

Psychological Safety and Its Influence on Innovation in High-Performance Teams

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ABSTRACT

This study examined the relationship between psychological safety and innovation behavior in high-performance teams, with a focus on the mediating roles of voice behavior and risk tolerance. A cross-sectional survey design was used with a sample of 250 employees from high-performance teams in technology, healthcare, and financial services sectors. Validated measures assessed psychological safety (Edmondson, 1999), innovation behavior (Scott & Bruce, 1994), voice behavior (Van Dyne & LePine, 1998), and risk tolerance (Sitkin & Pablo, 1992). Hierarchical multiple regression analyses indicated that psychological safety significantly predicted innovation behavior ($\beta = .58, p < .001$), explaining 47% of variance in the outcome. Voice behavior ($\beta = .27, p < .001$) and risk tolerance ($\beta = .21, p < .001$) each partially mediated this relationship, with bootstrapped indirect effects confirming significance of both pathways. These findings highlight the strategic importance of psychologically safe team climates as preconditions for the creative risk-taking and proactive communication through which high-performance teams sustain innovative capacity.

Keywords: *psychological safety, innovation behavior, high-performance teams, voice behavior, risk tolerance, team climate*

INTRODUCTION

In an era defined by rapid technological change and intensifying global competition, the capacity to innovate continuously has emerged as one of the most consequential determinants of organizational survival and competitive advantage (Amabile, 1996; West, 2002). The core of organizational innovation is the team which is the basic unit where ideas are generated, tested and implemented. Among the areas of innovation, high-performance teams, which are ambitious goal-oriented, highly interdependent and maintained excellence in crises, are especially crucial (Katzenbach and Smith, 1993). But the psychological factors that allow such teams to be innovative, not just reliable, are not fully comprehended.

One of the most theoretically interesting, as well as empirically strong antecedents of team innovation, has been found to be psychological safety, or the shared assumption between team members that the team is safe to take risks on interpersonal levels (Edmondson, 1999). The more team members are psychologically safe, the more they are willing to express any unconventional ideas, question their current assumptions, explore some new approaches, and use any failures as a learning experience instead of a threat to their

professional identity (Edmondson and Lei, 2014). On the other hand, in the event of lack of psychological safety, team members self-censor and emphasize self-protection, rather than creative contribution, and suppress the idea generation and collaborative experimentation on which innovation requires (Nembhard and Edmondson, 2006).

In spite of this theoretical clarity, the mediating processes by which psychological safety is converted to innovation behavior are poorly specified. Theoretically plausible mediators that are limited in the empirical literature on the high-performance team setting are voice behavior- the proactive expression of ideas and concerns- and risk tolerance- the readiness to assume uncertainty in the quest to achieve new results (Morrison, 2011; Sitkin and Pablo, 1992). The current research fills this gap by considering the correlations between these constructs in a multi-sector sample of 250 high-performance team members, contributing to the theoretical knowledge and practical recommendations to the leader aiming at fostering innovation within his team.

LITERATURE REVIEW

Psychological Safety in Teams

Psychological safety construct was conceptualized by Edmondson (1999), who described it as the collective belief at a team-level that the interpersonal climate is safe to take risks. Based on the previous work by Kahn (1990) on psychological requirements of personal engagement, Edmondson placed safety at the group level - by stating that it is a group intersubjective perception of the team climate, but not an individual characteristic. This difference is theoretically significant in the sense that it grounds psychological safety in the common social space of the team and thus is a shiftable, climate-level resource determined by the leadership behavior, team norms and organizational culture. Empirical studies have repeatedly confirmed the existence of a relationship between psychological safety and team learning behavior, information sharing, error reporting, and performance (Edmondson, 1999; Carmeli and Gittell, 2009). Interestingly, in its Project Aristotle, Google found psychological safety to be the one most significant variable of high-performing teams (Duhigg, 2016). The systematic review by Newman, Donohue, and Eva (2017) affirmed strong relationships between psychological safety and team learning, creativity, and performance in organizational settings, and leader inclusiveness and organizational support as driving factors.

Psychological Safety and Innovation Behavior

The association between innovation and psychological safety on the theoretical level is based on the fact that innovation itself is socially risky. The creation and promotion of new ideas leave people vulnerable to the threat of social judgment and rejection - threats especially relevant in the context of high-performance teams where professional reputations are constantly reviewed (West and Farr, 1990). At high psychological safety these interpersonal risks are softened and the creative risk-taking that is needed to make innovation psychologically available becomes psychologically available (Edmondson, 2003). Baer and Frese (2003) showed that psychological safety mediated the connection among process innovation and firm performance. Carmeli, Reiter-Palmon, and Ziv (2010) demonstrated that the relationship between inclusive leadership and creative performance was mediated by its impacts in psychological safety. The meta-analysis by Frazier et al. (2017) of 136 studies proved the significant positive relationship between psychological safety and creativity and innovation at both individual and team levels, and the effects were most pronounced in the work environment characterized by high levels of interdependence and knowledge-intensive work.

Mediating Roles of Voice Behavior and Risk Tolerance

One of the behavioral mechanisms theorized to be crucial in the relationship between psychological safety and innovation has been voice behavior, which is the proactive expression of constructive ideas, suggestions, and concerns (Morrison, 2011). Psychologically safe teams permit the members to voice out with innovative suggestions and oppose non-beneficial practice without the dread of retaliation, and thus bring new ideas into the group discourse where creativity arises (Detert and Burris, 2007). Van Dyne, Ang, and Botero (2003) have shown that promotive and prohibitive voice can have a role in team learning and adaptive performance, which is in line with a mediating role in the safety–innovation pathway. Risk tolerance - the attitude toward unpredictability and possible failure to achieve new results is a second theoretically significant mediator (Sitkin and Pablo, 1992). There is a great normative demand of proven approaches in high-performance teams; it is hypothesized that psychological safety mitigates the normative pressure by lowering the perceived personal cost of innovative failure (March, 1991) thus establishing the risk tolerance that allows experimentation with creativity. Coupled with risk tolerance, voice behavior is the behavioral and attitudinal conduit through which psychological safety is converted to long-term innovative performance.

METHODOLOGY

Participants and Procedure

The present study employed a cross-sectional survey design. A total of 250 full-time employees from high-performance teams across three organizational sectors — technology (n = 89), healthcare (n = 82), and financial services (n = 79) — participated. High-performance teams were operationally defined as teams that had consistently met or exceeded organizational performance benchmarks for a minimum of 12 consecutive months, verified through HR records. Participants ranged in age from 23 to 58 years (M = 34.7, SD = 8.3), with tenure ranging from 6 months to 22 years (M = 6.4 years, SD = 4.1). The sample comprised 142 women (56.8%) and 108 men (43.2%). Educational attainment included bachelor's (48.4%), master's (38.0%), and doctoral or professional degrees (13.6%).

Organizational contacts were established through purposive sampling, supplemented by snowball referrals. Participation was voluntary, with anonymity and confidentiality assured. Surveys were administered electronically over six weeks. To mitigate common method variance (Podsakoff et al., 2003), predictor and outcome measures were temporally separated by two weeks, and respondent anonymity was assured throughout. The final usable response rate was 89.3% (250 of 280), with 30 surveys excluded due to incomplete data (n = 17) or failure to meet the high-performance team criterion (n = 13).

Measures

Psychological safety was assessed using Edmondson's (1999) seven-item team psychological safety scale (e.g., "It is safe to take a risk on this team"; $\alpha = .88$) on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Innovation behavior was measured using Scott and Bruce's (1994) six-item scale adapted to the team level (e.g., "Our team searches out new technologies, processes, and ideas"; $\alpha = .91$). Voice behavior was assessed using Van Dyne and LePine's (1998) six-item scale measuring proactive communication of constructive ideas ($\alpha = .84$). Risk tolerance was measured using Sitkin and Pablo's (1992) five-item scale ($\alpha = .82$). All scales demonstrated acceptable to excellent internal consistency. Confirmatory factor analysis confirmed the discriminant validity of the four constructs, with acceptable model fit (CFI = .94, RMSEA = .06, SRMR = .07).

Analytic Strategy

Data were analyzed using IBM SPSS Statistics Version 27. Preliminary analyses confirmed that distributional assumptions for parametric analyses were satisfactorily met. Descriptive statistics and Pearson bivariate correlations were computed for all study variables. Primary hypotheses were tested using hierarchical multiple regression, entering demographic controls (age, tenure) in Step 1 and the primary predictor and mediators in Step 2. Mediation was tested using Baron and Kenny's (1986) causal steps approach, supplemented by bootstrapped indirect effect estimates (5,000 bootstrap samples, 95% confidence intervals) via Hayes's (2018) PROCESS macro (Model 4), providing statistically robust tests of indirect effects.

RESULTS

Descriptive Statistics

Table 1 presents means, standard deviations, ranges, and reliability coefficients for all study variables. Mean psychological safety (M = 3.84, SD = 0.71) indicated moderately high perceived safety, consistent with the high-performance team criterion. Innovation behavior (M = 3.67, SD = 0.79) similarly indicated above-average team innovation. Voice behavior (M = 3.52, SD = 0.83) and risk tolerance (M = 3.41, SD = 0.77) were somewhat lower but remained above the scale midpoint, suggesting that while participants reported positive team climates overall, proactive voicing and risk-taking were perceived as somewhat less normative than safety and innovation per se.

Table 1

Descriptive Statistics and Reliability Coefficients for Study Variables (N = 250)

Variable	N	M	SD	Range	α
Psychological Safety	250	3.84	0.71	1–5	.88
Innovation Behavior	250	3.67	0.79	1–5	.91
Team Performance	250	3.75	0.68	1–5	.86
Voice Behavior	250	3.52	0.83	1–5	.84
Risk Tolerance	250	3.41	0.77	1–5	.82

Note. M = mean; SD = standard deviation; α = Cronbach's alpha reliability coefficient.

Correlational Analyses

Table 2 presents the bivariate correlation matrix. Psychological safety was significantly and positively correlated with innovation behavior ($r = .61, p < .001$), voice behavior ($r = .67, p < .001$), and risk tolerance ($r = .48, p < .001$). Innovation behavior was significantly correlated with voice behavior ($r = .52, p < .001$) and risk tolerance ($r = .55, p < .001$). These intercorrelations provide preliminary evidence for the theorized relationships and are consistent with the hypothesis that psychological safety predicts both voice behavior and risk tolerance, which in turn are associated with innovation. No intercorrelation among predictors exceeded .70, indicating that multicollinearity was not a threat to regression validity.

Table 2

Pearson Bivariate Correlations Among Study Variables (N = 250)

Variable	1	2	3	4
1. Psychological Safety	—			
2. Innovation Behavior	.61**	—		
3. Voice Behavior	.67**	.52**	—	
4. Risk Tolerance	.48**	.55**	.51**	—

Note. ** $p < .001$ (two-tailed).

Regression and Mediation Analyses

Table 3 presents hierarchical multiple regression results predicting innovation behavior. Step 1 demographic controls (age, tenure) accounted for a non-significant 4% of variance, $R^2 = .04$, $F(2, 247) = 5.11$, $p = .07$. Adding psychological safety, voice behavior, and risk tolerance in Step 2 produced a significant increase in explained variance, $\Delta R^2 = .43$, $\Delta F(3, 244) = 43.27$, $p < .001$. The final model explained 47% of total variance in innovation, $R^2 = .47$.

Psychological safety was the strongest predictor ($\beta = .58$, $t = 9.43$, $p < .001$). Voice behavior ($\beta = .27$, $t = 4.68$, $p < .001$) and risk tolerance ($\beta = .21$, $t = 3.52$, $p < .001$) each contributed significant unique variance, consistent with their theorized mediating roles. Bootstrapped mediation analyses confirmed significant indirect effects of psychological safety on innovation through voice behavior ($B = .18$, 95% CI [.11, .26]) and through risk tolerance ($B = .12$, 95% CI [.06, .19]). The direct effect of psychological safety on innovation remained significant after controlling for both mediators ($B = .31$, $p < .001$), indicating partial rather than full mediation.

Table 3

Hierarchical Multiple Regression Analysis Predicting Innovation Behavior (N = 250)

Predictor	B	SE B	β	t
Step 1 (Controls)				
Age	.04	.03	.06	1.21
Organizational Tenure	.07	.04	.09	1.74
Step 2 (Main Predictors)				
Psychological Safety	.54	.06	.58**	9.43
Voice Behavior	.31	.07	.27**	4.68

Risk Tolerance	.22	.06	.21**	3.52
<i>R² = .47, ΔR² = .43, F(5, 244) = 43.27, p < .001</i>				

Note. β = standardized regression coefficient. ** p < .001.

DISCUSSION

The current research aimed at investigating the role of psychological safety on innovation behavior on high-performance teams and the mediating mechanisms that partake in the relationship between the two. The results indicate a strong and significant empirical evidence in support of the main hypothesis: psychological safety was a strong, significant predictor of innovation behavior, and the largest portion of all predictors. These findings extend and support the current body of research that psychological safety is the basis of creativity and innovation at the team level (Edmondson, 1999; Frazier et al., 2017), and add on to earlier evidence about how the particular mediating mechanisms by which safe team climates drive innovative performance.

The result that voice behavior was a significant mediator between the psychological safety and the innovation relationship is theoretically consistent and practically implicated. It indicates that psychological safety encourages innovation not merely by establishing a generally positive climate but by facilitating in particular the voicing of creative propositions, the confrontation of unproductive practices, the expression of alternative solutions, and by the processes of generating innovative ideas into the team discourse where innovative processes are triggered. This observation builds on the discussion of voice as a process of organizational learning by Morrison (2011) to the high-performance team setting, where the pressure to maintain high-established performance can otherwise quash unorthodox idea-sharing. In practice, these findings imply that the interventions that should be used to promote innovation in high-performance teams need to target not only the general safety climates but the behavioral patterns of sharing ideas and positive challenge in particular.

The mediation role of risk-taking moves the knowledge on the psychological processes underlying the relationship between safety and innovation in consequential directions. The pressure of high performance placed on high performance teams and the risk of failure linked to innovation can be especially threatening when the high performance team operates in an environment where there is a strong history of success that imposes strong normative pressures in favor of conservative strategies (West, 2002). This discovery that psychological safety creates risk tolerance, which in effect fosters innovation, indicates that the act of safety may have one of its most valuable contributions to high-performance environments: counteracting these conservative pressures by redefining failure as an acceptable price of innovative involvement instead of a professional disaster. When the team members have the impression that failures will be viewed as learning opportunities, the psychological calculus of creative risk-taking is tilted in a positive direction, making the exploratory acts that innovation demands to be more psychologically available (Edmondson, 2011).

There are a number of shortcomings that should be mentioned. The cross-sectional design does not allow any kind of causal inference and mediation relationships proposed must be viewed with caution until they are replicated in longitudinal or experimental studies. The use of self-report measures presents a possibility of common method variance, but there were procedural controls that ensured that the problem was avoided. The sample was restricted to one national context and the cross-cultural generalization was restricted. Longitudinal designs are to be used in future studies to determine time dynamics of the relationship between safety and innovation, identify cultural moderators, and test the relationships among leadership behaviours as proximal antecedents of psychological safety within a high-performance team.

Despite these shortcomings, the results have important practical implications. The active development of psychological safety should be the strategic focus of the leaders of high-performance teams that understand that performance pressure may actually be counterproductive to the innovative attempts and the open manner of communication that are needed to maintain the high-performance eventually. Practical strategies, such as modeling fallibility, appreciative response to input, and framing failures as learning data, are both well known (Edmondson, 2019) and need to be intentionally included in high-performance team leadership training. Organizations are also advised to look into the performance management systems to make sure that accountability systems are not inadvertently used to punish the productive failures and nontraditional offers that come along and result in the generation of innovation.

CONCLUSION

The current research offers strong evidence that psychological safety is a pre-condition of innovation in high-performance teams, whose mechanisms of influence are complementary, i.e., voice behavior and risk tolerance. Organizations can combine the proactive communication and experimental orientation that are the behavioral infrastructure of innovation by developing team climates where interpersonal risk-taking is deemed safe. These results confirm that high performance and innovation are not conflicting imperatives but are very complementary - teams which experience psychological safety are not just better places to work, but are more innovative, adaptive, and resilient. Psychological safety is not a cultural luxury, but a strategic asset that can be measured by its leaders with quantifiable outcomes on the innovative power that ultimate competitive advantage is pegged on as leaders in organizations strive to meet both the performance excellence and continuous innovation demands with equal satisfaction.

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