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Personality as a Multilevel Predictor of Climate: An Examination in the Domain of Workplace Safety

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Abstract

Individual and aggregate personality traits are theoretical antecedents of psychological and workgroup climates, respectively. However, empirical research has yet to test whether or to what degree this is true. Consequently, in the domain of workplace safety, we tested emotional stability and locus of control as multilevel antecedents of safety climate. We also tested a series of homology theories to determine the degree to which personality–climate associations are similar across organizational levels. Results revealed that both emotional stability and locus of control were meaningfully associated with safety climate at psychological and workgroup levels. In addition, multilevel homology tests demonstrated that workgroup-level personality–climate associations were more than 2½ times stronger than corresponding individual-level associations, supporting a proportional theory of homology.

Keywords

organizational climate, safety climate, personality, multilevel research

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People are naturally driven to construct meaning in their work environments to guide workplace decisions and behavior (James, James, & Ashe, 1990; Schneider, 1975). Individuals make sense of, or attach meaning to, workplace phenomena by cognitively grouping related events and behaviors into context-based schemas (Gioia & Poole, 1984). These behavior-guiding schemas that form as a result of organizational sense-making constitute climate (Schneider & Reichers, 1983). Whereas climate at the individual level (i.e., psychological climate) represents a person's idiosyncratic schema or interpretation of the social context of work, climate at the group level emerges when unambiguous workplace conditions result in a shared interpretation of the work environment within a group (Dickson, Resick, & Hanges, 2006; Ostroff, Kinicki, & Tamkins, 2003; Schneider, Ehrhart, & Macey, 2011). Climate—at both individual and group levels—informs behavior and has revealed meaningful associations with organizational outcomes across varying domains (e.g., ethics, Ambrose, Arnaud, & Schminke, 2008; safety, Christian, Bradley, Wallace, & Burke, 2009; customer service, Schneider, Ehrhart, Mayer, Saltz, & Niles-Jolly, 2005).

Despite an extensive body of research on climate's outcomes, it is noteworthy that comparatively little empirical attention has been placed on studying climate's *antecedents*—although numerous calls for research on the formation of climate have been made (e.g., Kuenzi & Schminke, 2009; Ostroff et al., 2003; Schneider et al., 2011; Zohar & Hofmann, 2012). Because climate formation fundamentally begins with sense-making (Schneider, 1975), it is necessary to consider factors that affect the way in which individuals and groups make sense of the work environment. Recognizing that sense-making is a cognitive process that is inevitably filtered by individuals' psychological predispositions (Louis, 1980), there is a specific need to consider factors that affect *how* people interpret their work environments. Personality is one such factor that is particularly relevant for climate formation (Schneider et al., 2011). As a set of psychological traits that account for patterns of thought and emotion (Funder, 2001), personality represents a ubiquitous grouping of individual differences that should meaningfully affect the interpretation of organizational events and phenomena.

In their conceptual treatise on the causes of climates, Schneider and Reichers (1983) highlighted the need to consider individual differences, such as personality, as climate antecedents. Schneider and Reichers also delineated objective organizational characteristics (e.g., size, hierarchy) and social interactions with coworkers as causes of climate. However, while acknowledging the importance of these varying climate antecedents in combination, we assert that taking an individual difference perspective on climate emergence is uniquely informative because personality can affect the interpretation of work environments regardless of whether or to what extent those interpretations are based on contextual factors. That is, independent of the degree to which organizational structure or social interactions affect climate perceptions, those perceptions must necessarily be filtered through the lens of personality, whether at the individual or group level. Because personality should effectively act as a gatekeeper of individual and aggregate climate perceptions, its multilevel examination is particularly important to advance knowledge of climate formation.

However, despite the theoretical relevance of personality in climate formation, research is almost completely silent on the associations between personality and climate at both individual and aggregate levels (Schneider et al., 2011). Thus, the extent to which personality plays a role in climate formation is currently unknown. Correspondingly, it is also unknown whether or to what degree personality–climate associations relate across levels. Does the configuration of personalities within a group have a comparable impact on shared climate perceptions relative to the impact of individual personality on individual climate perceptions? Answers to questions such as this are needed to inform climate theory.

Consequently, we contribute to the literature on climate formation by conducting an initial investigation of personality's multilevel associations with climate. This has practical implications for human resource decisions such as those concerning the composition of work teams. Specifically, to the extent that personality reveals meaningful multilevel associations with climate, it may be possible to manipulate team-level climates in targeted ways by composing teams with specific group-level personality characteristics. As a necessary component of considering these multilevel associations, we contribute to climate theory by testing a series of homology theories to explain and compare personality and climate relationships across levels of analysis (Chen, Bliese, & Mathieu, 2005). This examination is value adding for future climate research as it can illuminate whether personality's associations with climate are isomorphic, or identical, across levels of analysis (Bliese, Chan, & Ployhart, 2007). That is, comparing personality–climate associations across levels can speak to whether aggregate personality differentially affects group climate relative to individual personality's influence on psychological climate.

Personality as a Multilevel Climate Antecedent

Sense-making theory posits that worker characteristics, such as personality, affect individual efforts to attribute meaning to organizational events (Louis, 1980). Similarly, the five-factor theory of personality postulates that individuals interpret their environments in ways that are concordant with their personality traits (McCrae & Costa, 1999). These theoretical perspectives converge on the notion that organizational events are perceived by individuals through the filter of their unique personality characteristics (Gavin, 1975). For example, whereas a person low in agreeableness who has a tendency to be more cynical and unforgiving (McCrae & Costa, 1987) may perceive their company's decision to temporarily suspend merit pay increases to reflect organizational *in*justice, a person high in agreeableness who is generally more trusting and acquiescent may perceive the same decision as an economic necessity that has no bearing on organizational justice. This has direct implications for corresponding climate perceptions. That is, despite their exposure to the same event, high and low agreeable individuals may form differing perceptions of their organization's climate for justice because of their differing personality characteristics (McCrae & Costa, 1999). Thus, personality should be meaningfully associated with climate at the individual level, given its expected influence on the interpretation of related organizational events.

Although we are unaware of any studies that have tested personality–climate relationships at group levels, extant theory and research in related areas suggest that personality's influence on climate at aggregate levels may be correspondent with its theorized effect at the individual level. Regarding the group-level manifestation of personality, Stewart (2003) concluded, following his review of multilevel personality research, that teams can develop ways of thinking that are analogous to individual-level conceptualizations of personality (e.g., teams described as extraverted; see also Hoffman & Jones, 2005). If most individuals in a workgroup are high in a trait, such as openness to experience, then shared group interpretations of organizational policies or priorities (i.e., climate) should reflect a group-level manifestation of openness. In this case, even if a given group member is not predisposed to be particularly open to experience, the presence of highly open coworkers in their immediate workgroup could still cause them to view organizational events as a more open person might due to social influence processes (Ashforth, 1985). Thus, workplace interactions with fellow group members can cause the dominant or pervasive personalities within the group to affect shared interpretations of organizational events. For instance, to extend our earlier example of agreeableness to the group level, a group composed of more agreeable individuals should be more likely to arrive at a shared conclusion that the suspension of merit pay increases was an economic necessity relative to a group with fewer agreeable individuals that may be less likely to give their organization the benefit of the doubt. Consequently, whereas a group with disagreeable individuals may perceive such an organizational event as a negative indicator of its climate for justice, a group with more agreeable individuals is less likely to make the same connection.

Taken together, we assert that it is reasonable to expect unit-level trait manifestations to affect unit-level climates in ways that parallel corresponding individual-level relationships. This suggests that personality–climate relationships are homologous, or similar, across organizational levels. For clarity, we note that the concept of homology is more inclusive than the concept of isomorphism, which is a more restrictive term that is commonly used when making cross-level comparisons. Isomorphism assumes a "one-to-one correspondence" between higher and lower level variables (Bliese et al., 2007, p. 553), and by extension, in higher and lower level relationships. Thus, if personality–climate relationships are isomorphic across levels, there should be equality in the magnitude and direction of relationships at individual and group levels. Homology, on the other hand, refers to similarity in relationships across levels that can take multiple forms (e.g., proportionality), of which equality is only one potential manifestation (Chen et al., 2005).

Presupposing that personality–climate relationships are homologous requires two key assumptions (Chen et al., 2005). The first assumption is that personality and climate are theoretically correspondent enough in terms of their individual and aggregate construct manifestations to permit meaningful cross-level comparisons (e.g., individual compared with group personality; Bliese, 2000; Kozlowski & Klein, 2000). Although the multilevel nature of climate is well established both theoretically and empirically, permitting cross-level climate comparisons (Chan, 1998; Schneider et al., 2011; Yammarino & Dansereau, 2010; Zohar & Hofmann, 2012), extant understanding of the multilevel nature of personality is less well developed. With regard to the formation of individual relative to group personality, Stewart (2003) likened the combination of genes at the individual level to the combination of individual personalities at the group level. Specifically, just as an individual's genes uniquely combine to affect the formation of individual personality, so too should individual personalities uniquely combine to affect the formation of group personality—or group ways of thinking and perceiving. This metaphor suggests that cross-level comparisons of individual and group-level personality can indeed be meaningful.

The second assumption of homology is that personality–climate *relationships* at the individual level are comparable to personality–climate *relationships* at the group level (Chen et al., 2005). As already noted, at the individual level, personality characteristics should affect the sense-making process and thus color individual climate perceptions. Likewise at the group level, although a single personality may not be shared across group members, the amalgamation of personalities within the group should shape the ways in which group members interpret organizational events and thus result in shared climate perceptions (Schneider & Reichers, 1983). These theoretical perspectives suggest that it is defensible to consider personality–climate relationships to be comparable across levels. Furthermore, given the lack of theory or evidence to suggest otherwise, proposing a homologous relationship across levels of analysis for these relationships is a logical and parsimonious starting point that warrants empirical disconfirmation (Chen et al., 2005).

Nevertheless, although we propose that personality–climate relationships are homologous across levels, the *degree* of similarity—or type of homology—has yet to be theorized or tested. Chen et al. (2005) articulated three successive theories of homology to compare relationships across levels: metaphoric, proportional, and identical. Metaphoric theories of homology represent preliminary theories that rely on metaphors or analogies to compare relationships across levels, whereas the latter two represent more specific, and often evidence-based, theories of homology that posit proportional and identical similarity across levels, respectively; as previously noted, a corollary of an identical theory of homology is the expectation of isomorphism. These three theories can be evaluated in a sequence such that a metaphoric test precedes tests of proportional and identical similarity (Chen et al., 2005). Metaphoric tests are a necessary first step in multilevel theory development when there is limited theory or empirical evidence concerning multilevel relationships. Correspondingly, in the absence of such evidence for multilevel personality–climate associations, we first tested a metaphoric theory of homology before assessing the viability of more specific proportional and identical theories. A metaphoric theory of homology is supported when both individual and group-level relationships are in the same direction and are statistically significantly different from zero (Chen et al., 2005). We next offer directional hypotheses for context-specific personality–climate relationships that cumulatively constitute our initial metaphoric theory of homology.

Personality and Climate in the Domain of Workplace Safety

We conducted this research in the domain of workplace safety by considering safety-related personality traits as antecedents of individual and workgroup-level safety climates. Schneider and Reichers (1983) noted that workers make sense of the myriad of cues in their work environments by grouping psychologically related events and phenomena together. These perceptual groupings of related phenomena represent climates "for something," which are posited to affect domain-specific behaviors (Schneider & Reichers, 1983, p. 21). Thus, for the examination of climate to be meaningful, climate perceptions should be considered as they pertain to a particular perceptual grouping or organizational domain (e.g., safety, customer service, and ethics). We selected safety as the specific domain of interest for this study because of its extensive research base and also given its practical implications for salient organizational outcomes (Beus, Payne, Bergman, & Arthur, 2010; Christian et al., 2009; Nahrgang, Morgeson, & Hofmann, 2011).

Safety climate represents the perceived priority or importance placed on safety within a work unit (Zohar, 2000, 2008) and has demonstrated consistent positive associations with safe behaviors and consistent negative associations with workplace accidents and injuries at both individual and group levels (Beus et al., 2010; Christian et al., 2009; Nahrgang et al., 2011). Consequently, consideration of individual- and group-level antecedents of safety climate is particularly important for a greater understanding of the factors that affect this workplace phenomenon.

Personality is one such factor that has received limited attention in the occupational safety literature. Although several relevant personality traits have been tested as antecedents of safety *behavior* (e.g., Beus, Dhanani, & McCord, 2015; Christian et al., 2009), we are unaware of studies that have considered personality traits as safety climate antecedents, particularly at aggregate levels. Given personality's posited effect on the interpretation of the work environment, this is a noteworthy gap in the safety climate literature.

Two personality traits that are particularly relevant for safety climate are emotional stability and locus of control. These traits were selected because they represent divergent aspects of a higher order construct that should specifically affect individuals' interpretations of their external environment (Judge, Erez, Bono, & Thoresen, 2002). Although both self-efficacy and self-esteem are also considered to be close theoretical corollaries of these traits (Judge et al., 2002), they are primarily focused on self-evaluation, whereas emotional stability and locus of control should more meaningfully affect the interpretation of external organizational phenomena as well—particularly if the phenomena are negatively valenced (e.g., Pratto & John, 1991). An additional benefit of selecting these particular personality traits is that they are two of the most commonly studied traits in psychology (Judge et al., 2002) and arguably have application to climates beyond just the domain of workplace safety (e.g., Judge & Bono, 2001). A graphical depiction of our multilevel hypotheses is illustrated in Figure 1.

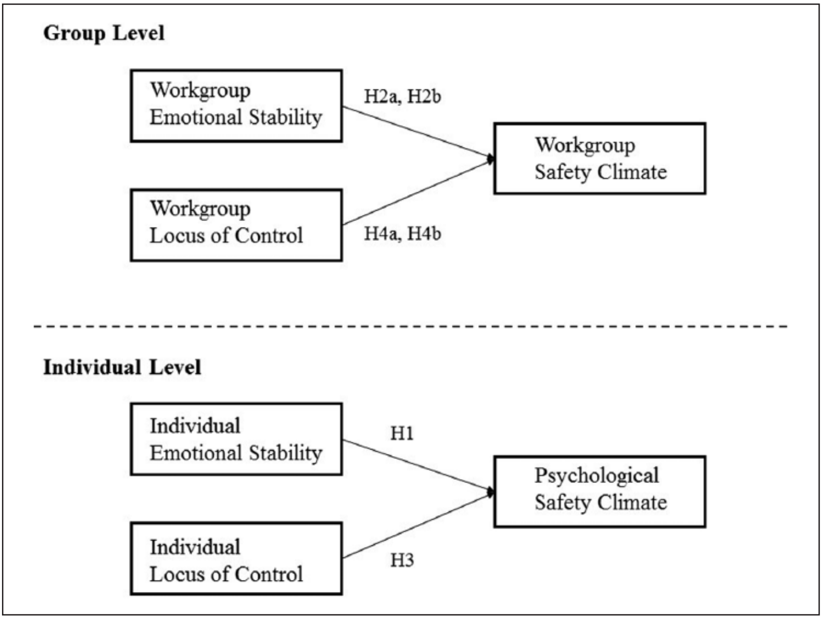

Figure 1. Multilevel personality–climate hypotheses.
Note. H1 = Hypothesis 1 and so forth.

Emotional Stability

High levels of emotional stability are characterized by feelings of security, optimism, and tolerance, whereas low levels are characterized by anxiety, worry, and moodiness (McCrae & Costa, 1987; Mount, Barrick, & Stewart, 1998). Individuals low in emotional stability have been found to selectively attend to threat cues in their environments (Gallagher, 1990; Mathews & MacLeod, 1985) and are correspondingly more likely to perceive potential dangers or threats in everyday work situations. This has meaningful implications for safety climate as emotionally unstable individuals may be more prone to perceive their workplace environment as less safe, whereas emotionally stable individuals are less likely to have such inclinations and should correspondingly have more favorable safety climate perceptions. Thus, emotional stability should demonstrate a positive association with safety climate at the individual level such that emotionally unstable workers should have lower perceptions of safety climate and vice versa.[1]

> **Hypothesis 1:** Individual-level emotional stability is positively associated with psychological safety climate.

A positive relationship between emotional stability and safety climate should also exist at the workgroup level, given the expectation of homology across construct levels. Although there are multiple ways of operationalizing personality at the workgroup level (e.g., mean, standard deviation, minimum/maximum score), the selection of which operationalization(s) to use should be based on the nature of the traits under consideration (Barrick, Stewart, Neubert, & Mount, 1998). For emotional stability, the mean score group-level operationalization is particularly relevant. This operationalization is correspondent with Hypothesis 1 at the individual level and suggests that the group-level impact of emotional stability is additive such that lower levels of emotional stability in a group should be associated with lower group-level safety climate perceptions and vice versa. We thus hypothesize the following:

> **Hypothesis 2a:** Workgroup mean emotional stability is positively associated with workgroup safety climate.

Not only should mean levels of emotional stability have an additive effect on group interpretations of safety climate but also the minimum emotional stability score within a group should likewise affect group-level safety climate. This is expected because the presence of even one particularly emotionally *un*stable individual can have a uniquely adverse effect on group member perceptions regarding workgroup safety (cf. Barrick et al., 1998). The converse is unlikely to be true such that the maximum emotional stability score within a group should have less of an impact on group safety climate. This is because negative stimuli often tend to be more influential on perceptions and behaviors than positive stimuli (Frodi, Lamb, Leavitt, & Donovan, 1978; Kahneman & Tversky, 1984; Pratto & John, 1991). Thus, we posit the following:

> **Hypothesis 2b:** Workgroup minimum emotional stability score is positively associated with workgroup safety climate.

Locus of Control

Locus of control represents the extent to which individuals believe the events in their lives are personally controlled versus dependent upon external forces (e.g., luck, fate, powerful others; Rotter, 1966). Whereas belief in personal control over life events represents an internal locus of control, belief in life events being controlled by external forces represents an external locus of control (Rotter, 1966). Because safety is the domain of interest for this study, safety locus of control is considered here as opposed to generalized locus of control. Safety locus of control represents the extent to which individuals perceive personal control in the domain of workplace safety (Jones & Wuebker, 1985, 1993). Past research has revealed that workers with an external safety locus of control tend to work less safely and are involved in more accidents and injuries in comparison with workers with an internal safety locus of control (Christian et al., 2009; Jones & Wuebker, 1985). These findings suggest that to the extent workers believe safety is the result of external factors, they will regard safety-related behaviors as less important, and thus less relevant in informing safety climate perceptions. Consequently, individuals with an external safety locus of control should have less favorable safety climate perceptions, whereas individuals with an internal locus of control—who believe they (and others) have greater control over workplace safety—should have more favorable safety climate perceptions.

Hypothesis 3: Individual-level safety locus of control is positively associated with psychological safety climate.

We likewise expect a positive association between safety locus of control and safety climate at the group level. Specifically, higher mean perceptions of personal control within a workgroup should reflect more favorable interpretations of workgroup-level safety climates due to the belief that safety is under the workgroup's control as opposed to being a function of luck or fate. Although not every group member is likely to have the same level of safety locus of control, the presence of more individuals who are either higher or lower on the trait should affect the way the group as a whole tends to view safety climate. Thus, correspondent with the individual-level hypothesis, the impact of group safety locus of control on group safety climate should be positive and additive in nature.

Hypothesis 4a: Workgroup mean locus of control is positively associated with workgroup safety climate.

As with emotional stability, the minimum score operationalization should also be a relevant aggregate manifestation of safety locus of control. The expectation is that a person with particularly low safety locus of control should have a meaningful impact on shared group safety climate perceptions due to the substantive effect a negative, fatalistic outlook can have on others (Pratto & John, 1991). As such, a person who has particularly high safety locus of control may be less likely to have as much of an impact on group perceptions. Consequently, we hypothesize the following:

Hypothesis 4b: Workgroup minimum locus of control score is positively associated with workgroup safety climate.

In sum, these hypotheses constitute a domain-specific metaphoric theory of homology for individual- and group-level personality–climate associations. As noted, a metaphoric theory will be supported in this context if the hypothesized associations between the examined safety-related personality traits and safety climate are statistically significant and in the same direction at both the individual and workgroup levels. Such a pattern of results would provide evidence to suggest that personality–climate associations are homologous across organizational levels and would thus warrant additional steps to determine whether the similarity in relationships is proportional or identical in nature (Chen et al., 2005).

Method

Participants and Procedure

We collected data for this study by surveying a large sample of employees from a mining company in Chile. The majority of the respondents performed manual labor supporting mining operations such as equipment maintenance and repair, industrial cleaning, and construction work. Approximately 80% of the surveyed employees performed their duties in a concentration plant and a metallurgical treatment plant, whereas the remaining respondents worked inside the mine. The total sample consisted of 634 of a possible 975 employees (65% response rate) who were embedded within 90 workgroups. However, because of this study's multilevel focus, only those workers embedded within workgroups with at least three respondents were included for this study's analyses. We required workgroups to have at least 3 respondents to provide more stable estimates of group-level constructs. These criteria resulted in a final sample of 547 (86%) individuals embedded within 63 groups (70%). As is typical of the mining industry, 89% of the final sample were male with an average age of 36.28 years (SD = 10.27) and an average organizational tenure of 3.77 years (SD = 3.85).

Data were collected via paper-and-pencil survey measures that were administered to workers during regularly held shift meetings. Workers were allowed to complete the measures in two sessions (it was divided into two parts that separated predictor and criterion measures); however, the majority of respondents in the final sample (88%) elected to complete the measure in one session.[2] The measures were translated from English to Spanish using traditional translation–back translation techniques (Brislin, 1970). Two doctoral students in psychology who were fluent in both English and Spanish translated the measures.

Measures

Safety climate. Safety climate was assessed using the shortened eight-item version of Beus, Payne, and Arthur's (2011) generalized safety climate measure.[3] The shortened measure maintains representation of the seven safety climate indicators identified inductively by Beus et al. (2011) to represent safety climate's core content domain (e.g., management commitment to safety, safety communication, coworker safety practices). Participants responded to these items on a 5-point Likert-type scale (1 = s*trongly disagree*; 5 = *strongly agree*). Example items include, "My supervisor praises safe work behavior" and "My coworkers are committed to safety improvement." In the current sample, responses to these items revealed sufficient internal consistency at both the individual (α = .90) and aggregate levels (α = .92).

Emotional stability. Emotional stability was assessed using the 10-item International Personality Item Pool Big Five Factor Marker of emotional stability. Respondents were asked to rate the extent to which the item statements accurately described them responding on a 5-point scale (1 = *very inaccurate*; 5 = *very accurate*). Example items include, "I am relaxed most of the time" and "I get stressed out easily" (reverse-scored). Responses to these items revealed adequate internal consistency at the individual (α = .81) and workgroup levels (α = .85).

Safety locus of control. Safety locus of control was assessed using five of six items from Jones and Wuebker's (1985) internal safety locus of control scale. One item was dropped from the scale (i.e., "Most of my accidental injuries are preventable") because it makes reference to individuals' own accident experiences that can create ambiguity for responders, particularly if they have not personally experienced an accident at work. The five retained items each represent generalized statements such as "Most accidents are avoidable" and "Most on-the-job accidents and injuries result from employees' mistakes." Items were responded to on a 5-point agreement scale (1 = s*trongly disagree*; 5 = *strongly agree*), and the internal consistency of the scores was satisfactory at the individual (α = .70) and workgroup levels (α = .72).

Safety behavior. Although not part of a formal hypothesis test, we assessed safety behavior—behavior that contributes to workplace safety—because both theory and research indicate that it is a meaningful outcome of safety climate (Christian et al., 2009), and by extension, an indirect outcome of safety-related personality traits. We assessed safety behavior using Griffin and Neal's (2000) two dimensions of *safety compliance* (i.e., rule-prescribed safety behaviors) and *safety participation* (i.e., discretionary safety behaviors). Both types of safety behavior were assessed using four-item scales developed by Griffin and Neal (2000); items were rated on 5-point agreement scale (1 = s*trongly disagree*; 5 = *strongly agree*) and revealed adequate internal consistency at the individual ($\alpha = .89$, .80) and workgroup levels ($\alpha = .95$, .78) for safety compliance and participation, respectively. We tested these behaviors in a supplemental analysis of practical safety outcomes to determine whether emotional stability and locus of control are indirectly related to safety behavior via their associations with safety climate.

Analyses

Consistent with extant theories regarding group-level personality (e.g., Hoffman & Jones, 2005; Stewart, 2003), we tested a metaphoric theory of homology as a first step in comparing individual- and workgroup-level relationships between personality and safety climate (Chen et al., 2005). To evaluate a metaphoric theory in this context, we compared the direction and statistical significance of the hypothesized personality–climate associations at the individual and workgroup levels. Statistically significant relationships in the same direction at both construct levels provide support for the proposed metaphoric theory (Chen et al., 2005).

To aid in future theoretical specificity, we also conducted follow-up tests of more precise theories of homology that posit proportional and identical relationships across levels. We tested these theories of homology by following a series of steps outlined by Chen et al. (2005). The benefit of testing proportional and identical theories of homology once a metaphoric test is supported is that these more fine-grained tests can provide evidence to suggest *the degree* to which personality's associations with climate at the workgroup level are correspondent with associations at the individual level.

Results

Confirming the Measurement Model

Descriptive statistics and intercorrelations for all study variables are reported in Table 1. To test this study's measurement model, we conducted a confirmatory factor analysis (CFA) that specified separate factors for safety climate,

Table 1. Descriptive Statistics and Intercorrelations for Study Variables.

Variable	*M*	*SD*	1	2	3	4	5	6	7	*M*	*SD*
1. Safety climate	4.00	0.68	(.90, .92)	.42*, .39*	.33*, .15	−.21	−.03	.64*	.51*	4.05	0.38
2. Emotional stability	3.75	0.53	.17*	(.81, .85)	.13, .06	−.08, −.19	−.10, −.04	.40*, .37*	.32*, .25*	3.78,[a] 3.07[b]	0.27,[a] 0.46[b]
3. Locus of control	3.74	0.66	.19*	.03	(.70, .72)	.08, .02	−.07, .01	.27*, .20	.47*, .42*	3.76,[a] 2.86[b]	0.34,[a] 0.62[b]
4. Injuries	0.67	2.26	−.14*	−.06	−.01	—	.01	−.22	−.03	0.50	0.98
5. Accidents	4.40	17.37	−.06	−.09	−.10	.11	—	−.23	−.06	4.31	13.61
6. Safety compliance	4.19	0.61	.58*	.17*	.13*	−.16*	−.11	(.89, .95)	.68*	4.23	0.33
7. Safety participation	4.02	0.65	.52*	.10*	.11*	−.13*	−.07	.70*	(.80, .78)	4.04	0.32

Note. Correlations below the diagonal are at the individual level of analysis ($N = 547$) and correlations above the diagonal are at the group level of analysis ($N = 63$); *M* and *SD* on the left are at the individual level and *M* and *SD* on the right are at the group level; reliability estimates on the diagonal represent individual- and workgroup-level estimates, respectively; group-level correlations involving emotional stability and locus of control represent mean (left) and minimum (right) operationalizations, respectively.

[a]Descriptive statistics for mean score operationalizations.

[b]Descriptive statistics for minimum score operationalizations.

*$p < .05$, two-tailed.

emotional stability, and safety locus of control. We evaluated model fit using the comparative fit index (CFI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA). As indicated by both SRMR and RMSEA, the measurement model fit was satisfactory, $\chi^2(228) = 779.07$, $p < .05$; CFI = .87; SRMR = .06; RMSEA = .07, although we note that the CFI estimate was slightly below the generally accepted .90 standard (Hu & Bentler, 1999). Nevertheless, taken as a whole, the fit of the measurement model highlights the distinctiveness of this study's three core constructs and supports their separate consideration for our hypothesis tests.

We also conducted an exploratory factor analysis (EFA) to ensure that there were no alternative, better fitting models represented by our data. This analysis revealed that the proposed three-factor model was better fitting than both one-factor, $\chi^2(253) = 4{,}474.62$, $p < .05$; CFI = .47; SRMR = .16; RMSEA = .13, and two-factor models, $\chi^2(208) = 1{,}076.42$, $p < .05$; CFI = .79; SRMR = .08; RMSEA = .09. Although a four-factor model revealed a slight improvement in fit, $\chi^2(167) = 469.03$, $p < .05$; CFI = .93; SRMR = .03; RMSEA = .06, relative to the three-factor model, indicating that two locus of control items loaded onto an additional factor, we deemed the three-factor model to be the more appropriate choice, given that it is both more parsimonious and consistent with theoretical expectations.

Aggregating to the Workgroup Level

Because safety climate represents a referent-shift consensus construct requiring individuals to respond to items using a common group-level referent (Chan, 1998), we tested for both within-group agreement and between-group variability in safety climate responses to justify aggregating individual safety climate responses to the workgroup level. We tested within-group agreement by assessing $r_{wg(j)}$ using a moderately skewed null response distribution (see James, Demaree, & Wolf, 1984 or LeBreton & Senter, 2008). This distribution was selected, as opposed to a uniform null response distribution, because safety climate responses in this sample revealed moderate, negative skew. The median $r_{wg(j)}$ value of .90 in this sample is statistically significant ($p \leq .05$) compared with the corresponding critical $r_{wg(j)}$ values of .77 and .85 for 5- and 10-item scales, respectively; these critical values are based on simulations conducted by Smith-Crowe, Burke, Cohen, and Doveh (2014). Furthermore, 70% of the workgroup $r_{wg(j)}$ values in the sample were between .70 and 1.00.[4] These estimates suggest adequate within-group agreement in this sample's workgroups to justify aggregation. Between-group analyses likewise confirmed the appropriateness of aggregating individual safety climate responses

Table 2. Metaphoric Theory Results Testing Personality Traits as Multilevel Safety Climate Antecedents.

Variable	Estimate	*SE*	*t*
Individual-level model			
Intercept	2.47	0.35	7.04*
Emotional stability	0.22	0.05	4.45*
Locus of control	0.19	0.07	2.88*
R^2	.07		
Workgroup-level model (personality mean)			
Intercept	−0.33	0.90	−0.37
Emotional stability	0.69	0.20	3.48*
Locus of control	0.47	0.15	3.17*
R^2	.28		
Workgroup-level model (personality minimum score)			
Intercept	2.58	0.41	6.25*
Emotional stability	0.37	0.12	3.13*
Locus of control	0.13	0.09	1.46
R^2	.17		

Note. All regression estimates are unstandardized; the individual-level model ($N = 521$) accounted for workgroup nesting; the workgroup-level model ($N = 63$) is weighted by workgroup sample size.
*$p < .05$.

to the workgroup level by indicating meaningful between-group variability (intraclass correlation coefficient 1 [ICC1] = .22), and between-group mean stability (ICC2 = .70). Taken together, these indices provide sufficient evidence to consider safety climate to be an emergent workgroup-level construct in this sample.

Although we hypothesize that workgroup personality composition affects workgroup climate, there is little reason to expect personality traits to show strong within-group agreement or between-group variability when aggregated to the group level. Rather, the proposed additive nature of emotional stability and safety locus of control suggests that these traits should affect safety climate perceptions independent of whether workgroup members share similar standings on the trait. This is particularly true when using the minimum score to operationalize workgroup-level personality. Hence, it was unnecessary to use the aforementioned indices to justify aggregating personality to the workgroup level. As evidence that there was only trivial personality clustering at the group level, both emotional stability and safety locus of control revealed substandard ICC1 (.04, .08) and ICC2 (.26, .42) values, respectively.

Testing a Metaphoric Theory of Homology

Results for the individual- and workgroup-level models that were estimated to test a metaphoric theory of homology are reported in Table 2. At the individual level, both emotional stability (b = 0.22, p < .05) and safety locus of control (b = 0.19, p < .05) revealed statistically significant, positive associations with safety climate perceptions after accounting for workgroup nesting using pseudomaximum likelihood estimation for clustered data in Mplus 7.0 (Muthén & Muthén, 2012). Thus, Hypotheses 1 and 3 were supported. Likewise, mean workgroup-level emotional stability (b = 0.69, p < .05) and safety locus of control (b = 0.47, p < .05) revealed statistically significant, positive associations with workgroup safety climate, supporting Hypotheses 2a and 4a, respectively. When personality was operationalized using the minimum scores, both emotional stability (b = 0.37, p < .05) and safety locus of control (b = 0.13, *ns*) maintained positive associations with workgroup-level safety climate, although only emotional stability remained significantly associated with safety climate. Thus, Hypothesis 2b was supported whereas Hypothesis 4b was not supported.[5]

Taken together, these results support a metaphoric theory of homology. Specifically, the significant positive associations between these personality traits and safety climate at the individual level were likewise positive and significant at the group level when considering group-level personality in additive terms (i.e., group mean personality). Thus, personality–climate relationships appear to be homologous across individual and workgroup levels in terms of directionality and statistical significance.

Supplemental Results

Because safety climate is meaningfully associated with the outcome of workplace safety behavior (Christian et al., 2009), we evaluated the practical importance of the preceding findings in a supplemental analysis by testing to see if personality traits reveal associations with safety behavior that are mediated by safety climate. To do so, we tested the statistical significance of the indirect effects from emotional stability and safety locus of control to safety compliance and participation via safety climate perceptions. We tested these mediated associations using path analysis with bootstrapped standard errors (1,000 iterations) that allowed for the computation of confidence intervals computed around the examined indirect effects (MacKinnon, Coxe, & Baraldi, 2012). We elected not to estimate direct associations between the personality traits and safety behavior in our path model because of empirical evidence revealing weak associations between these variables (e.g., Beus et al., 2015) and also because a fully mediated path model is more parsimonious relative to a partially mediated path model and allows for the evaluation of model fit (MacKinnon et al., 2012). The decision to exclude direct effects was empirically supported by the good fit of the fully mediated path model at the individual level of analysis, $\chi^2(4) = 5.73$, *ns*; CFI = .99; SRMR = .02; RMSEA = .03. The analysis revealed that the indirect associations from emotional stability to both safety compliance ($b = 0.11$, $p < .05$; 95% CI = [0.05, 0.18]) and safety participation ($b = 0.11$, $p < .05$; 95% CI = [0.05, 0.17]) via safety climate perceptions were statistically significant. Similarly, the indirect associations between locus of control and safety compliance ($b = 0.10$, $p < .05$; 95% CI = [0.05, 0.15]) and participation ($b = 0.09$, $p < .05$; 95% CI = [0.04, 0.14]) were also statistically significant. Taken together, these results indicate that emotional stability and locus of control are indirectly associated with safety behavior via safety climate perceptions at the individual level of analysis.

We also tested these mediated relationships at the group level. However, before doing so, we determined whether it was appropriate to aggregate safety compliance and participation to the workgroup level. Whereas safety compliance revealed sufficient within-group agreement (median $r_{wg(j)} = .85$) and between-group variability (ICC1 = .11, ICC2 = .51) to justify aggregation, safety participation revealed less within-group agreement (median $r_{wg(j)} = .76$) and only minor between-group variability (ICC1 = .06, ICC2 = .35). Thus, we elected only to aggregate safety compliance for this supplemental analysis. As with our individual-level analysis, we estimated a fully mediated group-level model (i.e., personality safety climate safety behavior) that revealed adequate model fit, $\chi^2(2) = 29.42$, $p < .05$, in terms of CFI (.94) and SRMR (.04). Although RMSEA (.16) was above heuristic standards for model fit, this estimate was likely artificially inflated by the small group-level sample size ($N = 63$) and few degrees of freedom ($df = 2$) in this model (Kenny, 2014). Group-level path analysis results with bootstrapped standard errors indicated that the indirect associations between mean emotional stability ($b = 0.33$, $p < .05$; 95% CI = [0.26, 0.39]) and locus of control ($b = 0.22$, $p < .05$; 95% CI = [0.17, 0.28]) with safety compliance (via workgroup safety climate) were positive and statistically significant. In sum, these supplemental results suggest that individual- and workgroup-level operationalizations of emotional stability and locus of control are indirectly related to safety behavior through their associations with safety climate. This provides correlational evidence to support the practical value of examining the multilevel associations between personality traits and climate in the domain of workplace safety.

Table 3. Proportional Theory Results Testing Personality Traits as Multilevel Safety Climate Antecedents.

Model and predictor	Estimate	*SE*	*t*
Model 1			
Intercept	0.00	0.06	0.00
Emotional stability	0.22	0.05	4.45*
Locus of control	0.19	0.07	2.88*
R^2	.07		
Model 2			
Intercept	−0.02	0.04	−0.48
Emotional stability	0.69	0.20	3.48*
Locus of control	0.47	0.15	3.17*
R^2	.28		
Model 3			
Scaling factor	2.78	0.56	4.98*
R^2	.29		

Note. All regression estimates are unstandardized; Model 1 = Individual-level model accounting for non-independence due to workgroup nesting (N = 521); Model 2 = Unconstrained workgroup-level model using workgroup size as a weighting factor (N = 63); Model 3 = Single-parameter workgroup-level model constraining workgroup-level parameters to be a multiplicative function of individual-level estimates from Model 1.
*p < .05.

Testing Proportional and Identical Theories of Homology

Although our core hypothesis tests supported a metaphoric theory of homology for personality and climate, they did not articulate whether the examined personality–climate relationships are proportionately similar or identical across construct levels. Consequently, we tested both proportional and identical theories of homology to more fully examine the *degree* of similarity between individual- and aggregate-level personality–climate associations. We did so using mean personality operationalizations at the workgroup level as this operationalization led to more meaningful workgroup-level associations with safety climate relative to the minimum score operationalization.

We followed the steps outlined by Chen et al. (2005) to test both proportional and identical theories of homology. These tests allowed us to determine whether the examined personality traits revealed proportionately similar or identical associations across levels, respectively. We first tested for proportional similarity by estimating two regression models in which emotional stability and locus of control were entered as predictors of individual- and workgroup-level safety climate. The individual-level model (Model 1) accounted for workgroup nesting, whereas the group-level model (Model 2) was weighted by sample size. Results for these model tests are reported in Table 3. To compare these models, a third model (Model 3) was estimated in which the parameters obtained from the group-level model (Model 2) were constrained to be a multiplicative function of the parameters obtained from the individual-level model (Model 1). Model 3 thus represents a restricted version of Model 2 where the group-level parameters were equated with the individual-level parameters using a scaling factor. The fit of Models 2 and 3 was then compared using an F test. A significant difference between these models suggests that a single scaling factor *cannot* be used to compare individual- and group-level associations for a set of predictors (i.e., emotional stability and locus of control) and would thus fail to support a proportional theory of homology. Conversely, failure to find a significant difference between the unconstrained model (Model 2) and constrained model (Model 3) suggests that relationships *are* proportionately similar across levels for the specified set of predictors and would support a proportional theory of homology. Results revealed that there was not a statistically significant difference, $F(2, 60) = 0.32$, *ns*, in the fit of the freely estimated group-level model (Model 2) and the constrained group-level model (Model 3), indicating the presence of a meaningful scaling factor across levels and providing initial support for a proportional theory of homology. Specifically, the scaling factor indicated that the relationships between personality traits and safety climate at the group level were 2.78 times the size of the corresponding individual-level relationships.

Although the above steps indicated the presence of a scaling factor that can be used to compare individual- and group-level personality–climate associations, the next step was to determine whether the obtained scaling factor (2.78) is significantly different from 1 (Chen et al., 2005). Thus, an additional model (Model 4) was estimated that constrained the scaling factor from Model 3 to be equal to 1; this represents a test of an identical theory of homology (or isomorphism). No difference in fit from Model 3 to Model 4 would suggest that the scaling factor is not different from 1, providing support for an identical theory of homology, whereas a significant *decrease* in model fit would fully support a proportional theory. Results of an F test comparing Models 3 and 4 revealed a statistically significant difference in fit, $F(1, 62) = 10.43$, $p < .01$, indicating that the scaling factor of 2.78 is significantly larger than 1. This fails to support an identical theory of homology and thus fully supports a proportional theory of homology, suggesting that group-level associations between personality and climate are more than 2½ times stronger than individual-level associations. We next discuss the theoretical and practical implications of these findings.

Discussion

Little is known about how climates are formed in the workplace, particularly in terms of how psychological factors, such as personality, affect sense-making and subsequent climate perceptions (Schneider et al., 2011). Consequently, the purpose of this study was to test personality as a multilevel antecedent of climate to provide an initial examination of the extent to which personality traits are associated with both individual- and group-level interpretations of the work environment. We did so in the domain of workplace safety and found, consistent with theoretical expectations, that emotional stability and safety locus of control were positively associated with safety climate at both the individual and workgroup levels. This supports the proposition that although climates are expected to emerge from worker perceptions of organizational characteristics and social interactions, these perceptions are filtered through the lens of personality to affect individual- and subsequent group-level climates.

The meaningful personality–climate relationships evidenced at both the individual and workgroup levels in this study supported a preliminary metaphoric theory of homology. However, to guide future research efforts, we also tested proportional and identical theories of homology to more accurately estimate the extent to which individual- and workgroup-level personality–climate relationships are similar across construct levels. Results of these follow-up tests revealed strong support for a proportional theory of homology indicating that workgroup-level personality–climate associations were more than 2½ times stronger than corresponding individual-level associations.

Theoretical Implications

This study's support for a proportional theory of homology necessitates a theoretical explanation as to *why* personality traits revealed proportionately stronger associations with climate at the workgroup compared with the individual level. The primary explanation for this may lie in the fact that climates are inherently a property of groups, such that even when considered at the individual level, psychological climate represents a worker's perception of a *group* phenomenon (Glick, 1985; Schneider et al., 2011). Hence, although this study's results suggest that individuals' own personalities color their climate perceptions to some degree, it is group-level factors that should ultimately have the strongest effect on individuals' climate perceptions. As theorized by Schneider and Reichers (1983), these group-level factors include not only organizational characteristics and social interactions with coworkers but also the collective manifestation of individual differences such as personality within the group. Thus, beyond the observed effects of individuals' *own* personalities, individual climate perceptions should be more directly and consciously influenced by the manifested personalities of *fellow* workgroup members (Bliese et al., 2007). For example, although an individual with a high locus of control may have a natural tendency to perceive external events to be within their control, their membership in a workgroup with coworkers who are predominantly low in locus of control may cause them to interpret safety-related events at work as being less under group control and thereby result in a lower perception of safety climate. Because individual climate perceptions should be more laden by the influence of group personality relative to individual personality as this example illustrates, a group-level estimate of personality correlated with a group-level estimate of climate should be more meaningful than the same correlation at the individual level. Stated differently, aggregating individual personalities and climate perceptions to the group level should provide a more accurate—and thus stronger—estimate of the association between personality and climate because doing so matches the level of analysis to the level of theory (Klein & Kozlowski, 2000; Morgeson & Hofmann, 1999; Sirotnik, 1980). In summary, because climate is a property of groups, it is reasonable to posit a stronger association between group personality and group climate relative to individual personality and psychological climate.

Interestingly, personality traits revealed stronger associations with climate at the workgroup level even without the personality traits being meaningfully shared or clustered within groups. This is demonstrated empirically by ICC(1) values that suggest that only 4% and 8% of the variance in emotional stability and locus of control, respectively, could be attributed to group membership (compared with 22% for safety climate). This suggests that personality can affect climate at the workgroup level even when workgroup member personalities are divergent.

To further examine the merit of this proposition, we tested the interactive effect of personality heterogeneity (i.e., the variance of personality within workgroups) and mean workgroup personality on workgroup-level climate. The purpose of doing this was to determine if the influence of mean workgroup personality on safety climate is stronger when workgroup personalities are more homogeneous. This is consistent with the logic of studies that have tested the influence of climate strength (i.e., variability) on organizational outcomes (e.g., Gonzalez-Roma, Peiro, & Tordera, 2002; Schneider, Salvaggio, & Subirats, 2002). In studies such as these, the general proposition is that greater homogeneity of individual perceptions or characteristics within a group creates a stronger group-level phenomenon that results in more constrained behaviors within the group. However, results in the present sample revealed no meaningful interactions between personality heterogeneity (operationalized as standard deviation; see Schneider et al., 2002) and personality mean in predicting workgroup climate for either emotional stability ($\beta = -.15$, *ns*) or locus of control ($\beta = -.10$, *ns*). This suggests that workgroup personality is primarily additive in nature such that higher mean levels of personality within a group can affect climate regardless of whether workgroup members have similar personalities or not. Thus, having only one or two emotionally unstable individuals in a workgroup could have a detrimental influence on workgroup safety climate even if the majority of remaining group members are relatively high in emotional stability.

Practical Implications

This study's findings have important practical implications, particularly with regard to employee selection and staffing. Specifically, these results suggest that hiring or assigning individuals with lower levels of personality traits such as emotional stability and safety locus of control can have negative effects on workgroup safety climates, and subsequently, safety behavior. The additive nature of personality at the group level suggests that even one individual can meaningfully affect a group's perception of safety. Although the negative outcomes associated with poor safety climates likewise warrant making direct changes to safety policies and practices (Beus et al., 2010; Christian et al., 2009), this study's findings suggest that the consideration of individual personalities and their distribution in groups is an additional means through which safety climates can be altered and subsequent safety behavior can be improved. To the extent that this may not be possible, knowledge of the group's composition on these variables can at least have potential diagnostic value.

From a utility perspective, this study's results also suggest the need to appraise the value of selection systems at the appropriate level of analysis. To correctly appraise the value of a selection system, one must obtain a validity coefficient at the level of interest (individual or group level). Results from the present study suggest that the relationships between personality and climate are more than 2½ times stronger at the group level than at the individual level. Accordingly, because the value of a selection system is (in part) a function of the validity coefficient, utility estimates will be substantially higher if the validity coefficient utilized for determining the value of the selection system targets the group rather than solely the individual. Because the financial impact of human resource management systems is of increasing importance to practitioners, studies such as the present one are informative because they illustrate how failing to take multilevel considerations into account can be misleading in important ways.

Limitations and Future Directions

Despite its contribution to the extant literature, this study has some limitations that should serve as avenues for future research. One potential limitation is that, for the majority of participants, all core variables were assessed concurrently via self-report. Thus, we cannot rule out the influence of common method bias nor can we empirically establish temporal precedence when considering the relationship between personality and climate (Podsakoff, MacKenzie, & Podsakoff, 2012; Shadish, Cook, & Campbell, 2002). However, because of personality's resistance to change in adulthood (Costa & McCrae, 1988; Terracciano, McCrae, & Costa, 2010), it is unlikely from a theoretical perspective that workgroup safety climates influenced individual and workgroup personality. Furthermore, it is noteworthy that variable intercorrelations for participants who completed the survey in two versus one sitting were nearly identical in magnitude suggesting that concurrent variable assessment did not inflate observed relationships in our sample. We recommend that future research consider additional avenues of reducing common method bias in the assessment of personality–climate relationships such as temporally spacing the administration of predictor and criterion measures for all study participants. Doing so could likewise lessen concerns regarding temporal precedence.

Another possible limitation is that although this study is intended to apply to climate research broadly, our hypotheses were tested in only one domain (i.e., workplace safety). Hence, these findings may be limited to safety-related personality traits and safety climate. However, given the dominant paradigm in climate research of considering climates *for something* (Kuenzi & Schminke, 2009; Schneider et al., 2011) and the fact that safety climate is one of the most widely researched climate types, we deemed it an appropriate exemplar for an initial examination of personality's association with climate. Nevertheless, research that considers differing climate types and their associations with relevant personality traits is needed to more appropriately establish the generalizability of the findings obtained here. Examples in other commonly considered domains could include testing agreeableness or integrity as multilevel antecedents of service (e.g., Hong, Liao, Hu, & Jiang, 2013) or ethical climates (e.g., Mayer, 2014), respectively. As with the present sample and domain, group-level personality may form additively such that a single individual with particularly high or low agreeableness or integrity could have a meaningful impact on group perceptions and subsequent behaviors. In addition, the recently explored phenomenon of emotional climate (e.g., Liu, Hartel, & Sun, 2014) has particular relevance to the consideration of personality traits as climate antecedents. As shared perceptions of a workgroup's typical affective exchange (Liu et al., 2014), emotional climate should be strongly influenced by the emotional stability of workgroup members. Testing multilevel relationships with alternative climates such as these could not only provide substantiation for the theory proposed here but also underscore the practical value of considering personality traits as antecedents of climate.

In light of empirically demonstrating expected—but previously untested—theoretical relationships between personality traits and climate, an important next step is to examine the simultaneous influence of organizational characteristics and social interactions on climate (Schneider & Reichers, 1983). Although it was informative to consider multilevel associations with personality independent of these other factors, consideration of variables from each category of antecedents would provide a richer understanding of climate formation. Doing so would allow researchers to consider the relative importance of organizational characteristics, social interactions, and individual differences in the creation and change of organizational climates. One means of testing these factors as climate antecedents would be to follow a sample of newly formed groups (e.g., work teams, work sites, franchises) from formation to maturation. A sample of groups undergoing changes in leaders, personnel, or policies could likewise be examined. In either case, longitudinally assessing climate and its proposed antecedents at regular intervals would enable researchers to assess climate change and the relative influence of the proposed antecedents in the process. This is an important next step in improving the scientific understanding of organizational climate.

As an extension of the preceding recommendation, there are theoretical reasons to believe that personality's multilevel relationships with climate could change in magnitude or direction over time. For example, although we demonstrated that emotional stability is positively associated with safety climate at individual and group levels using a snapshot of these relationships in relatively new teams (mean tenure = 3.77 years, *SD* = 3.85), it is possible that the greater sensitivity to threat cues for emotionally unstable individuals could eventually have a corrective impact on safety climate. That is, the initial negative impact of emotionally unstable individuals on safety climate perceptions could change with time such that the presence of these individuals could ultimately promote positive changes in workplace safety to the extent that they help to create greater awareness of possible safety threats. However, this would only be true to the extent that emotionally unstable individuals take the effort to promote adaptive changes in workplace safety to alleviate safety-related anxiety. We recommend that researchers consider temporal factors such as this to build on the concurrent, multilevel personality–climate relationships demonstrated here.

Conclusion

This study offers three core contributions to the climate literature. First, it supports the theoretical expectation that personality traits affect climate. Using personality as an exemplar in the domain of safety, we demonstrated meaningful multilevel associations between safety climate and the personality traits of emotional stability and safety locus of control. Second, after demonstrating support for a preliminary metaphoric theory of homology, we tested and found support for a proportional theory of homology, indicating that aggregate associations between personality and climate are more than 2½ times stronger than associations at the individual level. We posited that this was due to group-level personality representing a more accurate assessment of the collective's influence on climate. Finally, this study's results revealed that personality appears to have an additive effect on climate, such that it can have meaningful workgroup-level associations with climate even when there is not substantial within-group clustering in personality. Collectively, these contributions highlight the value of considering personality traits as multilevel antecedents of climate for future research and practice.

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Notes

1. We note that the expected positive association between emotional stability and safety climate assumes a concurrent examination of these two constructs. However, as noted by a reviewer, when considered longitudinally, there are theoretical reasons to expect that this association may change direction over time (i.e., become negative). We elaborate on this point in the "Limitations and Future Directions" section of the "Discussion."
2. As a basic test of the presence of common method bias in our data, we compared individual-level variable intercorrelations for the employees who completed the measures in one session ($n = 482$) versus two sessions ($n = 65$). The presence of common method bias would be indicated by inflated variable intercorrelations in the one-session group relative to the two-session group. Although there were only trivial differences in correlation magnitude across the two groups, it is noteworthy that of the 21 possible intercorrelations, only 3 (14%) were stronger in

magnitude in the one-session group relative to the two-session group. This provides evidence to suggest that common method bias does not play a substantive role in these data.

3. We assessed self-reported workgroup injuries (M = 0.68, SD = 2.31) and accidents (i.e., non-injurious safety incidents; M = 4.63, SD = 17.83) over the preceding 6 months as possible control variables because these variables represent organizational events that have been shown to affect safety climate perceptions across levels of analysis (Beus, Payne, Bergman, & Arthur, 2010). However, the inclusion of these covariates did not affect the direction or statistical significance of our hypothesis tests at the individual or group levels and so we elected not to include these variables in our final models (Atinc, Simmering, & Kroll, 2012; Becker, 2005).
4. Workgroup-level hypothesis test results (H2a-b, H4a-b) were unchanged in direction or statistical significance whether workgroups with out-of-range $r_{wg(j)}$ estimates were excluded from the analyses.
5. Although we focused on mean and minimum score group-level operationalizations of personality for the theoretical reasons noted previously, we also tested maximum score and dispersion operationalizations as safety climate predictors for completeness. With the maximum score personality operationalization, whereas locus of control remained significantly associated with safety climate (b = 0.40, p < .05), emotional stability did not (b = 0.05, *ns*). With dispersion—operationalized as the standard deviation of personality scores—neither locus of control (b = 0.09, *ns*) nor emotional stability (b = −0.22, *ns*) was significantly associated with safety climate.

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