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PSYCHOLOGICAL SAFETY: A META-ANALYTIC REVIEW AND EXTENSION

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Although psychological safety research has flourished in recent years, and despite the empirical support for the important role of psychological safety in the workplace, several critical questions remain. In order to address these questions, we aggregate theoretical and empirical works, and draw on 136 independent samples representing over 22,000 individuals and nearly 5,000 groups, to conduct a comprehensive meta-analysis on the antecedents and outcomes of psychological safety. We not only present the nomological network of psychological safety but also extend this research in 4 important ways. First, we compare effect sizes to determine the relative effectiveness of antecedents to psychological safety. Second, we examine the extent to which psychological safety influences both task performance and organizational citizenship behaviors over and beyond related concepts such as positive leader relations and work engagement. Third, we examine whether research design characteristics and national culture alter validities within the nomological network, thus promoting a more accurate and contextualized understanding of psychological safety. Finally, we test the homology assumption by comparing the effect sizes of the antecedents and outcomes of psychological safety across individual and group levels of analysis. We conclude with a discussion of the areas in need of future examination.

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Introduction

Today's dynamic and hypercompetitive environments have rendered continuous improvements through learning, change, and innovation imperative to organizational success. These processes develop across multiple levels of the organization as individuals and groups engage in behaviors such as speaking up, collaborating, and experimenting (Grant & Ashford, 2008; Nembhard & Edmondson, 2011). In turn, employees are expected to take a more active role at work, which has resulted in organizational scholars attempting to identify the factors that foster the willingness by employees to take interpersonal risks and invest their energies into work (Kahn, 1990). One cognitive state that has emerged as a key factor in facilitating the process of learning, organizational change, and employee engagement is *psychological safety*—the belief that the workplace is safe for interpersonal risk taking (Edmondson, 1999; Kahn, 1990).

Psychological safety was introduced to the organizational sciences a half century ago by Schein and Bennis (1965), but it is only in recent years that empirical work has flourished. This research has generally demonstrated that psychological safety allows employees "to feel safe at work in order to grow, learn, contribute, and perform effectively in a rapidly changing world" (Edmondson & Lei, 2014, p. 23). However, despite the growing body of empirical support for the important role of psychological safety in today's workplace, several important questions remain. In order to address these questions and move research on psychological safety forward, we conducted a comprehensive meta-analysis on the antecedents and outcomes of psychological safety. In doing so, we hope to contribute to the literature in four important ways.

First, although many antecedents of psychological safety have been proposed in the extant literature, their relative importance remains unclear. Here, we not only compare antecedents across categories within the nomological network of psychological safety but also employ a nuanced approach, allowing us to examine the effect sizes of similar, yet unique, antecedent constructs within broad categories. By being detailed in our development, we are able to determine the relative effectiveness of antecedents to psychological safety. Given the importance of psychological safety to workplace outcomes, our study advances a better understanding of the drivers of psychological safety perceptions.

Second, in order to fully understand psychological safety's role in the workplace, we not only present the nomological network of psychological safety but also explore the incremental validity of psychological safety over and above related constructs. Specifically, we examine the extent to which psychological safety accounts for unique variance in both task performance and organizational citizenship behaviors over and beyond

constructs capturing positive leader relations, work design characteristics, and work engagement. Hence, our meta-analysis highlights psychological safety's validity in relation to important work outcomes, above and beyond the effects of antecedents that may lead to the emergence of psychological safety itself. Based on these analyses, we identify promising avenues by which psychological safety theory could be further extended.

Third, prior research has rarely theorized or empirically tested the contingencies that may influence the relative importance of psychological safety. Yet, understanding the boundary conditions of psychological safety validities within its nomological network is crucial to advance a more rigorous, accurate, and meaningful theory of this increasingly important construct (Seibert, Wang, & Courtright, 2011). To address this issue, we first examine whether research design characteristics have an effect on validities within the nomological network. Further, we extend our examination to substantive contingencies by exploring the influence of national culture on psychological safety effect sizes. Specifically, we examine uncertainty avoidance (UA) as a theory-driven moderator of the effect sizes in the nomological network. Researchers have long proposed that national culture may influence important work outcomes in organizations (Taras, Kirkman, & Steel, 2010), and recent calls have been made to examine the role of national culture in psychological safety perceptions (Edmondson & Lei, 2014). Accordingly, our study contributes to a more contextualized understanding of psychological safety.

Finally, we examine and compare the effect sizes of the antecedents and outcomes of psychological safety across individual and group levels of analysis. Though researchers generally treat psychological safety as homologous across different levels of analysis, this assumption has remained largely untested (Edmondson & Lei, 2014). If this assumption is not supported by empirical evidence, psychological safety theory may require further development before generalizing inferences drawn from one level of analysis to other levels. In the next section, we begin by conceptualizing the psychological safety construct.

Psychological Safety Conceptualized

Schein and Bennis (1965) introduced psychological safety as a critical part of the "unfreezing" process required for organizational learning and change. They proposed that psychological safety reduces perceived threats, removes barriers to change, and creates a context which "encourages provisional tries and which tolerates failure without retaliation, renunciation, or guilt" (p. 45). Kahn (1990) suggested that psychological safety was a condition necessary for people to feel attachments to—and engagement in—their work roles. He defined it as "feeling able to show

and employ one's self without fear of negative consequences to self-image, status, or career" (p. 708).

More recently, Edmondson (1999) defined psychological safety as a shared belief that the team is safe for interpersonal risk taking. Thus, whereas Schein and colleagues (Schein, 1993; Schein & Bennis, 1965) and Kahn (1990) focus on individual perceptions of psychological safety, Edmondson's (1999) initial work casts psychological safety as a group-level construct. Although these seminal works emerge from disparate literatures and speak to different levels of analysis, they should not be seen as competing viewpoints but rather as complementary views of the same construct. Indeed, these conceptualizations of the psychological safety construct converge around a single, unifying principle: the importance of creating a workplace in which perceptions of interpersonal risk are minimized. As noted by Edmondson and Lei (2014), "a central theme in research on psychological safety—across decades and levels of analysis—is that it facilitates the willing contribution of ideas and actions to a shared enterprise" (p. 24).

Similar Constructs

Psychological safety represents a cognitive state that is unique from a number of related states examined in the organizational sciences. We delineate the similarities and differences between psychological safety and three related and commonly studied constructs: psychological empowerment, work engagement, and trust. Psychological empowerment represents an intrinsic motivational state in which employees feel they have a sense of control over their work (Spreitzer, 1995). It is comprised of four cognitions: meaning, self-determination, competence, and impact. Work engagement refers to a cognitive state in which individuals invest their personal resources and energies into their work roles and tasks (Christian, Garza, & Slaughter, 2011; Kahn, 1990).

Although psychological empowerment, work engagement, and psychological safety all represent positive motivational states toward one's work, they are distinct in that psychological empowerment and work engagement refer to one's cognitions about their specific jobs or tasks (Spreitzer, 1995). Psychological safety, on the other hand, refers to perceptions of the broader social and work environment, and how people perceive that others in the workplace will respond to risk-taking behaviors (Carmeli & Gittell, 2009). Thus, it represents perceptions one holds of the environment in which they work rather than about their specific jobs or tasks.

Another noteworthy construct is trust, defined as the willingness to be vulnerable to the actions of others (Mayer, Davis, & Schoorman, 1995).

Like psychological safety, trust captures elements of vulnerability and risk one perceives in the workplace (Edmondson, 2004). Indeed, Edmondson (1999) noted the similarities between trust and psychological safety in her seminal work. However, Edmondson (2004) differentiated the two constructs by highlighting the focus of each constructs. Specifically, trust captures one's willingness to be vulnerable to others, thus demarcating one's willingness to give the *other person* the benefit of the doubt. Psychological safety, on the other hand, captures the extent to which one believes that *others will give them* the benefit of the doubt when taking risks (Edmondson, 2004). In sum, although psychological safety exhibits some conceptual similarities to other cognitive states often examined in organizational research, it is also conceptually unique in capturing perceptions of risk taking in the workplace.

The Nomological Network of Psychological Safety

In this section, we review extant theory and empirical research to provide a framework for formulating and testing the nomological network of the psychological safety construct. In doing so, we also aim to provide a platform to assess the relative effectiveness of each group of antecedent variables, as well as each variable within a group, in bringing about psychological safety.

Antecedents of Psychological Safety

Kahn (1990) very broadly identified four antecedents to psychological safety: interpersonal relationships, group dynamics, leadership, and organizational norms. Beyond these contextual factors, Kahn (1990) also recognized the potential influence of individual differences and called for researchers to explore the impact of dispositional factors on psychological safety. Recent theoretical and empirical works have answered this call (e.g., Edmondson & Mogelof, 2005). Several personality traits related to learning, risk taking, and self-expression have been posited to impact psychological safety. For instance, a trait commonly associated with psychological safety is proactive personality, which reflects a stable disposition toward engaging in proactive behaviors, largely unaffected by situational forces (Bateman & Crant, 1993). Proactive individuals take it upon themselves to enact change, detect problems, and subsequently solve those problems (Crant, 2000; Seibert, Crant, & Kraimer, 1999). As such, those with more proactive personalities are less likely to perceive a situation as being psychologically unsafe—even if contextual factors suggest otherwise (Chan, 2006). For instance, Detert and Burris (2007) found that proactive personality was a significant predictor of subordinate

perceptions of psychological safety beyond the influence of satisfaction and leadership.

Of the Big Five personality constructs, two have been theoretically linked to psychological safety: emotional stability and openness to experience. Emotionally stable individuals are more likely to perceive a psychologically safe environment because they tend to be calm, relaxed, and secure as opposed to anxious, hostile, and vulnerable to stress (Costa & McCrae, 1992; Judge, Bono, & Locke, 2000). Additionally, individuals that are open to new experiences tend to be curious and imaginative with a preference for novelty (Costa & McCrae, 1992). As mentioned by Edmondson and Mogelof (2005), "being open to new ideas and different ways of doing things may increase the likelihood that individuals would feel safe taking risks and exposing their vulnerabilities in a work environment" (p. 118). Indeed, a study of the impact of personality on risk taking found that openness was a predictor of risk taking in one's career (Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005).

Finally, learning orientation is a stable dispositional construct that is characterized by a focus on increasing competence and developing new skills (Dweck, 1986). Those with a learning orientation view making mistakes as a necessary and important part of their self-development, and indeed, this dispositional construct has been shown to positively affect psychological safety at both the individual (Chiu, Leung, Kong, & Lee, 2011) and group levels (Wilkens & London, 2006). To summarize, we put forth the following hypothesis:

Hypothesis 1: Psychological safety is positively related to (a) proactive personality, (b) emotional stability, (c) openness to experience, and (d) learning orientation.

Both Kahn (1990) and Edmondson (1999) identify positive relationships with leaders as having a crucial influence on perceptions of psychological safety. Relationships with leaders signal key information to employees concerning support, resilience, consistency, trust, and competence (Kahn, 1990). Further, the social exchanges between leaders and followers have a crucial impact on the formalization of expectations regarding what is and is not appropriate behavior (Edmondson, 2004). As such, it is no surprise that a variety of leadership constructs have been examined as precursors to psychological safety, including transformational leadership (e.g., Detert & Burris, 2007), ethical leadership (e.g., Walumbwa & Schaubroeck, 2009), servant leadership (e.g., Schaubroeck, Lam, & Peng, 2011), leader–member exchange (Coombe, 2010), trust in one's leader (e.g., Madjar & Ortiz-Walters, 2009), and management style (e.g., Halbesleben & Rathert, 2008). Thus, we expect the following:

Hypothesis 2: Psychological safety is positively related to positive leader relations.

Work design characteristics may also play an important role in shaping the psychological safety of individuals and teams. Though work design characteristics are not explicitly part of Kahn's (1990) theoretical model of psychological safety antecedents, Edmondson (1999) included such structural features and resources as facilitators of psychological safety. According to job characteristics theory (JCT), work design characteristics have a significant impact on employee psychological states (Hackman & Oldham, 1976). As such, these characteristics are expected to impact psychological safety by signaling to employees that they can be trusted to make important decisions (i.e., autonomy) and by giving employees a clear understanding of their role expectations (i.e., role clarity). Finally, interdependent work should be positively related to psychological safety as it becomes more crucial that employees rely on each other to accomplish their tasks (Edmondson, 1999). Therefore, we expect the following:

Hypothesis 3: Psychological safety is positively related to the work design characteristics of (a) autonomy, (b) interdependence, and (c) role clarity.

Recognizing that interpersonal relationships extend beyond the leader and that the entirety of the social exchange system influences psychological safety, Kahn's (1990) work included constructs designed to capture the overall supportive work context. This support can come from peers and the organization itself. Just as leaders transmit important information to employees regarding norms and appropriate workplace behaviors, employees often look to their peers and other workers for cues (Van Maanen & Schein, 1977; Wiesenfeld, Raghuram, & Garud, 2001). As such, a variety of variables capturing the quality of interpersonal relationships with peers have been linked with psychological safety, including support from team members (Schepers, de Jong, Wetzels, & de Ruyter, 2008), team caring (Bstieler & Hemmert, 2010), and trust in team members (Zhang, Fang, Wei, & Chen, 2010). In addition, research has shown that employees develop global conceptualizations of the extent to which the organization—as a whole—is a supportive entity (Eisenberger, Huntington, Hutchison, & Sowa, 1986). Here as well, variables such as organizational support (Tucker, 2007) and trust in the organization (Carmeli & Zisu, 2009) have been positively linked to psychological safety. Taken together, we expect that:

Hypothesis 4: Psychological safety is positively related to supportive work context.

Outcomes of Psychological Safety

To determine which outcomes are most relevant to psychological safety, we drew primarily from theory in the works of Schein and Bennis (1965), Kahn (1990), and Edmondson (1999). Schein and Bennis (1965), along with Edmondson (1999), identified psychological safety as a cognitive state necessary for learning and change to take place. From the learning and change perspective, a number of behavioral outcomes may result, most notably learning behaviors, information sharing, citizenship behaviors, and creativity. Kahn's (1990) work focused more on the motivational and attitudinal outcomes of psychological safety, with engagement and important job attitudes (i.e., commitment and satisfaction) being primary outcomes of relevance. To complement this stream of motivational outcomes, subsequent theoretical work also identifies task performance as an outcome of psychological safety (Nembhard & Edmondson, 2011). Hence, we focus on these most theoretically relevant outcomes in the following section.

An outcome of psychological safety that has received considerable attention is that of work engagement. Kahn's (1990) work cast psychological safety as a condition necessary for work engagement, defined as "the harnessing of organization members' selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances" (p. 694). Subsequent work has drawn from Kahn's efforts to cast engagement as a motivational state that emerges when one feels safe to engage in their work without fear of negative consequences (e.g., Edmondson & Lei, 2014; Kahn, 1992; May, Gilson, & Harter, 2004). This reduction in fear of negative consequences, which is the primary focus of the psychological safety construct, is crucial to fostering employee investment of physical, emotional, and cognitive resources into their work (Christian et al., 2011). Therefore, we posit the following:

Hypothesis 5: Psychological safety is positively related to work engagement.

Several studies have demonstrated that psychological safety has a direct impact on task performance (e.g., Baer & Frese, 2003; Schaubroeck et al., 2011). Psychological safety minimizes the potential negative ramifications of making mistakes or taking initiative (Edmondson, 1999), which should allow employees and groups to focus on the tasks that lead to improved performance (Faraj & Yan, 2009; Mayer & Gavin, 2005). Therefore, we posit the following:

Hypothesis 6: Psychological safety is positively related to task performance.

Psychological safety has been linked to several behavioral outcomes as well. Drawing from Edmondson and colleagues' research (Edmondson, 1999; Edmondson & Lei, 2014), information sharing among group members has been identified as one of the primary processes by which change and learning occurs in organizations. However, in order for information sharing to take place, employees must perceive that the work context provides an environment in which collaboration and feedback seeking is accepted and encouraged (Nembhard & Edmondson, 2011). Empirical research at both the individual (e.g., Siemsen, Roth, Balasubramanian, & Anand, 2009) and group levels (Bunderson & Boumgarden, 2010) has found that psychological safety is positively related to sharing of information.

Citizenship behaviors—behaviors that are outside of role prescriptions but aid in group and organizational functioning (Organ, 1988)—have also been examined as outcomes of psychological safety. Additionally, voice behavior, the discretionary citizenship behavior of making suggestions for improvement to current work practices and policies (Liang, Farh, & Farh, 2012; Van Dyne & LePine, 1998), is an outcome widely linked with psychological safety. There are potential risks associated with speaking up and employees must assess these risks before deciding whether to voice their opinion (Detert & Burris, 2007; Frazier & Bowler, 2015; Frazier & Fainshmidt, 2012). Because psychological safety creates a context where taking interpersonal risks is encouraged (Edmondson, 1999), employees are more likely to feel that they are safe to speak up, make suggestions, and challenge the current way of doing things (Walumbwa & Schaubroeck, 2009).

Creativity (i.e., the generation of novel ideas; Amabile, 1998) is another behavioral work outcome that has been posited to be positively influenced by psychological safety (Madjar & Ortiz-Walters, 2009). Experimentation that is expected to result from a psychologically safe work context should result in the generation of novel solutions. Similarly, a behavioral outcome identified in early research (e.g., Schein & Bennis, 1965) and more recent theorizing (e.g., Edmondson, 1999) is learning behavior; the role of psychological safety has widely been recognized for both individual learning (e.g., Carmeli, Brueller, & Dutton, 2009; Carmeli & Gittell, 2009) and team learning (e.g., Edmondson, 1999; Wong, Tjosvold, & Lu, 2010). A psychologically safe workplace allows employees to overcome the anxiety and fear of failure that is often necessary for learning to occur (Schein, 1985), enabling employees to focus on improvement rather than being concerned about how others will react to their actions. Hence:

Hypothesis 7: Psychological safety is positively related to (a) information sharing, (b) citizenship behaviors, (c) creativity, and (d) learning behavior.

In terms of attitudinal outcomes, when employees feel safe in their workplace, they are more likely to want to continue in their current jobs along with their current coworkers. As a desire to remain a part of the organization in the long-term emerges, employees develop stronger emotional attachment to the organization (Meyer & Allen, 1991). Thus, psychological safety results in higher levels of commitment (e.g., Detert & Burris, 2007; O'Neill & Arendt, 2008). Research on satisfaction in the workplace has similarly suggested that employees that perceive lower risk in making mistakes are more likely to be satisfied with their work, as psychological safety reduces anxiety and allows them to develop professionally (Hackman & Oldham, 1976). In sum:

Hypothesis 8: Psychological safety is positively related to (a) commitment and (b) satisfaction.

Extending Psychological Safety Research

As discussed above, we seek to extend psychological safety theory by addressing four important, unanswered questions. The previous section establishes the nomological network of psychological safety, thus providing a framework to examine the relative importance of each antecedent. In this section, we motivate the four research questions examined in this study.

Incremental Validity of Psychological Safety

Although empirical research demonstrates that psychological safety matters, *how much* it matters, as well as whether it matters in the presence of related constructs that have also been linked with work outcomes, is an issue that has yet to be empirically assessed. Therefore, we examine the incremental influence of psychological safety on two key outcomes that repeatedly appear in this research stream: task performance and citizenship behavior. First, we explore whether psychological safety explains incremental variance in these outcomes over and above the antecedents that impact its emergence. Second, we examine the incremental validity of psychological safety in the presence of work engagement. Prior research (e.g., Christian et al., 2011; Edmondson, 1999; Rich, LePine, & Crawford, 2010) implies that although psychological safety and engagement are undoubtedly related, psychological safety may entail benefits that extend beyond its influence on engagement. We empirically assess this notion to

more fully understand the relationship between these two variables and how they influence task performance and citizenship behaviors.

Research Question 1: Does psychological safety explain variance in task performance and citizenship behaviors over and beyond its nomological network variables?

Moderators of Psychological Safety Validities

One advantage of meta-analysis is the ability to explore the role of substantive and methodological moderators in altering effect sizes, which can facilitate conceptual refinement and extension within the research stream (Hunter & Schmidt, 2004). Accordingly, we examine whether psychological safety relationships generalize across different study designs. To begin, we examine the possibility of publication biases (Hubbard, 1997) and file-drawer effects (Rosenthal, 1979) by assessing whether there are differences in effect sizes across published and unpublished papers. In addition, we explore whether psychological safety relationships are artifacts of common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We first assess common rater effects by comparing effect sizes drawn from situations where the same person provided both psychological safety and the variable of interest with effect sizes drawn from situations where the relationship was a product of different sources. Then, we assess measurement context effects by comparing effect sizes drawn from situations where psychological safety and the variable of interest were collected at the same point in time with situations in which the variables were collected at different times.

Next, based on prior meta-analytic findings concerning weak correlations between objective and subjective measures of employee performance (Bommer, Johnson, Rich, Podsakoff, & Mackenzie, 1995), we also examine the extent to which the effect sizes of outcome relationships are dependent on whether the criteria of interest were measured subjectively (e.g., "manager ratings of performance") or objectively (e.g., "financial performance"). Finally, because a sizable number of studies relied on student samples, we examine the potential influence of student versus nonstudent samples on effect sizes. Taken together, by assessing the potential impact of these methodological characteristics, we seek to address the following question:

Research Question 2: Do research design characteristics influence effect sizes in the nomological network of psychological safety?

As discussed previously, very little is known about the ways in which national culture might influence the effect sizes between psychological safety and its nomological network. However, Edmondson and Lei (2014) call for research in this area and note that "employees in certain cultures may be particularly hesitant to ask questions, provide feedback, or openly disagree with their superiors" (p. 8), all behaviors that are theoretically affiliated with psychological safety. In other words, it is likely that validities within the nomological network of psychological safety are contingent upon the cultural context within which workplace interpersonal exchange takes place. We heed this call and examine the moderating role of uncertainty avoidance (UA) on the nomological network effect sizes.

UA is the extent to which members of society are threatened by (i.e., high UA) or tolerate (i.e., low UA) uncertainty and ambiguity in the workplace (Hofstede, 1980). Given the focus of UA on risk and ambiguity tolerance, as well as on behaviors that challenge the status quo, it is particularly relevant to psychological safety. However, most of the development of psychological safety theory (and most of the empirical research) has occurred in countries with low UA. It therefore remains unclear whether and how much this construct is relevant in countries where deviations from status quo are less accepted. High UA may countervail the positive effects of psychological safety on work outcomes. On the other hand, psychological safety may be particularly salient in cultures where interpersonal risk taking is not the norm. Likewise, questions remain concerning the emergence of psychological safety across different cultural contexts: Are antecedent predictive validities stable—in terms of both absolute and relative magnitudes—across high and low UA contexts? To explore these potential implications of national cultural context, we ask the following question:

Research Question 3: Does UA influence effect sizes in the nomological network of psychological safety?

Homology Across Levels of Analysis

In aggregating research on the nomological network of psychological safety, we uncovered a critical underlying assumption in the field: Researchers have generally assumed homology across levels of analysis. Indeed, a recent conceptual review of the psychological safety literature noted similarities in findings across levels of analysis (i.e., Edmondson & Lei, 2014). This is consistent with Kahn's and Edmondson's similar views of the psychological safety construct. To illustrate, such similarity implies that psychological safety would have a similar impact on outcomes, regardless of whether psychological safety is measured at the individual

level or as a group climate variable based on shared employee perceptions of their workplace (e.g., Chan, 1998; Zohar & Luria, 2005). This assumption, to our knowledge, has never been empirically tested.

Rousseau (1985) warns researchers of committing this *cross-level fallacy,* assuming constructs maintain theoretical equivalence across levels of analysis or that relationships observed at one level are homologous across different levels of analysis. As Chen and colleagues note, "[t]he assumption of homology is often made but rarely tested . . . Tests of homology can and should play an integral role in the validation of multilevel constructs and theories" (Chen, Bliese, & Mathieu, 2005, p. 378). In order to clarify the nature of psychological safety across different levels of analysis, we build on Edmondson and Lei's (2014) qualitative assessment of the literature and set forth the following question:

Research Question 4: Does psychological safety demonstrate homology across levels?

Method

We conducted a six-pronged search strategy for identifying research to include in our meta-analysis. First, we performed electronic searches of the Google Scholar, ABI/Inform Scholarly Journals, PsycInfo, and Web of Science databases using the keywords "psychological safety." Second, because Edmondson's psychological safety scale is overwhelmingly used to operationalize safety, we also used the online databases to identify any article that cited Edmondson (1999). Third, we supplemented our online search with a manual, targeted search of the following management, psychology, and organizational behavior journals: *Academy of Management Journal*, *Administrative Science Quarterly*, *Journal of Applied Psychology*, *Journal of Management*, *Journal of Organizational Behavior*, *Leadership Quarterly*, *Organizational Behavior and Human Decision Processes*, *Personnel Psychology*, and *Strategic Management Journal*. In order to include unpublished work, we searched for dissertations in Proquest and scholarly conference programs for presented papers. Next, we posted requests for unpublished work on listservs from the Academy of Management and the Society for Industrial and Organizational Psychology. Finally, when relevant articles were coded, we skimmed through reference sections in search for additional studies. In all, our literature search resulted in 457 studies for potential inclusion in our meta-analysis.

For the study to be included in our sample, it had to meet three criteria. First, the study had to empirically assess psychological safety in a manner theoretically consistent with our conceptualization of the construct. Most often, Edmondson's (1999) psychological safety scale or some version of

it was used. In cases where ad hoc scales were developed or other scales were used, we examined the authors' theoretical definitions to ensure that they were appropriate for inclusion. For example, May et al. (2004) drew from the work of Kahn (1990) and Edmondson (1999) to develop their scale, which captured the extent to which employees perceived their workplace was safe for risk taking. Therefore, it was included in our analysis. On the other hand, a number of studies used the term "psychological safety" when measuring perceptions of occupational safety held by employees of an organization. For example, Morrow et al. (2010) defined psychological safety climate as "a specific type of climate defined as an employee's perception of the value or priority of safety at his or her workplace" (p. 1461). This clearly captures elements of occupational safety that is beyond the scope of Edmondson's (1999) conceptualization of psychological safety.

A second criterion was that the study had to report the statistical information necessary to conduct our meta-analyses (i.e., sample sizes and effect sizes—either correlations or statistics convertible to correlations). Finally, only primary studies were included; archival studies and reexaminations of previous datasets were excluded to ensure independence of data sets. Through our literature search and inclusion process, we were able to narrow the pool of relevant studies down to 117 studies representing 136 independent samples. The final sample consisted of 78 published studies, 21 doctoral dissertations, and 18 unpublished working papers or conference presentations, which are indicated with an asterisk in the references section and in the supplementary material that accompanies this manuscript.

Coding Procedures

We utilized a combination of theory-driven and data-driven approaches to create a categorization scheme for coding articles. We started by drawing from the theoretical frameworks of psychological safety to create broad, hierarchical lists of antecedents and outcomes of psychological safety. In developing the categories for coding, we made every effort to balance parsimony and theoretical considerations. For example, variables used in past research on psychological safety to capture positive leader relations include, but are not limited to, trust in leader, transformational leadership, and leader-member exchange (LMX). A common theme running through these variables is that they capture employee perceptions of their leader and a higher score on each is indicative of more positive perceptions of their relationship with the leader.

Similarly, our categories of "work design characteristics" and "supportive work context" were classified with both theory and parsimony as

considerations. Consistent with Seibert et al. (2011) and Hong, Liao, Hu, and Jiang (2013), our meta-analysis aggregated variables including autonomy, flexibility, job enrichment, and task complexity into a broad "work design characteristics" category. "Supportive work context" captured the extent to which the organization and coworkers are supportive, including variables such as trust in coworkers, perceived organizational support, conflict, and social support. Once the category scheme was finalized, all study articles were coded. As we analyzed each article, we coded any relationship between psychological safety and a study variable that was included in our predetermined categories.[1]

To assess the impact of methodological moderators on effect sizes, each relationship was also coded to fit into moderator analyses schemes. In particular, relationships were coded as being based on either "published" or "unpublished" studies and "student" or "nonstudent" samples. Next, relationships were coded as being collected by the "same source" (e.g., the focal employee provided both the measure of psychological safety and the criteria of interest) or by "different sources" (e.g., the focal employee provided the measure of psychological safety but the supervisor provided the criteria of interest). Likewise, relationships were coded as "same time" if both variables were collected at the same point in time or "different time" if there was a lag between the collection of variables. Finally, a distinction was made for "objective criteria" (e.g., financial indices of team performance) and "subjective criteria" (e.g., manager perceptions of team performance).

To assess the moderating role of UA, the country in which the studies were conducted was coded to create our cultural moderator. We designated the sample countries into high and low UA based on whether they were above or below the median UA score for all available countries in Taras et al.'s (2012) meta-analysis of Hofstede's national cultural dimension scores. High UA countries include Belgium, Germany, Israel, Japan, Mexico, and Spain. Low UA countries include Australia, Canada, China, Hong Kong, Ireland, Netherlands, Scotland, Singapore, Sweden, Taiwan, Thailand, and the United States.

To ensure coding reliability and accuracy, studies were coded by dyads of the research team. Each member of the dyad coded the articles independently, and then the dyad met to compare coding. Consensus ranged from 84% (for coding variable reliabilities) to 100% (for coding whether studies were published or unpublished). The overall consensus rate through this coding process was 91%. When discrepancies arose, the dyad would meet to determine if the disagreement could be resolved with

[1]The coding scheme employed and the specific variables included from each study are available from the first author upon request.

information in the study. If not, a third member of the research team, not involved in initial coding of the article, was brought in to help with resolution. All discrepancies and disagreements were eventually resolved through discussion.

Meta-Analytic Calculations

In conducting our meta-analytic calculations, we followed the procedures established by Hunter and Schmidt (2004). Our results aggregate sample-size-weighted mean estimates of the correlations (r). When a study included multiple measures of a single variable (i.e., two variables that could be classified under the same category), and variable intercorrelations were available, a composite correlation was calculated. When intercorrelations were not available, the variable correlations were averaged to ensure that each sample only contributed at most one effect size for each meta-analytic calculation.

We also report validity estimates—population correlation coefficients ($\hat{\rho}$s)—which reflect meta-analyzed correlations corrected for unreliability. In order to create these corrected correlations, we collected interitem reliability estimates (Cronbach's α) when available. As suggested by Kepes, McDaniel, Brannick, and Banks (2013), when no reliability estimates were reported for a given variable, its reliability was imputed based on the average reliability calculated from studies that did report reliability information. Additionally, we report 95% confidence intervals around each population estimate as well as the percentage of variance explained by study artifacts for each correlation. Hunter and Schmidt (2004) propose that moderators are likely present if artifacts do not account for at least 75% of the variance in the correlations. Based on previous research, we set the minimum number of primary studies to justify performing a meta-analysis of the data at three (Chambless & Hollon, 1998; Seibert et al., 2011) except in the case of more specific constructs within the broad category, where we set the minimum to two studies.

As a test for moderators, we conducted weighted regression analyses with random effects models, as recommended by Geyskens, Krishnan, Steenkamp, and Cunha (2009). This technique accounts for the potential that there are correlations between moderators and also that our sets of studies are not identical in their methods or sample characteristics (Borenstein, Hedges, Higgins, & Rothstein, 2010). For each relationship between psychological safety and its nomological network, we included the moderators in the regression if there were at least three studies for each moderator category. Similarly, to explore our research question concerning the homology of relationships across levels, we conducted separate

metaregressions for each relationship in which we had at least three studies at both levels with *level* as the moderator. For all metaregression analyses, we used the package "metafor" in R (Viechtbauer, 2010).

Finally, to explore incremental validity, we followed the procedures outlined by Dudley, Orvis, Lebiecki, and Cortina (2006). First, we created different metacorrelation matrices for the set of meta-analytic effect sizes considered in each analysis. Estimates of the relationships between antecedents and psychological safety as well as estimates of the relationships between psychological safety and outcomes were drawn from the current study. Previous meta-analyses supplied estimates of the relationships between antecedents and outcomes. It should be noted that we were unable to test some of the antecedents due to a lack of previous meta-analyses to provide the estimates (e.g., learning orientation on citizenship behavior). We were also only able to assess these relationships at the individual level due to a lack of data for the group-level analysis. To ensure that findings were not biased by different artifact corrections employed across different meta-analyses, raw, sample-weighted effect sizes (r) were extracted from each study and then corrected for unreliability in both the predictor and the criterion using equal estimates.

Hierarchical regression was employed to assess the relative contribution of psychological safety. First, the criterion (task performance or OCB) was regressed on the predictor (Step 1). Then, the criterion was regressed on the set including both the predictor and psychological safety (Step 2). The change in the amount of variance explained (ΔR^2) between Steps 1 and 2 was used to explore the incremental validity of psychological safety. Finally, the ordering of independent variables was swapped such that psychological safety was entered in Step 1 and the predictor was added in Step 2 to explore whether the predictor captured variance in the outcome above and beyond psychological safety.

Results

Nomological Network

Individual level of analysis. Table 1 presents the meta-analytic correlations within the nomological network of psychological safety at the individual level of analysis. With regard to antecedents, Hypothesis 1 was partially supported as we found that three of the four personality variables were related to psychological safety. Proactive personality ($\hat{\rho} = .35$), emotional stability ($\hat{\rho} = .17$), and learning orientation ($\hat{\rho} = .24$) were positive and significantly related. Contrary to expectations, openness to experience was not significantly related to psychological safety. Hypothesis 2 was supported as psychological safety and positive leader relations were

TABLE 1
Meta-Analysis of Individual-Level Psychological Safety

Variable	k	N	$\bar{r}$	$\hat{\rho}$	CI_L	CI_U	%-Acc
Antecedents							
Proactive personality	6	4,830	.30	.35	.19	.51	3.88
Emotional stability	8	2,936	.14	.17	.07	.27	17.04
Openness to experience	5	2,249	.03	.03	−.11	.18	11.90
Learning orientation	6	1,172	.19	.24	.12	.37	28.81
Positive leader relations	30	10,180	.37	.44	.39	.50	14.34
Inclusive leadership	5	2,383	.27	.36	.30	.42	51.79
LMX	2	554	.28	.38	.30	.45	100.00
Transformational leadership	4	3,829	.38	.42	.36	.48	24.80
Trust in leadership	6	1,280	.32	.39	.31	.47	48.44
Work design characteristics	26	5,768	.41	.53	.40	.66	4.56
Autonomy	8	1,661	.38	.47	.30	.65	9.36
Interdependence	5	1,651	.62	.86	.64	1.00	3.57
Role clarity	6	1,017	.48	.63	.48	.78	15.19
Supportive work context	24	5,045	.40	.49	.39	.59	8.28
Peer support	6	1,293	.50	.62	.38	.86	5.40
Outcomes							
Engagement	13	3,676	.36	.45	.34	.56	10.50
Task performance	18	4,061	.35	.43	.31	.56	7.44
Information sharing	19	3,427	.42	.52	.40	.63	8.70
Citizenship behaviors	16	7,275	.28	.32	.27	.37	25.64
Voice	8	4,758	.27	.31	.26	.35	44.01
Creativity	10	4,567	.11	.13	.06	.21	20.76
Learning behaviors	15	4,648	.48	.62	.51	.73	7.21
Commitment	18	4,811	.39	.48	.38	.57	9.59
Satisfaction	20	8,245	.42	.53	.46	.60	9.25

Note. k = number of correlations. N = cumulative sample size. $\bar{r}$= estimated mean correlation. $\hat{\rho}$= estimated corrected correlation. CI_L and CI_U denote lower and upper limits of a 95% confidence interval. %-Acc = percentage of variance accounted for by sampling error.

significantly related ($\hat{\rho} = .44$). Also, in Table 1, we examined the effect sizes of four specific facets of leadership and all were similar in magnitude, ranging from .36 for inclusive leadership to .42 for transformational leadership. Hypotheses 3 and 4 were also supported, as the relationships between psychological safety and autonomy ($\hat{\rho} = .47$), interdependence ($\hat{\rho} = .86$), role clarity ($\hat{\rho} = .63$), and supportive work context ($\hat{\rho} = .49$) were all significant and positive.

Hypothesis 5 was supported as psychological safety was positively and significantly related to work engagement ($\hat{\rho} = .45$). Hypothesis 6 indicated that psychological safety would be positively related to task performance and this was supported by our results ($\hat{\rho} = .43$). Hypothesis 7 was supported as the mean corrected correlations were significant for

TABLE 2
Meta-Analysis of Group-Level Psychological Safety

Variable	k	N	$\bar{r}$	$\hat{\rho}$	CI_L	CI_U	%-Acc
Antecedents							
Learning orientation	6	354	.32	.40	.15	.65	21.26
Positive leader relations	16	1,583	.34	.39	.28	.50	21.04
Transformational leadership	4	543	.32	.38	.24	.51	38.83
Trust in leader	2	297	.38	.44	.34	.54	96.28
Work design characteristics	26	1,880	.27	.35	.25	.44	29.42
Autonomy	2	172	.27	.35	.21	.49	100.00
Interdependence	6	339	.28	.40	.21	.59	43.29
Role clarity	7	413	.41	.51	.37	.65	44.64
Supportive work context	18	1,449	.41	.51	.40	.61	23.94
Peer support	5	586	.49	.57	.48	.66	55.60
Organizational support	4	253	.34	.44	.13	.76	18.67
Outcomes							
Engagement	4	264	.32	.44	.17	.70	28.63
Task performance	33	2,802	.24	.29	.20	.38	22.13
Information sharing	9	644	.41	.50	.32	.67	20.75
Creativity	8	841	.24	.29	.14	.44	25.50
Learning behaviors	21	1,686	.42	.52	.44	.60	34.98
Satisfaction	4	299	.49	.69	.42	.97	18.55

Note. k = number of correlations. N = cumulative sample size. $\bar{r}$= estimated mean correlation. $\hat{\rho}$= estimated corrected correlation. CI_L and CI_U denote lower and upper limits of a 95% confidence interval. %-Acc = percentage of variance accounted for by sampling error.

all behavioral outcome variables, demonstrating a positive and significant relationship with information sharing ($\hat{\rho} = .52$), citizenship behaviors ($\hat{\rho} = .32$), creativity ($\hat{\rho} = .13$), and learning behavior ($\hat{\rho} = .62$). Finally, Hypothesis 8 received support as the mean corrected correlations between psychological safety and both commitment ($\hat{\rho} = .48$) and satisfaction ($\hat{\rho} = .53$) were significant and in the expected direction.

Group level of analysis. We were unable to assess a number of our hypotheses at the group level because of the reduced number of studies that have been conducted. The results of this analysis are presented in Table 2. With regard to personality variables at the group level, only learning orientation had enough of a sample size and it was positively related to psychological safety ($\hat{\rho} = .40$), providing support for Hypothesis 1d. Similar to the individual level, we found that positive leader relations ($\hat{\rho} = .39$), autonomy ($\hat{\rho} = .35$), interdependence ($\hat{\rho} = .40$), role clarity ($\hat{\rho} = .51$), and supportive work context ($\hat{\rho} = .51$) were all positively and significantly related to psychological safety, supporting Hypotheses 2–4. Within positive leader relations, the effect sizes of transformational leadership and trust in leader were again similar to the broad category, whereas

peer support resulted in the largest effect size within the supportive work context category.

Hypothesis 5 was again supported as psychological safety was significantly and positively related to work engagement ($\hat{\rho} = .44$). Hypothesis 6 was supported at the group level as psychological safety was positively related to task performance ($\hat{\rho} = .29$). We did not have enough primary studies to examine citizenship behaviors, but we found that information sharing ($\hat{\rho} = .50$), creativity ($\hat{\rho} = .29$), and learning behavior ($\hat{\rho} = .52$) were significantly related to psychological safety, supporting Hypotheses 7a, 7c, and 7d. We were not able to examine the relationship with commitment at the group level but did find that satisfaction ($\hat{\rho} = .69$) was significantly related to psychological safety, providing support for Hypothesis 8b.

Incremental validity analysis. The analysis for task performance is presented in Table 3. Here, psychological safety predicts incremental variance in task performance over and above all of the variables included in the analysis. We also conducted analyses to examine the other constructs' ability to predict incremental variance over and above psychological safety. For emotional stability, proactive personality, autonomy, and peer support, no additional variance was predicted beyond psychological safety, and for all other constructs, the incremental variance predicted beyond psychological safety was .10 or below.

Table 4 presents the incremental validity analysis for organizational citizenship behaviors. Again, for all of the variables from the nomological network that we were able to examine, psychological safety predicted variance in the outcome over and above each individual construct, though the amount of incremental variance is not as strong in most cases. Additionally, for the majority of the variables, psychological safety predicts more incremental variance than the other variables do when psychological safety is added first to the analysis. Only LMX and autonomy predict an equal or more incremental variance in organizational citizenship behavior over and above psychological safety. In sum, these results show that psychological safety does explain unique variance in both outcomes over and beyond each of the nomological network variables, providing an affirmative response to Research Question 1.

Moderator Analyses

Examining percentages of variance accounted for by sampling error, it was clear that subgroup heterogeneity existed within our nomological network categorization scheme. At the individual level and at the group level, sampling error for every construct category accounted for less than 75% of the variance in the effect sizes. Thus, when sample size allowed

TABLE 3
Hierarchical Regression Analyses: Incremental Validity of Psychological Safety as a Predictor of Job Performance

Variable	Source	N	$\bar{r}_x$	$\bar{r}_y$	$\hat{\rho}_x$	$\hat{\rho}_y$	R^2	ΔR^2_1	ΔR^2_2
Antecedents									
Positive personality Traits									
Emotional stability	Judge et al. (2013)	4,696	.14	.07	.18	.11	.31	.29	.00
Openness	Judge et al. (2013)	3,997	.03	.09	.04	.15	.32	.30	.02
Proactive personality	Fuller & Marler (2009)	2,478	.30	.15	.37	.23	.31	.26	.00
Learning orientation	Payne et al. (2007)	1,514	.19	.15	.24	.23	.32	.26	.01
Positive leader relations									
LMX	Dulebohn et al. (2012)	1,435	.28	.30	.35	.46	.38	.18	.08
Transformational	Wang & Leung (2011)	4,616	.38	.19	.46	.28	.31	.23	.01
Trust in leadership	Colquitt et al. (2007)	2,100	.32	.22	.38	.32	.32	.22	.01
Work design characteristics									
Autonomy	Humphrey et al. (2007)	3,077	.38	.18	.49	.28	.31	.23	.00
Interdependence	Humphrey et al. (2007)	2,296	.62	.14	.81	.22	.46	.41	.15
Role clarity	Tubre & Collins (2000)	2,281	.48	.15	.61	.23	.32	.27	.05
Supportive work context									
Peer support	Chiaburu & Harrison (2008)	2,741	.50	.20	.65	.32	.31	.21	.00
Organizational support	Rhoades & Eisenberger (2002)	515	.63	.16	.76	.23	.38	.33	.08
Proximal outcome									
Engagement	Christian et al. (2011)	4,068	.36	.36	.43	.53	.41	.13	.10

Note. N = Harmonic mean. $\bar{r}_x$= estimated mean correlation with psychological safety. $\bar{r}_y$= estimated mean correlation with job performance. $\hat{\rho}_x$= estimated corrected correlation with psychological safety. $\hat{\rho}_y$= estimated corrected correlation with job performance. R^2 = variance in job performance accounted for by the set of psychological safety and predictor. ΔR^2_1 = incremental variance in job performance accounted for by psychological safety beyond predictor. ΔR^2_2 = incremental variance in job performance accounted for by predictor beyond psychological safety.

TABLE 4

Hierarchical Regression Analyses: Incremental Validity of Psychological Safety as a Predictor of Organizational Citizenship Behavior

Variable	Source	N	$\bar{r}_x$	$\bar{r}_y$	$\hat{\rho}_x$	$\hat{\rho}_y$	R^2	ΔR^2_1	ΔR^2_2
Antecedents									
Positive personality traits									
Emotional stability	Judge et al. (2013)	5,449	.14	.13	.18	.17	.14	.11	.01
Openness	Judge et al. (2013)	3,664	.03	.03	.04	.04	.13	.13	.00
Proactive personality	Fuller & Marler (2009)	3,672	.30	.26	.37	.32	.17	.07	.04
Positive leader relations									
LMX	Dulebohn et al. (2012)	1,446	.28	.34	.35	.42	.23	.05	.10
Transformational	Wang & Leung (2011)	5,724	.38	.26	.46	.31	.16	.06	.03
Trust in leadership	Colquitt et al. (2007)	2,397	.32	.22	.38	.26	.15	.08	.02
Work design characteristics									
Autonomy	Christian et al. (2011)	1,061	.38	.28	.49	.36	.17	.04	.04
Supportive work context									
Peer support	Chiaburu & Harrison (2008)	2,593	.50	.14	.65	.18	.13	.10	.01
Organizational support	Rhoades & Eisenberger (2002)	532	.63	.21	.76	.25	.13	.07	.00
Proximal outcome									
Engagement	Christian et al. (2011)	4,391	.36	.26	.44	.31	.16	.06	.03

Note. N = Harmonic mean. $\bar{r}_x$ = estimated mean correlation with psychological safety. $\bar{r}_y$ = estimated mean correlation with organizational citizenship behavior. $\hat{\rho}_x$ = estimated corrected correlation with psychological safety. $\hat{\rho}_y$ = estimated corrected correlation with organizational citizenship behavior. R^2 = variance in organizational citizenship behavior accounted for by the set of psychological safety and predictor. ΔR^2_1 = incremental variance in organizational citizenship behavior accounted for by psychological safety beyond predictor. ΔR^2_2 = incremental variance in organizational citizenship behavior accounted for by predictor beyond psychological safety.

(i.e., at least three studies per each level of the moderator category), we conducted regression analyses to assess potential moderators. The results of these regression analyses are presented in Tables 5 and 6.

For individual-level regression analyses, the results show that a majority of the moderators (24 out of 33; 73%) were not significant. There were, however, a few instances where study characteristics moderated psychological safety relationships. Relationships between learning orientation and psychological safety were significantly lower in studies that used students as participants ($\hat{\rho} = .13$) than nonstudents ($\hat{\rho} = .45$). Relationships between psychological safety and positive leader relations were larger when ratings of both variables were provided by the same source ($\hat{\rho} = .45$) than different sources ($\hat{\rho} = .29$). For outcomes, both task performance and citizenship behaviors were more strongly related to psychological safety in studies that were published ($\hat{\rho} = .54$ and .35, respectively) versus unpublished studies ($\hat{\rho} = .19$ and .26, respectively). Task performance also demonstrated larger effect sizes when the outcome measure was subjective ($\hat{\rho} = .40$) rather than objective ($\hat{\rho} = .07$). Finally, the relationship between satisfaction and psychological safety was significantly stronger when both were measured at the same point in time ($\hat{\rho} =$ .54 vs. .25) and when students were participants ($\hat{\rho} = .77$ vs. .50).

At the group level, we were able to assess fewer moderators due to sample size restrictions; the majority (14 out of 16; 88%) were nonsignificant. The only significant results emerged for positive leader relations, where again the effect sizes were smaller when different sources provided ratings of psychological safety and leadership ($\hat{\rho} = .15$) than same sources ($\hat{\rho} = .44$). In addition, effect sizes were smaller when the studies were unpublished ($\hat{\rho} = .16$ vs. .37) for the group-level positive leadership category. Overall, we find that there are areas of research design that require attention, which we discuss later in the manuscript.

Results regarding the moderating influence of UA are presented in Table 7. The effect sizes did vary for the majority of the nomological network for which we had enough studies to conduct the subgroup analysis. Positive personality traits effects were stronger in high UA cultures ($\hat{\rho} =$ .54) than for low UA cultures ($\hat{\rho} = .24$). Positive leader relations effects were lower in high UA cultures ($\hat{\rho} = .30$) than in low UA cultures ($\hat{\rho} =$ .44). Work design characteristics demonstrated a stronger effect in high UA cultures ($\hat{\rho} = .74$) compared to low UA cultures ($\hat{\rho} = .39$), as did supportive work context ($\hat{\rho} = .71$ compared to $\hat{\rho} = .35$).

With regard to outcomes, the effect on work engagement was stronger in high UA cultures ($\hat{\rho} = .58$) than in low UA cultures ($\hat{\rho} = .28$). Similarly, the effect on task performance was stronger in high UA cultures ($\hat{\rho} = .78$) compared to low UA cultures ($\hat{\rho} = .29$), whereas citizenship behaviors were similar in both ($\hat{\rho} = .30$ to $\hat{\rho} = .34$). Learning behaviors effects were

TABLE 5
Meta-Regression Results for Moderator Analysis—Individual Level

Variable	Estimate	SE	*Z* value	*p* value	Q_R	Q_M
Individual level						
Emotional stability					96.06**	.94
Time	.05	.07	.75	.45		
Published	.05	.07	.66	.51		
Openness					73.86**	2.63
Time	−.12	.08	−1.62	.10		
Learning orientation					7.21	19.95**
Time	−.04	.08	−.47	.64		
Student	.21**	.08	2.65	.01		
Positive leader relations					228.40**	14.83**
Source	−.33**	.11	−3.08	.01		
Time	−.13	.07	−1.90	.06		
Published	.11	.06	1.85	.06		
Work design characteristics					616.94**	.70
Published	−.03	.10	−.29	.77		
Student	−.08	.12	−.68	.50		
Supportive work context					245.05**	1.49
Time	−.07	.12	−.60	.55		
Published	−.04	.10	−.46	.65		
Student	−.09	.11	−.81	.42		
Engagement					149.58**	.01
Published	−.01	.09	−.09	.93		
Information sharing					319.83**	.91
Published	−.10	.10	−.95	−.30		
Task performance					67.42**	35.71**
Subjective	.19**	.06	2.91	.01		
Source	−.13*	.06	−2.33	.02		
Time	.07	.06	1.20	.23		
Published	−.20**	.06	−3.33	.01		
Student	.12	.06	1.94	.05		
Citizenship behavior					55.17**	12.06**
Source	.03	.04	.65	.52		
Time	.03	.06	.60	.55		
Published	−.14**	.04	−3.26	.01		
Creativity					211.49**	0.75
Source	.02	.10	.22	.82		
Time	−.08	.12	−.64	.53		
Published	−.09	.12	−.72	.47		
Learning behavior					239.30**	3.10
Time	.02	.10	.23	.82		
Published	−.18	.11	−1.69	.09		
Student	−.01	.11	−.02	.99		
Commitment					298.74**	.01
Published	−.01	.08	−.04	.97		

(*Continued*)

TABLE 5 (continued)

Variable	Estimate	SE	*Z* value	*p* value	Q_R	Q_M
Satisfaction					224.41**	12.61**
Time	−.26**	.09	−2.86	.01		
Published	−.03	.06	−.51	.60		
Student	−.18**	.07	−2.62	.01		

Note. Subjective, 1 = yes, 2 = no; Source, 1 = same, 2 = different; Time, 1 = same, 2 = different; Published, 1 = yes, 2 = no; Student, 1 = yes, 2 = no. Unstandardized estimates are reported. SE = standard error. $Q_R = Q$ statistic for residual heterogeneity. $Q_M = Q$ statistic for overall moderator model.
*$p < .05$. ** $p < .01$.

TABLE 6
Meta-Regression Results for Moderator Analysis—Group Level

Variable	Estimate	SE	*Z* value	*p* value	Q_R	Q_M
Group level						
Learning orientation					36.70**	.46
Published	.14	.20	.68	.50		
Positive leader relations					38.92**	21.65**
Source	−.21*	.09	−2.40	.02		
Time	−.02	.14	−0.12	.90		
Published	−.22*	.11	−2.11	.04		
Work design characteristics					92.75**	3.18
Source	−.10	.13	−.79	.43		
Published	−.14	.10	−1.43	.15		
Student	−.04	.12	−.34	.74		
Supportive work context					153.08**	.01
Published	.01	.11	.09	.93		
Task performance					111.15**	22.62**
Subjective	−.02	.10	−.21	.83		
Source	−.12	.08	−1.56	.12		
Time	−.12	.07	−1.88	.06		
Published	−.12	.07	−1.71	.09		
Student	.12	.09	1.38	.17		
Learning behavior					65.73**	5.07
Source	.09	.09	1.05	.29		
Published	−.10	.08	−1.22	.22		
Student	.06	.08	.76	.45		

Note. Subjective, 1 = yes, 2 = no; Source, 1 = same, 2 = different; Time, 1 = same, 2 = different; Published, 1 = yes, 2 = no; Student, 1 = yes, 2 = no. Unstandardized estimates are reported. SE = standard error. $Q_R = Q$ statistic for residual heterogeneity. $Q_M = Q$ statistic for overall moderator model.
*$p < .05$. ** $p < .01$.

higher in high UA cultures ($\hat{\rho} = .77$) compared to low UA cultures ($\hat{\rho} = .60$). Finally, the effect on commitment was higher in high UA cultures ($\hat{\rho} = .57$) compared to low UA cultures ($\hat{\rho} = .41$). Taken together, it appears that psychological safety's relationships with its nomological

TABLE 7
Meta-Analysis of Psychological Safety: Cultural Moderator

	High uncertainty avoidance							Low uncertainty avoidance						
Variable	k	N	$\bar{r}$	$\hat{\rho}$	CI_L	CI_U	%-Acc	k	N	$\bar{r}$	$\hat{\rho}$	CI_L	CI_U	%-Acc
Antecedents														
Positive personality traits	7	2,669	.43	.54	.36	.72	4.93	23	8,603	.20	.24	.17	.31	12.27
Positive leader relations	4	904	.26	.30	.24	.37	100.00	21	7,994	.37	.44	.39	.50	15.01
Work design characteristics	4	1,276	.50	.74	.43	1.00	3.36	18	3,003	.30	.39	.25	.54	8.35
Supportive work context	4	622	.59	.71	.61	.81	35.52	15	2,736	.28	.35	.23	.47	13.87
Outcomes														
Engagement	5	1,685	.48	.58	.43	.74	8.22	7	1,440	.21	.28	.19	.37	43.52
Task performance	4	1,217	.65	.78	.61	.95	4.72	13	2,675	.22	.29	.21	.36	33.28
Citizenship behaviors	3	774	.24	.30	.19	.41	46.05	10	5,190	.30	.34	.27	.40	21.21
Learning behaviors	6	1,508	.63	.77	.61	.92	6.13	6	2,329	.44	.60	.49	.71	17.46
Commitment	5	1,669	.47	.57	.42	.72	9.87	9	1,676	.33	.41	.29	.54	18.06

Note. k = number of correlations. N = cumulative sample size. $\bar{r}$= estimated mean correlation. $\hat{\rho}$= estimated corrected correlation. CI_L and CI_U denote lower and upper limits of a 95% confidence interval. %-Acc = percentage of variance accounted for by sampling error.

TABLE 8
Meta-Regression Results for Tests of Homology Across Levels

Variable	Estimate	SE	*Z* value	*p* value	Q_R	Q_M
Individual level						
Learning orientation	0.17	0.10	1.68	0.09	71.33**	2.81
Positive leader relations	−0.05	0.06	−0.83	0.41	544.76**	0.69
Work design characteristics	−0.01	0.07	−0.20	0.84	798.80**	0.04
Supportive work context	0.06	0.06	0.99	0.32	540.07**	0.99
Engagement	0.06	0.11	0.56	0.57	197.10**	0.32
Conflict	0.05	0.13	0.43	0.67	266.70**	0.19
Relationship conflict	0.12	0.13	0.89	0.37	87.24**	0.81
Task conflict	−0.21	0.17	−1.21	0.23	136.15**	1.47
Information sharing	0.07	0.10	0.68	0.49	481.12**	0.47
Task performance	−0.01	0.07	−0.17	0.86	760.55**	0.03
Creativity	0.06	0.08	0.82	0.41	258.12**	0.68
Learning behavior	−0.04	0.06	−0.62	0.53	424.98**	0.39
Satisfaction	0.12	0.10	1.25	0.21	424.79**	1.57

Note. Unstandardized regression estimates are reported. SE = standard error. $Q_R = Q$ statistic for residual heterogeneity. $Q_M = Q$ statistic for overall moderator model.
*$p < .05$. **$p < .01$.

network are impacted by the cultural dimension of UA, a finding we return to in the discussion.

Homology Across Levels

Table 8 presents the results of our regression analyses, assessing homology across levels (when possible) for each relationship between psychological safety and its nomological network. In these analyses, we ran regressions with the correlations of each study as the dependent variable and study level as the moderator. As can be seen in Table 8, none of the relationships examined resulted in a significant coefficient estimate, providing evidence that the magnitude of the relationships is not significantly different across levels. Only learning orientation approached statistical significance as these effects were significant at $p < .10$. These findings provide support for the prevalent assumption of homology across both individual and group levels of analysis.

Discussion

This study presents the first comprehensive, quantitative review of the role of psychological safety in the workplace. As such, our work offers an assessment of the current state of knowledge concerning this important workplace construct. In addition, though a review of the literature

and an empirical assessment of the nomological network are useful, our study extends research on psychological safety by exploring a number of important questions best captured through meta-analytic techniques. We discuss the findings of our study in the following sections.

Main Relationships Within the Nomological Network

Our review of the literature and empirical analysis at the individual level resulted in support for the majority of the hypothesized relationships. Contrary to our expectations, however, openness to experience was not significantly related to psychological safety. Those high in openness to experience are described as being independent thinkers, amenable to new ideas, and more likely to challenge the status quo (Zhou & George, 2001). It may be that those high in openness to experience are more focused on ways to express their independence regardless of context and thus less likely to be concerned with psychological safety.

We found support for the relationship between psychological safety and positive leader relations as a general category. This highlights the salience of the direct leader in shaping the work context and crucial role leaders play in fostering psychological safety. Additionally, within the category of positive leader relations, we examined four specific leadership constructs that have been theoretically linked to psychological safety. The effect sizes ranged from .36 for inclusive leadership to .42 for transformational leadership. There is little variation in the extent to which each of these leadership constructs impacts psychological safety, an issue to which we return in the future directions section.

Going beyond the direct leader, we also found that work design characteristics and supportive work context as broad categories both positively influence psychological safety. Within the category of work design characteristics, interdependence showed the strongest relationship. Peer support, within the category of supportive work context, also demonstrated a significant and strong effect. These findings are consistent with Kahn's (1990) original theorizing whereby interpersonal relationships and group dynamics are posited as central drivers of psychological safety perceptions. Psychological safety was also found to be significantly related to a number of outcome variables. We found that psychological safety was positively related to employee engagement, task performance, satisfaction, and commitment. We found a moderate relationship with citizenship behavior and a relatively weak one with creativity.

Given the rapid changes that businesses face in the modern economy and the seminal work from Edmondson (1999) on psychological safety and learning, one of the most relevant findings of our study is the strong relationship that psychological safety demonstrated with

information sharing and learning behavior. These are two important outcomes in the psychological safety literature and demonstrate the unique contributions that the psychological safety construct makes in today's dynamic workplace. Hence, fostering perceptions of psychological safety appears to be an important consideration for organizations attempting to maintain competitiveness. Indeed, the impact that psychological safety has on the learning process is "at the very core of why the construct has maintained the high level of research attention over the years" (Edmondson & Lei, 2014; p. 37) and why it likely will continue to be an important construct in the 21st century organization.

At the group level of analysis, we were limited in our ability to assess the full nomological network because considerably fewer studies on psychological safety have been conducted at this level. However, we were able to examine a number of key relationships and found that the relationships with antecedents and outcomes were generally consistent with individual-level findings. In sum, psychological safety is a robust construct with a diverse nomological network. There are a myriad of factors that may facilitate the emergence of psychological safety with some (e.g., work design and leadership) being relatively more important than others (e.g., personality). Furthermore, it is an important construct given its relationship with a variety of critical group-level work outcomes, providing additional support for its validity at both levels of analysis.

Incremental Validity

Though it may come to no surprise that psychological safety is related to central work outcomes, one may wonder whether this construct possesses predictive power over and above the antecedents that lead to its emergence. In every investigation, psychological safety captured significant incremental variance in outcomes beyond the antecedent predictors. Conversely, many antecedents failed to capture incremental variance beyond psychological safety. Overall, our findings demonstrate the critical role of this emergent construct as a facilitator of employee performance. Interestingly, psychological safety accounted for more incremental variance explained in task performance than citizenship behaviors; the unique attitudes, cognitions, and behaviors that derive from a psychologically safe workforce seem to be more strongly related to in-role performance than extra-role behaviors.

Methodological Moderators

One concern with any primary study is the possibility that findings are artifacts of study design characteristics. Meta-analyses are uniquely suited

to address these concerns by systematically comparing results across different research designs. In many cases where study design characteristics could be explored as moderators, the significance of psychological safety generalized regardless of the study design characteristics tested. However, our analyses did demonstrate a number of areas of methodological concern for psychological safety research that should be addressed in future research.

We first focus on two issues related to common method bias: same source bias and temporal separation. As for the former, only 13% of the correlations extracted for analyses were collected from different sources. In fact, for several relationships, it was not possible to examine the presence of same source bias because of an absence of studies in which variables were collected from multiple sources. In total, for the seven relationships in which there was enough variance in study designs to permit an assessment of this moderator condition, three contained statistically significant differences in effect sizes, with validity coefficients being higher when both psychological safety and the criterion of interest were collected from the same source.

Temporal separation has been much more prevalent in the literature, with 35% of the psychological safety correlations including constructs measures at separate points in time. For the 12 total relationships where it was possible to assess the impact of this research design characteristics, only one was statistically significant; the relationship between psychological safety and job satisfaction was significantly lower when these constructs were assessed at different points in time than when assessed simultaneously.

Taken together, we conclude that common method bias is a major concern with past empirical research and we encourage researchers in this literature to design studies that draw from different sources and introduce temporal separation between these constructs. Overall, effect sizes were 27% higher when studies involved data collected within the same sources and at the same times than when both different sources and temporal separation were employed. That being said, our meta-analysis revealed that psychological safety relationships are not entirely spurious artifacts of percept–percept inflation; when assessed at different times and from different sources, effect sizes were decreased, but still moderate in magnitude and statistically significant.

In addition, in some cases where same-source biases appeared—for instance, concerning relationships between positive leadership relations and psychological safety—relying on different sources to alleviate common method biases may have undesirable consequences. To the extent that it is the *perception* of leadership that influences individual's feelings concerning psychological safety, it is possible to argue that drawing on

different sources may deflate true validities (Frese & Zapf, 1988). Therefore, we recommend that if data are best collected from the same source, researchers should attempt to add temporal separation between the variables to minimize artificial inflations of effect sizes due to common method bias (Podsakoff, MacKenzie, & Podsakoff, 2012).

Our moderator analyses also uncovered evidence at the individual level that the "file drawer effect" may be an issue in psychological safety research. Our comparative analysis of published and unpublished studies demonstrated instances where relationships with psychological safety were significantly higher across published studies for task performance and citizenship behaviors ($p < .05$) and learning behavior ($p < .10$). This is particularly concerning because these are the three most studied outcomes in the psychological safety literature. Though recent research suggests that file drawer effects do not pose a major problem (i.e., Dalton, Aguinis, Dalton, Bosco, & Pierce, 2012), our results indicate that it may be premature to make broad statements on the issue, at least as it pertains to research on psychological safety. Indeed, organizational scholars are often interested in the "bottom line" in their research, and the lack of statistical findings for important outcome variables might hinder a study's ability to be published. Our results seem to partially support this notion for our sample. Though this issue transcends any single research area, future research on psychological safety should design research studies that are not wholly contingent upon the bottom line and focus on research that is methodologically and theoretically sound.

The final issue that emerged as a result of our analysis was the significant difference between subjective and objective measures of task performance. Although the psychological safety literature in general lacks longitudinal designs and the incorporation of objective criteria, we found that for task performance, the effect sizes were higher when measures of performance were subjective in nature (e.g., supervisor rated; $\hat{\rho} = .40$) as compared to objective in nature (e.g., course performance; $\hat{\rho} = .07$). Indeed, past research has noted that these two ratings are only moderately correlated (Bommer et al., 1995). Our concern regarding this issue is further exacerbated because effect sizes were lower when task performance was rated by someone other than the person providing the psychological safety perceptions (i.e., source). We urge future researchers to examine the extent to which psychological safety impacts more objective measures of task performance and to continue to gather ratings of performance from other sources when subjective measures are the most viable outcome.

Uncertainty Avoidance as a Moderator

Our study takes a first step toward understanding the role of national context in psychological safety validities. With regard to antecedents, we found that positive personality traits, work design characteristics, and supportive work context all had significantly stronger effects on psychological safety in high UA cultures. Somewhat surprisingly, the effects of positive leadership relations were weaker in high UA cultures. Recall that high UA cultures value stability and the establishment of formal rules (Hofstede, 2001), and thus, it may require that the signals come from a broader range of sources in order to feel higher psychological safety in these cultures. Thus, employees in high UA cultures may demonstrate a higher sensitivity to elements of personality, work design, and supportive work context than to leader behaviors. Research has shown that leaders in high UA cultures tend to be more controlling and less approachable (Offermann & Hellmann, 1997), thus putting a larger emphasis on the other antecedents to shape psychological safety perceptions.

With regard to outcomes, our results demonstrate that high UA may make psychological safety even more important in affecting work outcomes. As employees in high UA cultures are less inclined to take risks at work, they are more likely to fully invest themselves into their work and perform at a higher level when they perceive such expressions of self are encouraged within the work context. Hence, it seems like fostering psychological safety—a construct developed in countries with low UA norms—may be even more critical in cultures where risk taking and divergence from status quo is not the norm. All in all, our results provide initial evidence that the role of psychological safety may be impacted by culture and encourage future research to more fully explore this issue.

Homology Across Levels of Analysis

To date, the majority of research, at both the group and individual level of analysis, has drawn from the same theoretical roots (i.e., Edmondson, 1999; Kahn, 1990; Schein & Bennis, 1965). By using group-level empirical and theoretical evidence to support individual-level propositions, there is an implied assumption of homology across levels. If this assumption is unfounded, both researchers and practitioners should be careful not to expect inferences drawn from one level of analysis to generalize to other levels or for cross-level relationships to exist (where, for instance, group perceptions of psychological safety influence individual outcomes).

Chen et al. (2005) identify three different theories of homology. Identical theories of homology predict that relationships within a construct's nomological network will be identical in magnitude and direction across

levels of analysis. Proportional theories of homology predict that the relative pattern of relationships will hold across levels though magnitudes may differ. Finally, metaphoric theories require only that the pattern of significant findings hold true across levels. The evidence from our analyses is most consistent with an *identical theory of homology*. In other words, the assumption of homology that has permeated the literature is supported by our empirical analysis. Though magnitudes somewhat differed, the results of our regression analysis to assess homology showed that there was no statistically significant difference in effects sizes across levels of analysis. As additional support for these results, the Spearman rank-order correlation between the distribution of ratings across the individual and group levels was high ($r_s = .86$). This finding is important because it provides empirical validation for previous assumptions concerning the multilevel composition of psychological safety and the generalizability of cross-level theories (Chen et al., 2005; Edmondson & Lei, 2014).

Implications for Future Psychological Safety Research

A primary contribution of this research is not only to synthesize empirical work on psychological safety but also to identify the pressing issues that should be addressed as the literature continues to mature. In this section, we present what we consider to be the most pressing areas of research that can potentially move the literature forward.

Our meta-analysis has uncovered the impressive and rather extensive nomological network surrounding psychological safety. It is clear that several antecedents are related to the emergence of psychological safety perceptions and that these perceptions are significantly associated with a variety of workplace outcomes. Although our meta-analysis contributes to the understanding of the relative importance of different antecedents, what is less clear is whether certain antecedents are necessary and/or sufficient for the development of psychological safety. Or, for that matter, whether psychological safety is necessary and/or sufficient for the development of behavioral and attitudinal work outcomes. Moreover, in what ways might different antecedent conditions substitute or neutralize the effectiveness of other conditions? Here, we suggest future theoretical development exploring issues of necessity and sufficiency and encourage researchers to explore alternative nonparametric methodologies—such as qualitative comparative analysis (Ragin, 2000) or necessary condition analysis (Dul, 2016)—which are better suited to address these issues than standard regression approaches.

Another critical question left unaddressed thus far in the psychological safety literature is, "can psychological safety lead to negative consequences?" As with many constructs in the organizational sciences, there

may be a "dark side" that accompanies the positives (Griffin & O'Leary-Kelly, 2004). As an example, organizational citizenship behaviors have long been considered a positive behavior that aids in organizational functioning (Organ, 1988), yet recent research has demonstrated that there may be costs associated with such behaviors (Bolino, Hsiung, Harvey, & LePine, 2015; Bolino, Turnley, & Niehoff, 2004). Similarly, there may be situations in which psychological safety can lead to negative outcomes. Pearsall and Ellis (2011) found that high psychological safety, whereby perceptions of interpersonal risk are low, created a context in which teams high in utilitarianism were more likely to engage in cheating behavior. Future research should further explore such possibilities to develop a deeper understanding of how and when psychological safety might contribute to less than positive outcomes.

Although we provide initial evidence that culture matters to psychological safety, research that explores psychological safety across a variety of cultures and cultural dimensions is warranted, especially given that the majority of research on psychological safety has been conducted in English-speaking, Western countries. Additionally, research can go beyond national culture to shed light on the role of context in psychological safety's nomological network. For instance, norms and workplace practices differ by industry (Chatman, & Jehn, 1994) and can therefore alter the extent to which different antecedents matter to psychological safety. Similarly, in some industries, particularly those where membership in external professional associations is important (Wimbush & Shepard, 1994), employees may form psychological safety perceptions at least partially based on factors related to the "way of doing things" within their *profession* (Nembhard & Edmondson, 2006). Finally, formal institutions or "rules of the game" also warrant attention. For instance, countries with fragile or corrupt states and ineffective judicial systems often create a climate of cynicism in addition to providing poor protection to the workforce (e.g., Pelletier & Bligh, 2006; Theobald, 1990). Hence, weak institutional environments may counter benefits otherwise resulting from psychological safety as well as reduce the effectiveness of psychological safety antecedents. Alternatively, weak institutional environments may make some antecedents, such as immediate leaders, even more important. These issues have not been examined to date, and comparative studies are crucial for the field to advance a contextualized understanding of psychological safety.

Further, few studies have examined how psychological safety may evolve over time. One exception, Liang et al. (2012) reported that psychological safety perceptions collected just 6 weeks apart were only moderately correlated ($r = .27$), which indicates that psychological safety may fluctuate over time within individuals. The exploration of the workplace

dynamics and events that influence these changes offers a ripe opportunity for psychological safety researchers. Techniques such as experience sampling methodology (ESM) or ecological momentary assessment (EMA) have gained considerable traction in organizational research (Beal & Weiss, 2003; Fisher & To, 2012) and thus might be appropriate for the field to explore the drivers of psychological safety dynamics.

Psychological safety is inherently an interpersonal construct built through workplace interactions (Edmondson, 2002), which means that it can be breached or violated. Hence, damages to psychological safety would necessitate repair to continue to reap the benefits. If a transgression occurs that damages psychological safety, what is the process by which psychological safety might be rebuilt? For instance, considerable research has been conducted on trust repair (e.g., Kim, Cooper, Dirks, & Ferrin, 2013; Tomlinson & Mayer, 2009), and the theoretical link between trust and psychological safety would suggest that the literature on trust repair may be relevant to understanding psychological safety repair. To our knowledge, no studies have examined this issue, and we feel that research on this aspect of psychological safety would create a deeper understanding of psychological safety development.

As for the role of leadership, the results of our study across both levels of analysis clearly indicate that as leaders develop positive relationships with followers, higher perceptions of psychological safety are likely to occur. Additionally, the effect sizes across the different conceptualizations of leadership were strikingly similar. Leadership matters in fostering psychological safety, so we strongly encourage researchers to move beyond studying main effects to developing a deeper understanding of when and where leadership matters. The boundary conditions of psychological safety remain an understudied area (Edmondson & Lei, 2014), with this being particularly the case when it comes to the role of leadership. Further, from a methodological perspective, research on psychological safety and leadership would benefit from examining leadership's impact from multiple perspectives. Braddy, Gooty, Fleenor, and Yammarino (2014) recently found that agreement on leader behavior between self-reports and follower reports is moderate, at best. We are not suggesting that the impact that leaders have on psychological safety has been overstated in the literature, but to the extent that research can examine leadership from multiple perspectives, it will contribute to a more complete picture of this relationship.

Another potentially fruitful avenue that emerges from our findings is the exploration of the nature of the relationship between engagement and psychological safety. Theoretically, most research has cast psychological safety as an antecedent to work engagement, with psychological safety enabling employees to invest themselves into their work (e.g., Edmondson

& Lei, 2014; Kahn, 1990; May et al., 2004). However, other conceptual work has indicated a possible reciprocal relationship between psychological safety and engagement with both having the ability to influence the other positively (i.e., Saks, 2006). Indeed, research on psychological safety (e.g., Edmondson, 1999) and engagement (Christian et al., 2011; Rich et al., 2010) often utilizes an input-process-output framework in which psychological safety or engagement independently serve as mediating states between antecedents and outcomes. Our incremental validity analysis found that both engagement and psychological safety predicted similar levels of incremental variance in task performance and citizenship behaviors when the other is added to the analysis first. This provides some evidence that psychological safety and engagement may work together to impact important work outcomes. Research that empirically examines this relationship in more depth would be beneficial for both literatures.

Finally, we were unable to assess a number of relationships at the group level of analysis because of the comparatively smaller number of group level studies. This is somewhat surprising given that Edmondson's (1999) original work, which provides the scale that is most often utilized, was designed at the group level. In fact, Edmondson and Lei (2014) recently noted that psychological safety is a "phenomenon that lives at the group level" (p. 37). Hence, the literature would benefit from more group-level and cross-level research on psychological safety.

Practical Implications

Whether it is performance gains, increased learning, engagement, information sharing, or improved satisfaction and commitment, we demonstrate that psychological safety impacts important organizational outcomes. Our results show that there are personality traits that are positively related to psychological safety. Hence, organizations may find value in selecting applicants that are predisposed to either create or perceive a work environment safe for personal risk taking. In particular, organizations can benefit from investing in employees that are proactive, as they are more likely to feel psychologically safe and engaged in their work. Human resource managers and those responsible for designing selection tools may find value in including measures that capture these personality traits. Given the concern that self-report personality measures may be vulnerable to faking (White, Young, Hunter, & Rumsey, 2008), additional mechanisms throughout the interview process should be implemented to capture these specific personality traits. Though structured interviews often include personality elements, namely, the Big Five (Levashina, Hartwell, Morgeson, & Campion, 2014), our results indicate that organizations interested in

fostering psychological safety should focus on designing interview questions that capture proactive personality and learning orientation as well.

A recent survey of employees across the world revealed that only 47% characterized their workplace as "a psychologically safe and healthy environment to work in" (Ipsos, 2012). In light of the results presented here, more organizations should be paying attention to this issue. Indeed, the results of the incremental validity analyses indicate that psychological safety should not be treated as a byproduct of high impact work processes but rather as a goal with unique importance. Our results indicate that psychological safety is impacted by positive leader relations, workplace support, and work design. Training sessions for those interested in leadership positions might emphasize the importance of ensuring that subordinates feel safe to challenge the status quo. Though "open door" policies are often touted in the workplace, leaders can be trained in ways to actively pursue being challenged. Relatedly, to the extent that leaders communicate clear expectations and goals, this is more likely to lead to perceived safety as employees have a better understanding of what they should be doing.

In addition, training efforts for all employees can focus on teamwork and developing effective relationships as social support was shown to have a positive influence on safety perceptions. From a job design perspective, interdependence was found to have a strong effect on psychological safety. Designing work that requires more interdependence may not be relevant for all work settings, but to the extent that employees must rely on each other to get their jobs done, psychological safety is more likely to develop. With that said, we provide initial evidence that psychological safety effect sizes may vary across cultures. Therefore, organizations may have to adjust their efforts to foster psychological safety depending on the culture in which they are operating. For instance, investing in the facilitation of psychological safety may be even more critical where risk taking is not the norm, particularly for managers whose behavior is likely to be shaped by the same cultural norms of the followers. On the other hand, expatriates working in a culture other than their own should be trained on the underlying assumptions of the culture in which they are working to not only understand how followers are likely to react but also to overcome the biases that are likely to result from their own culture.

Limitations and Future Research

This research effort is not without limitations. First, in many cases, the relatively smaller sample sizes prevented us from more rigorous analytical examinations. Thus, our study highlights areas where research has the potential to fill in existing gaps in the literature. For example, very few

studies have examined how group-level psychological safety is affected by group personality. As research into the development of team-level personality accumulates (LePine, Buckman, Crawford, & Methot, 2011), we hope researchers engage in such studies. On a related note, the lack of research conducted at the group level limited our ability to examine the incremental validity issue at the group level. As group-level meta-analyses begin to accumulate, this issue could be explored in future research efforts.

Second, in categorizing previous research, we aimed for operationalizing constructs at a level of breadth that would balance the need to have high accumulations of primary studies with the need to keep the construct categories theoretically meaningful. Though we do present narrower categories as sample size allowed, we also report the broader categories for moderator testing due to sample size restrictions. A significant advantage to our approach is that it allows for cross-study comparisons. For instance, broad leadership categories consistent with our operationalization have been examined meta-analytically (i.e., Heavey, Holwerda, & Hausknecht, 2013; Nahrgang, Morgeson, & Hofmann, 2011; Seibert et al., 2011). In addition, broad "work design" categories have been conceptualized similarly in meta-analyses by Hong et al. (2013) and Seibert et al. (2011).

Third, though we drew from theory to classify constructs as antecedents and outcomes, the majority of our studies were cross sectional in nature, so we are not able to make strong assertions of causality. We encourage future research to examine these models utilizing longitudinal or experimental designs to assess causality.

Fourth, though our analyses indicate that psychological safety perceptions demonstrate homology from the individual to the group level, we were not able to assess the relative impact of individual and group perceptions of psychological safety on important work outcomes. Research has demonstrated support for the ability of employees to form coexisting perceptions of the same phenomenon at two levels of analysis (Naumann & Bennett, 2000; Zohar & Luria, 2005). We therefore encourage future research that examines the incremental impact of psychological safety climate beyond individual perceptions.

Conclusion

The results of this study demonstrate that psychological safety is an important construct at both the individual and group level of analysis. By taking stock of what has been done, and exploring several important questions, this study moves the research stream forward and brings to light gaps to be filled in future research. We hope that our study will

encourage researchers to pursue these and other investigations into the role of psychological safety in the workplace.

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