Therefore, the effects of team personality composition as a higher-level construct manifest not only at the team level (e.g., Bell, 2007; Beus, Munoz, & Arthur, 2015) but also at the individual level (e.g., Gonzalez-Mulé et al., 2014; Prewett et al., 2018). By focusing on the single level of analysis, we might provide an incomplete picture of team personality composition, resulting in "incomplete or misspecified models" (Kozlowski & Klein, 2000, p. 14). Further, without clarifying the effects of team personality composition on individual performance, the utility of using personality in team member selection and staffing could be compromised (Ployhart & Schneider, 2005; Prewett et al., 2018). However, previous research has predominantly adopted a single-level approach to examine the effects of team personality composition on team outcomes (e.g., Bell, 2007; Beus, Munoz, & Arthur, 2015). Not surprisingly, there have been calls for the examination of the cross-level effects of team personality composition (e.g., LePine et al., 2011; Prewett et al., 2018).

In this study, we examine *how* and *why* team conscientiousness would influence individual safety performance. We believe that examining the cross-level effects that team conscientiousness has on individual safety behavior will substantially contribute to our theoretical understanding of the implications of team personality composition across different levels of analyses, and that considering the mediating mechanisms of these cross-level influences is significant to the extent that it provides insights into the "black box" operating between team personality composition and individual behavior (Kozlowski & Klein, 2000; LePine et al., 2011).

Finally, although job performance is one of the most studied criteria in organizational research (Viswesvaran, Schmidt, & Ones, 2005), comparatively less research has examined job performance pertaining to occupational safety (i.e., safety

[1] We thank the editor and the anonymous reviewers for their suggestion of considering different operationalizations of team conscientiousness and several alternative models.

performance; cf. Griffin & Neal, 2000). Considering the non-trivial individual (e.g., death, lost income) and organizational consequences (e.g., health insurance cost, damage to property) associated with safety violations, it is critical to develop a more complete understanding of the factors that contribute to safety performance. Considering that teams are the building blocks of an organization (Mathieu et al., 2014), it is of practical importance to examine individual safety behavior in team contexts. However, research has remained silent on the contextual influence of team personality composition on individual safety behavior. Thus, we make the first attempt to investigate the impact of team personality composition on individual safety performance, and therefore bridge the literatures on team personality composition and workplace safety.

Our study opens a new avenue toward the investigation of personality in the safety literature. Personality traits have been widely and commonly examined in the safety literature. For instance, several meta-analyses have been conducted on the effects of personality traits on safety-related outcomes (e.g., Beus, Dhanani, & McCord, 2015; Christian et al., 2009; Clarke & Robertson, 2005, 2008). However, previous research has predominantly focused on the single-level effects of personality traits on safety-related outcomes, such as safety behavior, accidents and injuries (Beus, Dhanani, & McCord, 2015; Christian et al., 2009; Clarke & Robertson, 2005, 2008). Our study is the first study that moves beyond this traditional approach to the implications of personality traits in the safety literature. Most importantly, our multilevel approach to the implications of personality provides important implications and promising directions for safety researchers and practitioners. One the one hand, safety researchers can continue along this new line of research by examining the effects of team personality (beyond conscientiousness, such as other Big Five and locus of control) on safety-related outcomes (beyond safety performance, such as injuries and accidents). On the other hand, practitioners can take a more accurate approach to address safety issues at the workplace via a multilevel perspective to select and staff individual employees. Previously, in the safety literature, practitioners and employers commonly adopt a single-level approach to selection and staffing, for example, via screening out "accident-prone employees in the hiring process" at the individual level (Beus, Dhanani, & McCord, 2015, p. 481; Kaplan & Tetrick, 2011). However, this practice completely ignores the impact each individual will have in terms of altering group personality composition and affecting group processes, such as safety climate, and eventually individual and team safety outcomes. Our multilevel approach draws scholars' attention to the limitation of the single-level approach to the implication of personality in the safety literature. We believe that the multilevel approach allows for a broader picture of the complexity of personality in relation to safety, and reveals fruitful directions and more effective interventions for safety researchers and practitioners. Specifically, a multilevel perspective to personality can enrich the safety research both theoretically and practically by including personality variables at different levels and examining much more interesting research questions (e.g., bottom-up and top-down influences between higher level constructs and lower level constructs), with far more robust tests that take into account the multilevel nature of the organizations (e.g., Hackman, 2003; LePine et al., 2011).

Literature Review and Hypothesis Development

Team Conscientiousness and Team Safety Climate

Scholars have long theorized that climate can be influenced by one's own personality and the personality of others in the social context through various mechanisms (Kozlowski & Klein, 2000; Schneider, 1987; Schneider & Reichers, 1983), such as sense-making processes (Louis, 1980; Schneider & Reichers, 1983), social influence (Kozlowski & Bell, 2013), concertive control (Barker, 1993), and observational learning or modeling (Bandura, 2001). In team contexts, teams can develop team personality composition (Hofmann & Jones, 2005; Stewart, 2003) that shapes team climate through various mechanisms (e.g., Beus, Dhanani, & McCord, 2015; Mathisen, Martinsen, & Einarsen, 2008; Prewett et al., 2018).

Team personality composition refers to the configuration or combination of *individual* personality within a team so that different team members contribute to the team with their unique personalities (Kozlowski & Klein, 2000; Levine & Moreland, 1990; Moreland & Levine, 1992). Although individual personality is, by definition, at the individual level (i.e., self-referent), team personality composition captures the array, pattern, or variability of individual personality within a team (Bell, 2007; Moreland & Levine, 1992; Kozlowski & Klein, 2000). Because team personality composition, as a configural property, emerges from individuals but does not coalesce as shared properties (e.g., team safety climate) do, the operationalizations of team personality composition "need not evaluate consensus, similarity, or agreement among individual members" (Kozlowski & Klein, 2000, p. 34).

Using a cross-sectional, single-source design, Beus, Dhanani, and McCord (2015) found that team emotional stability and team internal locus of control (i.e., mean and minimum) were significantly related to team safety climate and individual emotional stability and internal locus of control were significantly related to individual safety climate. However, Beus, Dhanani, and McCord (2015) did not hypothesize or examine any relationships between individual-level constructs and team-level constructs. Thus, Beus, Dhanani, and McCord (2015) took a single-level approach to examine the single-level

effect of personality on safety climate. Extending Beus, Dhanani, and McCord's (2015) study, we not only examine the effect of team personality composition on team safety climate but also explore the cross-level influence of team personality composition on individual safety performance. Our study helps to elucidate the extent to which team members constitute a contextual characteristic (i.e., team conscientiousness) that can hinder or promote individual safety performance and therefore goes beyond traditional models of team personality composition (e.g., Barrick et al., 1998; Bell, 2007; Beus, Dhanani, & McCord, 2015) by taking into account the extent to which individual safety performance depends on both individual differences between people (i.e., individual conscientiousness), and differences between teams (i.e., team conscientiousness).

Team Conscientiousness We examine conscientiousness rather than other personality traits for several reasons. First, research suggests that conscientiousness is the only personality that consistently predicts individual performance across settings and occupations (e.g., Barrick & Mount, 1991; Stewart, 1999), and a stronger personality predictor of individual performance compared with other personality (e.g., Barrick & Mount, 1991). In contrast, other personality, such as emotional stability and locus of control are demonstrated to predict individual performance only for certain jobs. Indeed, Barrick et al. (1998) concluded that only "two dispositional predictors in our field whose validity generalizes: general mental ability and conscientiousness" (p. 856). Further, empirical research supports that team conscientiousness predicts team processes and team outcomes (Barrick et al., 1998; Bell, 2007) and that the validity of conscientiousness in predicting safety behavior and safety-related outcomes is well supported by multiple meta-analyses (e.g., Beus, Dhanani, & McCord, 2015; Christian et al., 2009; Clarke & Robertson, 2005). Therefore, conscientiousness is a theoretically and empirically relevant predictor of safety in team contexts. Second, conscientiousness is more commonly included as a criterion in personnel selection compared with other personality (Schmidt & Hunter, 1998, 2004). Thus, considering the prevalence of using conscientiousness in personnel selection, examining the implications of conscientiousness across different levels of analyses could provide a broader impact on personnel selection practices than investigating other personality traits that are less frequently included as criteria in personnel selection. Finally, in exploring the effect of conscientiousness on safety climate, we also respond to Beus, Dhanani, and McCord's (2015) call for studies to identify additional personality traits beyond emotional stability and internal locus of control as antecedents of safety climate.[2]

Conscientious people are characterized as being cautious, careful, dependable, hardworking, achievement oriented, rule following, and risk avoiding (McCrae & Costa Jr., 1999). Conscientiousness includes at least two facets: achievement and dependability (Costa Jr & McCrae, 1992; Costa Jr, McCrae, & Dye, 1991). The achievement facet reflects one's feelings of competence and need for achievement (Costa Jr et al., 1991). Thus, individuals with high achievement orientation strive for high personal goals (Costa Jr et al., 1991). Research suggests that because working unsafely can cause severe consequences (e.g., injuries and losing the job), unsafe behaviors are generally not aligned with the achievement goal of conscientious individuals (Beus, Dhanani, & McCord, 2015). The dependability facet captures several different aspects of conscientiousness, including dutifulness, orderliness, and deliberation, which have been demonstrated to be associated with an adherence to established ways of doing things, forward planning, and thoroughness in decision-making, as well as an avoidance of unsafe and risky behaviors (Costa Jr et al., 1991; West, Elander, & French, 1993). Thus, it is expected that the global conscientiousness and its facets are related to individual safety behavior. Indeed, research suggests that the global conscientiousness and its facets are important predictors of safety motivation, safety performance, and accidents (e.g., Beus, Dhanani, & McCord, 2015; Christian et al., 2009; Clarke & Robertson, 2005; Postlethwaite, Robbins, Rickerson, & McKinniss, 2009).

Conscientiousness can be conceptualized as a team-level construct—team conscientiousness. There are multiple ways of operationalizing team conscientiousness, including the mean, variance (or standard deviation), maximum, and minimum scores of individual conscientiousness within a team (for a quantitative review, see Bell, 2007).

Team Mean Conscientiousness Team mean conscientiousness based on the additive model (Chan, 1998) is the most common operationalization of team conscientiousness (e.g., Barrick et al., 1998; Bell, 2007). The additive model assumes that the trait is additive such that more of a trait is always better or worse for a team (Chan, 1998; Kozlowski & Klein, 2000). Thus, the amount of conscientiousness possessed by each team member increases the collective pool of conscientiousness, regardless of the variance (or agreement) among team

[2] We also measured internal and external locus of control. The results indicated that team minimum internal locus of control ($\gamma = -0.03$, SE = 0.01, $p = 0.007$), team variance internal locus of control ($\gamma = 0.33$, SE = 0.12, $p = 0.006$), and team minimum external locus of control ($\gamma = -0.012$, SE = 0.006, $p = 0.046$) were significantly related to team safety climate. Other operationalizations of team internal and external locus of control were not significantly related to team safety climate. Further, when controlling the effects of team internal and external locus of control, our results regarding different operationalizations of team conscientiousness did not change.

members (Chan, 1998; Kozlowski & Klein, 2000). Conceptually, team mean conscientiousness pertains to the extent to which a team is predominantly composed of conscientious members, and captures the extent to which team members as a group are thorough, achievement oriented, rule following, risk avoiding, and engaged in task-focused roles (Bell, 2007; Stewart, Fulmer, & Barrick, 2005). Thus, team mean conscientiousness is expected to have positive effects on desired team outcomes (e.g., team performance) as individual conscientiousness does on individual outcomes (e.g., Barrick et al., 1998; Bell, 2007). Considering the linkage between conscientiousness and safety at the individual level (e.g., Beus, Dhanani, & McCord, 2015; Christian et al., 2009; Clarke & Robertson, 2005), it is expected that conscientious teams have a collective tendency to comply with safety regulations and rules, as well as avoid unsafe and risky behaviors. On a daily basis, in a conscientious team, employees interact frequently and work closely with their conscientious team members to accomplish common goals, and subsequently develop a perception of the importance of safety, which originates from conscientious members' safety behaviors (Chao, Kozlowski, Major, & Gardner, 1994). During such social interaction processes, individuals "attach meaning to, or make sense of clusters of psychologically related events" (Schneider & Reichers, 1983, p. 21) and make sense of others' safe and unsafe behaviors. Over time, these interactions and "sense-making" processes help team members learn the so-called way we do things around here (Fisher, 1986; Schneider & Reichers, 1983), and consequently, team members will be pressured to follow safety regulations and rules, due to social influence (Kozlowski & Bell, 2013), concertive control (Barker, 1993), and observational learning or modeling (Bandura, 2001). Therefore, it is expected that safety behaviors and risk avoidance exhibited by the majority conscientious members in the team (i.e., high team mean conscientiousness) will create a climate that signals safety behaviors are supported, expected, and rewarded in the team.

> ***Hypothesis 1:*** Team mean conscientiousness score will be positively related to the level of team safety climate.

Team Minimum and Maximum Conscientiousness Team conscientiousness can be also operationalized as the minimum or maximum individual conscientiousness score within a team, when one single team member can significantly affect the group (Barrick et al., 1998; Kenrick & Funder, 1988). We argue that team minimum conscientiousness is particularly relevant to safety in the team context, as one "bad apple" could threaten the safety of the public and damage the positive safety climate within a team (Felps, Mitchell, & Byington, 2006). Research suggests that individuals with low conscientiousness tend to be careless, lacking of self-control and respect for social order and rules (e.g., Hansen, 1989; Shaw & Sichel, 1971; West et al., 1993). Further, empirical studies have demonstrated that unconscientious employees tend to have low levels of safety motivation (Christian et al., 2009) and break or ignore safety rules and regulations, resulting in low safety performance and increased workplace accidents (Beus, Dhanani, & McCord, 2015; Christian et al., 2009; Clarke & Robertson, 2005). Very often, the negative consequences of one single employee's unsafe behaviors and the resulting accidents are not limited to the focal person (Kohn, Corrigan, & Donaldson, 1999). That is, workplace accidents due to the error of one member could affect the safety, health and well-being of others in the workplace (Kohn et al., 1999). Individuals will make sense of the resulting accidents and subsequently interpret that the work environment is unsafe. Thus, team members' safety climate perceptions could be significantly influenced by one single team member's unsafe work behavior and the resulting accidents.

However, a team member who has particularly high conscientiousness may not have a meaningful impact on team members' perceptions of safety in the team. In team contexts, safety (both personal safety and public safety) cannot be achieved by the safe behaviors of one single member with extremely high conscientiousness. This is because even this team member strictly follows safety procedures, the unsafe behaviors of other unconscientious members can significantly impede the achievement of the safety goal. For instance, one single unconscientious member's non-compliance with a procedure can result in hydrocarbon leaks, which significantly threaten the public safety. Therefore, each member must have a minimum level of conscientiousness to achieve the common safety goal, whereas the team member with a maximum level of conscientiousness cannot maintain safety in the work environment by his or her own safe behaviors. Indeed, empirical research has supported that each team member must have a minimum level of conscientiousness in order to achieve collective goals for the team (e.g., team performance), whereas team maximum conscientiousness has no significant relationship with the achievement of these collective goals (Barrick et al., 1998; Bell, 2007). Hence, we expect that team minimum conscientiousness, but not team maximum conscientiousness will be positively related to team safety climate.

> ***Hypothesis 2:*** Team minimum conscientiousness score will be positively related to the level of team safety climate.

Team Variance Conscientiousness Team conscientiousness can be also operationalized as the variance of individual conscientiousness scores within a team based on the dispersion model (Barrick et al., 1998; Bell, 2007). The dispersion model is appropriate when examining the effects of team

composition homogeneity or diversity (Chan, 1998). Because supplementary fit occurs when an individual "supplements, embellishes, or possesses characteristics which are similar to other individuals" (Muchinsky & Monahan, 1987, p. 269), minimizing conscientiousness variance within teams should promote supplementary fit (Kristof-Brown, Barrick, & Stevens, 2005). Humphrey, Hollenbeck, Meyer, and Ilgen (2011) explicitly argued that "minimizing conscientiousness variance creates a team in which all members have essentially the same perspective on how to accomplish work, how much effort to put in, and what they hope to achieve" (p. 1709). A team with low conscientiousness variance is composed of team members with similar achievement goals, values, and behavioral tendency, as low conscientiousness variance reflects the similarity in purposeful, achievement-oriented, organized, and self-disciplined behaviors (Humphrey, Hollenbeck, Meyer, & Ilgen, 2007; Humphrey et al., 2011). In contrast, a team with high conscientiousness variance is composed of high- and low-conscientiousness members who have different achievement goals, values, and behavioral tendencies (Humphrey et al., 2007; Humphrey et al., 2011). Consistently, research suggests that low team conscientiousness variance facilitates coordination among team members, improves interpersonal relationships and team effectiveness (Antonioni & Park, 2001; Barrick et al., 1998; Gevers & Peeters, 2009; Humphrey et al., 2007). In contrast, high team conscientiousness variance could create interpersonal conflict and coordination-related problems (Antonioni & Park, 2001; Gevers & Peeters, 2009), which have been demonstrated to be associated with workplace accidents (Friswell & Williamson, 2010). Thus, high team conscientiousness variance might create an unsafe work environment. Further, conscientious members may resent unconscientious members because unconscientious members tend to ignore or break safety rules, cause workplace accidents (Beus, Dhanani, & McCord, 2015; Christian et al., 2009; Clarke & Robertson, 2005), and consequently put other members' safety at risk. Team members will make sense of these unsafe behaviors and the resulting accidents, and subsequently form their perceptions that safety is not supported in the team.

> ***Hypothesis 3:*** Team variance conscientiousness score will be negatively related to the level of team safety climate.

Team Conscientiousness, Safety Climate, and Individual Safety Performance

Griffin and Neal (2000) proposed that safety performance consists of "task" and "contextual" components: safety compliance and safety participation. Safety compliance is defined as the "core safety activities that need to be carried out by individuals to maintain workplace safety" (Griffin & Neal, 2000, p. 349), such as wearing personal protective equipment. In contrast, safety participation refers to employees' voluntary safety activities which contribute to workplace safety, such as helping coworkers in safety-related issues (Griffin & Neal, 2000). Safety compliance helps maintain workplace safety, while safety participation contributes to the formation of a work environment in which safety is well supported (Griffin & Neal, 2000). Empirical studies including meta-analytic studies have demonstrated that safety compliance and safety participation have differential relationships with the antecedents (e.g., safety climate and leadership) and outcomes (e.g., injuries and accidents), supporting the distinction between safety participation and safety compliance (Christian et al., 2009; Neal & Griffin, 2006).

As a high level of team safety climate reflects that safety practices are highly supported, rewarded, and expected in the team, it is expected that team safety climate is positively related to individual safety compliance and participation. Safety climate provides a frame of reference for employees' safety behaviors (Zohar, 2000). In other words, safety climate provides informational cues to team members regarding the extent to which safety practices and behaviors are supported, rewarded, and expected in the work group and subsequently regulates team members' safety behaviors (Zohar, 2000). Indeed, empirical studies have documented the positive effect of safety climate on individual safety performance (Christian et al., 2009; Neal & Griffin, 2006). As discussed earlier, team safety climate is defined and shaped by the configuration of individual conscientiousness within a team (i.e., team conscientiousness). Taken together, we expect that as a type of team input, team conscientiousness (i.e., mean, minimum, and variance) affects team safety climate, which in turn influences individual safety compliance and safety participation.

> ***Hypothesis 4:*** Team mean conscientiousness score will positively relate to individual (a) safety compliance and (b) safety participation through team safety climate.
> ***Hypothesis 5:*** Team minimum conscientiousness score will positively relate to individual (a) safety compliance and (b) safety participation through team safety climate.
> ***Hypothesis 6:*** Team variance conscientiousness score will negatively relate to individual (a) safety compliance and (b) safety participation through team safety climate.

Method

Participants and Procedure

Healthcare employees (e.g., nurses, doctors, and administrators) and their supervisors were recruited from two branches

(i.e., one in Guizhou Province and the other in Xuzhou Province) of one hospital in China to participate in a safety study. Employees completed three online surveys with an approximately 1-month interval in between each administration. In the three surveys, 528, 506, and 485 employees provided usable responses, resulting in 96, 91, and 88% response rates. Teams with less than 2 respondents were excluded, resulting in a final sample of 451 employees and 70 supervisors nested within 70 teams. The respondents were mostly (74.3%) female with an average age of 33.69 (SD = 7.75). On average, participants had worked in the hospital for 9.35 years (SD = 8.22).

At time 1, employees reported their demographics and background information, and completed the conscientiousness measure. At time 2, employees completed the safety climate measure. At time 3, employees completed safety performance measures, and were asked to send their supervisors a link to fill out a brief employee assessment. For each employee, supervisors provided ratings of employee safety compliance and safety participation. Thus, we obtained both self-ratings and supervisor ratings of safety performance at time 3. All surveys were administered online and linked over time and with supervisor ratings using employee identification numbers.

Measures

The survey items were originally written in English and then translated into Chinese using the back-translation procedure (Brislin, 1970). All items were responded to on a 5-point agreement scale (1 = *strongly disagree*, 5 = *strongly agree*).

Team Conscientiousness Employee conscientiousness was assessed by the four-item conscientiousness measure from Donnellan, Oswald, Baird, and Lucas's (2006) Mini-IPIP Scale. A sample item was "I make a mess of things" (reverse coded). We operationalized team conscientiousness as the mean, the minimum, the maximum, and the variance scores of team members' conscientiousness within each team. Because we examined the configurations of individual conscientiousness within a team, within-team agreement for conscientiousness was neither expected nor tested (Kozlowski & Klein, 2000; Levine & Moreland, 1990; Moreland & Levine, 1992).

Safety Climate This construct was measured using Beus, Munoz, Arthur, and Payne's (2013) eight-item safety climate scale. A sample item was "My co-workers are committed to safety improvement."

Safety Performance Supervisors assessed employee safety performance using Griffin and Neal's (2000) eight-item measure. Four items assessed safety compliance. A sample item was "This employee uses all the necessary safety equipment to do the job." The other four items assessed safety participation. A sample item was "This employee promotes the safety program within the organization." Our measurement of safety performance from the employee perspective used the same items by changing "This employee" into "I."

Control Variables We controlled for the effects of mean organizational tenure of team members within each team, team size, individual conscientiousness, sex, age, and organizational tenure, as previous studies have suggested that these variables are related to safety climate and/or individual safety performance (e.g., Beus, Dhanani, & McCord, 2015).

Data Analysis

Within-group agreement (mean $r_{wg(j)} = 0.54$) based on a uniform null distribution (James, Demaree, & Wolf, 1984), and the intraclass correlation (ICC1 = 0.07, F (61, 389) = 1.60, $p = 0.005$) justified the aggregation of individual safety climate scores to team-level scores. Because individual responses are nested within 70 groups from two branches of one hospital, the data violate the assumption of independence. We used multilevel path analyses with the Type = COMPLEX TWOLEVEL routine of Mplus 7.4 (Muthén & Muthén, 1998–2012) to deal with the data dependency caused by the nested sampling (i.e., individuals are nested within teams/supervisors and branches) to test all hypotheses (Bryk & Raudenbush, 1992). Indirect effects of team conscientiousness on safety performance were examined with the MODEL INDIRECT command of Mplus 7.4.

We evaluated the models based on the Comparative Fit Index (CFI; Bentler, 1990), Root Mean Square Error of Approximation (RMSEA; Steiger & Lind, 1980), the standardized root mean square residual for the within-level (i.e., individual-level) model (SRMR-Within; Hu & Bentler, 1999), and the standardized root mean square residual for the between-level (i.e., team-level) model (SRMR-Between; Hsu, Kwok, Lin, & Acosta, 2015). Ideally, the model with an adequate fit should be with CFI greater than 0.90, RMSEA less than 0.06, SRMR-Within less than 0.08 (Hu & Bentler, 1999), and SRMR-Between less than 0.14 (Hsu et al., 2015).

Results

Descriptive statistics and correlations are presented in Table 1. We ran the models with supervisor ratings of safety performance as the outcomes and the models with employee self-ratings of safety performance as the outcomes for each

Table 1 Descriptive statistics and correlations among the study constructs

	1	2	3	4	5	6	7	8
Individual-level variables								
1. Age								
2. Sex	−0.12*							
3. Organizational tenure	0.83**	0.03						
4. Conscientiousness	0.01	0.12**	0.04	(0.66)				
5. Safety compliance[E]	0.01	0.10**	0.07	0.31**	(0.93)			
6. Safety participation[E]	−0.04	0.09	0.00	0.27**	0.76**	(0.96)		
7. Safety compliance[S]	0.08	0.05	0.04	0.00	0.08	0.12**	(0.93)	
8. Safety participation[S]	0.05	0.04	0.02	0.03	0.08	0.13**	0.89**	(0.96)
Mean	33.69	1.74	9.35	3.89	4.27	4.23	4.28	4.21
SD	7.75	0.44	8.22	0.62	0.74	0.71	0.65	0.74
Team-level variables								
1. Team size								
2. Team mean tenure	−0.28**							
3. Mean[a]	0.00	−0.06						
4. Minimum[b]	−0.34**	0.21**	0.66**					
5. Maximum[c]	0.45**	−0.33**	0.56**	−0.01				
6. Variance[d]	0.07	−0.22**	−0.05	−0.58**	0.54**			
7. Safety climate	−0.10*	0.04	0.35**	0.23**	0.03	−0.13**	(0.96)	
Mean	9.17	9.35	3.89	3.08	4.75	0.60	4.09	
SD	4.01	4.11	0.22	.31	0.31	0.16	0.32	

Note. N = 451 employees and 70 supervisors nested within 70 teams from 2 branches of one hospital. Cronbach's alpha is on the diagonal. Sex: male (1) and female (2)

T1, time 1; *T2*, time 2; *T3*, time 3; *S*, supervisor ratings; *E*, employee self-ratings

* $p < .05$. ** $p < .01$

[a] Team mean conscientiousness score

[b] Team minimum conscientiousness score

[c] Team maximum conscientiousness score

[d] Team variance conscientiousness score

operationalization of team conscientiousness, respectively.[3] As the results with control variables were the same to the results without control variables, we reported the results without control variables (Becker, 2005). The results of multilevel path analyses indicated that team conscientiousness regardless of its operationalizations did not directly influence individual safety compliance or safety participation (Figs. 1 and 2). However, these models were saturated models (Table 2), and thus had perfect or close to perfect model fit and were of little value (cf. Bentler, 1990). As such, we ran more parsimonious models without the direct paths from team conscientiousness to safety performance. These new models fit the data very well and were supported by the chi-squared difference tests (Table 2). Thus, we retained the parsimonious models as our final models.

The results (Fig. 1) indicated that team mean conscientiousness ($\gamma = 0.46$, $p < 0.001$) and team minimum conscientiousness ($\gamma = 0.23$, $p < 0.001$) were positively related to team safety climate, whereas team variance conscientiousness ($\gamma = -0.46$, $p < 0.001$) was negatively related to team safety climate. Team maximum conscientiousness was not significantly related to team safety climate ($\gamma = 0.02$, $p > 0.05$). Thus, Hypotheses 1, 2, and 3 were supported. Further, the results showed that team safety climate was positively related to supervisor ratings of safety compliance ($\gamma = 0.17$, $p < 0.001$) and safety participation ($\gamma = 0.23$, $p < .01$). Finally, there were

[3] We tested several alternative models that were suggested during the review process. First, we ran models with team mean/variance conscientiousness excluding the focal individual's conscientiousness score. Specifically, team mean conscientiousness excluding the focal individual's conscientiousness score was significantly related to team safety climate (γ = 0.39, SE = 0.11, p < 0.001), which significantly influenced both safety compliance (self-ratings: γ = 0.39, SE = 0.14, p < 0.01; supervisor-ratings: γ = 0.40, SE = 0.17, p < 0.05) and safety participation (self-ratings: γ = 0.60, SE = 0.14, p < 0.001; supervisor-ratings: γ = 0.45, SE = 0.20, p < .05). However, although team variance conscientiousness excluding the focal individual's conscientiousness score was still negatively related to team safety climate (γ = − 0.26, SE = 0.17, p = 0.12), this linkage was no longer significant. Prewett et al. (2018) suggested that the variance operationalization of team personality excluding the focal individual's personality score lacks construct validity. Further, the variance scores of team conscientiousness for the teams with only two individuals will completely lose its conceptual meaning of heterogeneity (variance or diversity) by excluding the focal individual's score, as these teams will become "one-person" teams. Second, the results were identical between the models with individual conscientiousness and the models without individual conscientiousness. Third, we tested whether team conscientiousness moderated the relationship between individual conscientiousness and safety performance. However, the results did not support the moderation role of team conscientiousness. Fourth, we examined whether safety climate strength moderated the relationship between safety climate and individual safety performance, however, the results did not support the moderation role of safety climate strength. Finally, team conscientiousness regardless of its operationalizations was not significantly related to the strength of team safety climate.

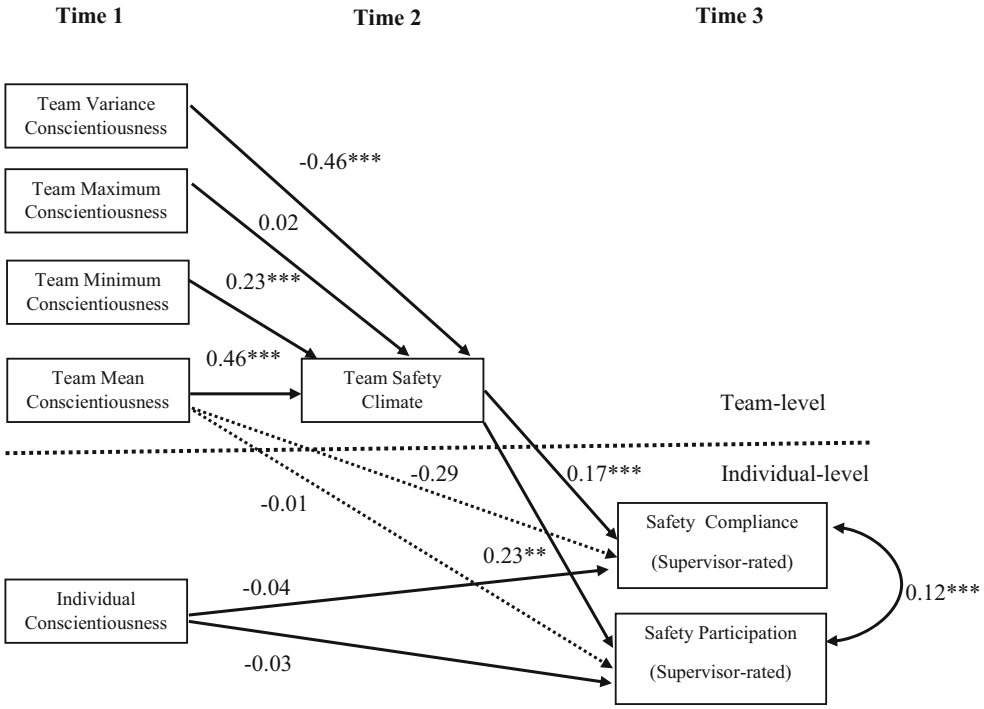

Fig. 1 The results of multilevel path analysis for the hypothesized cross-level mediation model with supervisor-rated safety performance as outcomes. Note. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

significant indirect effects of team mean, minimum, and variance conscientiousness on supervisor ratings of safety performance through team safety climate, and the 95% confidence intervals did not include zero (Table 3). Therefore, Hypotheses 4, 5, and 6 were supported.

The results for the models with employee self-ratings of safety performance as outcomes were quite similar to the results of the models with supervisor ratings of safety performance as outcomes for *all hypothesized relationships* (Figs. 1 and 2). Although we did not hypothesize the relationship

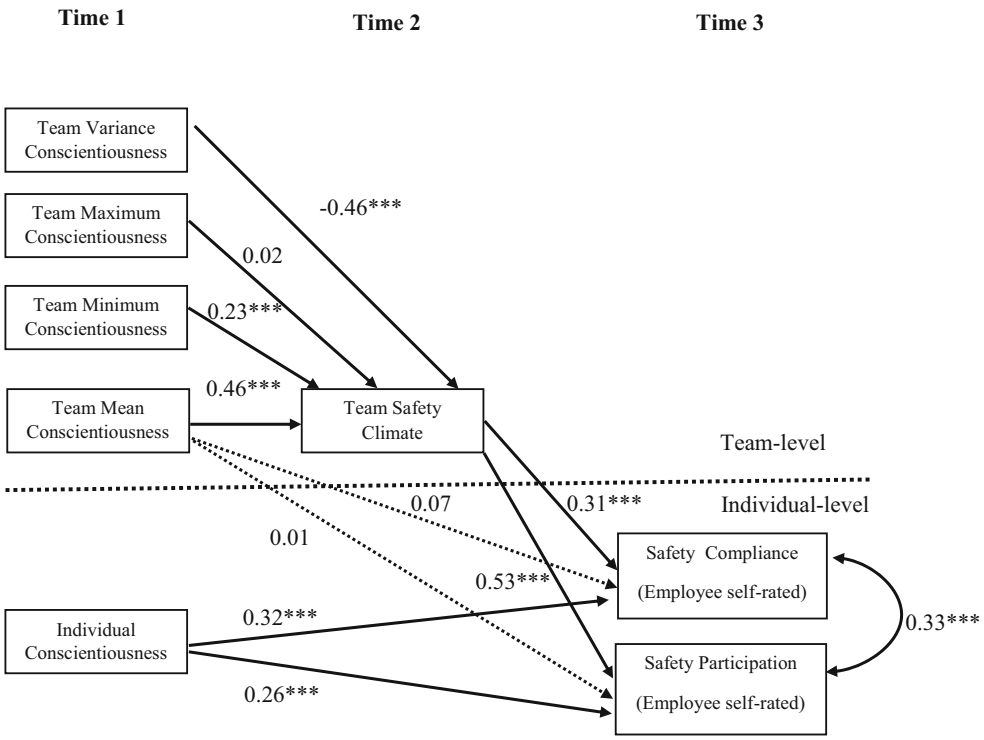

Fig. 2 The results of multilevel path analysis for the hypothesized cross-level mediation model with employee self-reports of safety performance as outcomes. Note. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table 2 Fit indices for the full mediation models and the partial mediation models

	χ^2 (*df*)	RMSEA	CFI	SR-W	SR-B	χ^2 difference
Supervisor ratings of safety performance						
Mean[a]						
Full	χ^2 (2) = 2.89	0.03	1.00	0.01	0.03	χ^2 (2) = 2.89
Partial	χ^2 (0) = 0.00	0.00	1.00	0.00	0.00	
Minimum[b]						
Full	χ^2 (2) = 7.12	0.08	0.99	0.01	0.09	χ^2 (2) = 7.12
Partial	χ^2 (0) = 0.00	0.00	1.00	0.00	0.00	
Maximum[c]						
Full	χ^2 (2) = 1.11	0.00	1.00	0.002	0.05	χ^2 (2) = 1.11
Partial	χ^2 (0) = 0.00	0.00	1.00	0.00	0.00	
Variance[d]						
Full	χ^2 (2) = 0.61	0.00	1.00	0.00	0.07	χ^2 (2) = 0.61
Partial	χ^2 (0) = 0.00	0.00	1.00	0.00	0.00	
Self-ratings of safety performance						
Mean[a]						
Full	χ^2 (2) = 0.52	0.00	1.00	0.01	0.03	χ^2 (2) = 0.11
Partial	χ^2 (0) = 0.41	0.00	1.00	0.01	0.01	
Minimum[b]						
Full	χ^2 (2) = 11.13	0.10	0.98	0.01	0.05	χ^2 (2) = 10.80
Partial	χ^2 (0) = 0.33	0.00	1.00	0.01	0.01	
Maximum[c]						
Full	χ^2 (2) = 0.61	0.00	1.00	0.01	0.01	χ^2 (2) = 0.18
Partial	χ^2 (0) = 0.43	0.00	1.00	0.01	0.01	
Variance[d]						
Full	χ^2 (2) = 12.29	0.11	0.98	0.01	0.06	χ^2 (2) = 12.05
Partial	χ^2 (0) = 0.24	0.00	1.00	0.01	0.002	

Note. SR-W, SRMR-With; *SR-B*, SRMR-Between

[a] Team mean conscientiousness score

[b] Team minimum conscientiousness score

[c] Team maximum conscientiousness score

[d] Team variance conscientiousness score

Table 3 Indirect effects of team conscientiousness on safety performance

	Safety compliance		Safety participation	
	Estimate	95% CI	Estimate	95% CI
Supervisor ratings of safety performance				
Mean[a]	0.08***	0.07:0.08	0.09*	0.02:0.18
Minimum[b]	0.04***	0.037:0.044	0.05*	0.01:0.09
Variance[c]	− 0.07***	− 0.11:− 0.03	− 0.09***	− 0.12:− 0.06
Self-ratings of safety performance				
Mean[a]	0.15***	0.145:0.151	0.25***	0.20:0.30
Minimum[b]	0.08***	0.07:0.09	0.13***	0.11:0.15
Variance[c]	− 0.14***	− 0.21:-0.07	− 0.23***	− 0.30:− 0.16

Note. CI, confidence interval

*$p < 0.05$; ***$p < 0.001$

[a] Team mean conscientiousness score

[b] Team minimum conscientiousness score

[c] Team variance conscientiousness score

between individual conscientiousness and safety performance, we reported the results for informational purposes. Specifically, the results indicated that employee self-reports of conscientiousness were significantly related to employee self-reports of safety compliance ($\gamma = 0.32$, $p < 0.001$) and safety participation ($\gamma = 0.26$, $p < 0.001$), whereas employee self-reports of conscientiousness were not significantly related to supervisor ratings of safety compliance ($\gamma = -0.04$, $p > 0.05$) and safety participation ($\gamma = -0.03$, $p > 0.05$).

Discussion

Team personality composition is expected to exert top-down influences on individual attitudes and behaviors (Kozlowski & Klein, 2000; LePine et al., 2011; Prewett et al., 2018). For instance, LePine et al. (2011) argued that team personality composition, as a team input or an immediate social context, could exert cross-level influences on individual attitudes and behaviors.

Correspondingly, there have been calls for studies to examine the cross-level influence of team personality composition on individual outcomes (e.g., LePine et al., 2011; Prewett et al., 2018). To answer these calls, we explored the extent to which team conscientiousness could influence individual safety performance and its underlying mechanism (i.e., team safety climate) with a sample of 451 healthcare employees and 70 supervisors nested within 70 teams from 2 branches of one hospital.

Theoretical Implications

Our findings have several theoretical implications. First, as an extension to Beus, Dhanani, and McCord (2015), we found that team conscientiousness (i.e., mean, minimum, and variance but not maximum) significantly predicted team safety climate. Specifically, we demonstrated that teams with higher collective conscientiousness had more positive team safety climate such that more conscientiousness was always better for promoting team safety climate; a team member with particularly low conscientiousness had a negative impact on team safety climate; and the heterogeneity of individual conscientiousness within a team was negatively related to team safety climate. To the best of our knowledge, our study was the first to examine the effect of team conscientiousness on team safety climate, providing further evidence that personality is one influential factor in climate formation (Schneider & Reichers, 1983; Schneider, Ehrhart, & Macey, 2011). We also call researchers' attention to the role of team personality composition in shaping team climate beyond safety climate. For instance, as extraverts are sociable, energetic, gregarious, and optimistic (Costa Jr & McCrae, 1992), extraversion might be a theoretically relevant antecedent of service climate. We encourage further theoretical and empirical exploration of the relationship between team personality composition (beyond conscientiousness) and team climate (beyond safety climate) which will significantly improve our understanding of climate formation in team contexts.

Second, we contributed to the literature by examining the top-down influence of team conscientiousness on individual safety performance and its underlying mechanism (Kozlowski & Klein, 2000; LePine et al., 2011). As an employee is embedded in the team—one's immediate social context, his or her attitudes and behaviors are likely to be influenced by the team context created by other team members. Ignoring the cross-level interplay between the individual and the team may lead to misleading conclusions (Kozlowski & Klein, 2000). Further, Hackman (2003) argued that a more robust test of the effects of personality in team contexts can be achieved when examining the effects at both individual and team levels. Thus, a multilevel approach to examining the effects of team personality composition is needed. However, previous studies have largely focused on the effects of team personality composition on team outcomes by adopting a single-level approach and thus ignored the cross-level effects that occur from team personality composition to individual outcomes (e.g., Barrick et al., 1998; Bell, 2007; Beus, Dhanani, & McCord, 2015). For instance, Beus, Dhanani, & McCord, 2015 adopted a single-level approach to the implications of team emotional stability and team internal locus of control on team safety climate. Moving beyond traditional models of team personality composition, our study was the first study that took a cross-level approach to examine the top-down influence of team conscientiousness on individual safety performance and its underlying mechanism. Our findings confirm that in addition to an individual's conscientiousness (i.e., an individual difference between people), team conscientiousness (i.e., a difference between teams) could create a context that can hinder or promote individual safety behavior through team safety climate. Besides providing a more robust test of the effects of personality, a cross-level perspective can enrich team composition research both theoretically and practically by including variables at different levels and testing more interesting research questions and theoretical propositions advanced by scholars (e.g., LePine et al., 2011; Prewett et al., 2018). Therefore, we recommend scholars take a multilevel approach to team composition, which will provide a richer and deeper understanding of the complexity of team composition across different levels of analyses (Kozlowski & Klein, 2000; LePine et al., 2011; Prewett et al., 2018).

Third, we extended previous research by investigating the implications of team conscientiousness in the safety domain. The effects of team personality composition on job performance have been well documented (e.g., Bell, 2007). However, comparatively fewer studies have considered job performance as it pertains to occupational safety (cf. Griffin & Neal, 2000). Our study was the first study to examine the cross-level effects of team personality composition on individual safety performance. Our findings indicated that team conscientiousness could exert a top-down influence on individual safety performance, suggesting that the implications of team personality composition could be extended to the safety domain and thus broaden our knowledge of team personality composition. Further, we contributed to the safety literature by identifying team composition as an additional antecedent of safety-related outcomes, providing promising future directions for safety research. For instance, future research could explore whether different kinds of team composition or configurations of member attributes (e.g., age, sex, abilities, personality, and functional expertise) may work as contextual factors that influence safety performance and safety-related outcomes across different levels of analyses. This line of research might provide new insights into the development of effective interventions across different levels (e.g., individual and team levels) to reduce workplace injuries and accidents.

Finally, all our hypothesized relationships were supported by using either supervisor ratings or self-ratings of safety

performance. However, we found that self-reports of individual conscientiousness were not related to supervisor ratings of safety performance. Perhaps the correlation between self-ratings of conscientiousness and self-ratings of individual safety performance was inflated by common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). However, other reports are not necessarily superior to self-ratings (cf. Conway & Lance, 2010). For instance, supervisors may not have enough opportunities to adequately observe subordinates' safety behaviors (also see self-ratings and supervisor ratings of counterproductive work behaviors, Berry, Carpenter, & Barratt, 2012). Perhaps the inadequate measurement of safety performance from the supervisor perspective deflated the relationship between conscientiousness and individual safety performance. To the best of our knowledge, there are only four studies examining the relationship between individual conscientiousness and supervisor ratings of safety performance. However, these studies provide conflicting findings (i.e., Buck, 2011; Postlethwaite et al., 2009; Wallace & Chen, 2006; Wallace & Vodanovich, 2003). For instance, Buck (2011) found that conscientiousness (i.e., orderliness, dutifulness, self-discipline, and achieve-striving) was not significantly related to supervisor ratings of safety performance. The inconsistent findings may be due to methodological differences across studies (e.g., different measures of conscientiousness and safety performance, cross-sectional designs vs. longitudinal designs, data analytic techniques—regression analysis vs. multilevel modeling).

Practical Implications

This study also provides several important practical implications. First, practitioners should consider team personality composition as a potential contributor to workplace safety. To reduce accidents and injuries, employers may include conscientiousness as one criterion at the stages of selection and staffing of team members (e.g., firefighter teams) for high-risk occupations. For instance, managers may consider selecting individuals with similarly high conscientiousness to build teams. By selecting individuals with homogenously high conscientiousness to build teams, managers not only can increase team mean and minimum conscientiousness but also decrease the variance of conscientiousness across members, which in turn promote team safety climate and consequently individual safety performance. Or, when tasks have a great risk of accidents and injuries (e.g., handling dangerous equipment), managers may assign conscientious teams with low variance in individual conscientiousness to complete these tasks.

Second, our finding concerning the effect of team conscientiousness on team safety climate also provides guidance for promoting safety climate in team contexts. Specifically, managers may consider manipulating team safety climate by creating teams with specific configurations of individual conscientiousness. In other words, managers may consider team conscientiousness as a viable mean to improve safety climate. For instance, practitioners can consider replacing a team member who has the minimum conscientiousness score with a highly conscientious employee, and therefore quickly elevate the overall level of conscientiousness in the team and improve team safety climate.

Third, because safety climate mediates the effect of team conscientiousness on individual safety performance, managers could consider interventions designed to improve safety climate when it is not feasible to reassign individuals into different teams. Our findings also provide a new approach for managers and practitioners to identify at-risk groups that should be targeted at by safety interventions. Specifically, safety interventions should be targeted at teams with low levels of team mean conscientiousness and/or high levels of team conscientiousness variance as well as the least conscientious team member. This approach could help organizations reap the most benefits from safety inventions by targeting at the right teams and the right team members with limited resources.

Finally, broadly speaking, as our findings suggest that team personality composition may influence outcomes across different levels, employers should take multiple levels of entities in the organization into account in order to make more accurate decisions and achieve higher utility of personalities as criteria in selection and staffing across different levels (Ployhart & Schneider, 2005; Prewett et al., 2018). Indeed, Ployhart and Schneider (2005) suggested that "to ignore the nested nature of selection within a multilevel system is to ignore the very basis of organizational science" (p. 513). By ignoring the multilevel effects of team personality composition, employers might under- or over-estimate the utility of using personality for selection and staffing (Ployhart & Schneider, 2005; Prewett et al., 2018). When staffing teams or workgroups, human resource managers should not simply consider the utility of personality for selecting and placing individual employees (at the individual level); they also need to consider the impact each individual will have in terms of altering team personality composition and influencing team processes, such as team climate, and eventually individual and team criteria that matter to the organization (LePine et al., 2011; Prewett et al., 2018).

Strengths, Limitations, and Future Directions

There are several strengths of the present study. For instance, by using a longitudinal design and collecting data from multiple sources, we were able to reduce common method bias and rule out the possibility of reverse causality (Podsakoff et al., 2003), which allowed us to get closer to establishing causal relationships among the study variables. Further, assessments of team safety climate and team conscientiousness

can be treated as objective measures, as the aggregated score of individual group members' scores can be considered "an objective rating of the environment" (Bliese & Jex, 2002, p. 271). However, we acknowledge some limitations. First, we did not have repeated measurements of the study constructs, because the survey length was constrained by the organization's administration, and research suggests that long surveys could decrease response rate and elicit negative reactions from the respondents (e.g., Rogelberg & Stanton, 2007). Thus, we encourage researchers to use repeated measurements to provide a stronger test of our hypotheses.

Second, the sample of healthcare employees utilized in this study might limit the generalizability of our findings to other occupations. Yet, our hypotheses were developed based on theories that are applied to employees regardless of their occupations, and our findings were consistent with theoretical predictions. Further, research suggests that similar to other work settings, safety is often sacrificed to productivity and other priorities in healthcare settings (Zohar & Tenne-Gazit, 2008). Nevertheless, future research is needed to replicate our findings with samples from other occupations.

Third, there are various mechanisms, such as sense-making processes (Louis, 1980; Schneider & Reichers, 1983), concertive control (Barker, 1993), and observational learning or modeling (Bandura, 2001) through which personality influences climate perceptions. Unfortunately, we were not able to measure these mechanisms. We call for future research to tease out these different mechanisms through which personality influences climate perceptions.

Finally, although we used an established conscientiousness scale, it has low reliability. However, our low alpha level of 0.66 is consistent with the alpha levels reported in previous studies (e.g., Donnellan et al., 2006). Most importantly, this low alpha level should not change our conclusions regarding our hypotheses, as unreliability results in underestimates rather than overestimates of the true effects of conscientiousness (Raju & Brand, 2003). Nevertheless, we encourage researchers to replicate our findings using measures of conscientiousness with higher reliability. Further, because existing studies have predominantly focused on the effect of the global conscientiousness on safety behavior (Beus, Dhanani, & McCord, 2015), we encourage researchers to investigate which facet of conscientiousness is most important for safety.

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