

Exploring the Relationship Between Psychological Safety and Innovation in Nursing Practice Environments

Dominic Ellis, Harley Boyd, Vivian Greene

1 Introduction

The contemporary healthcare landscape demands continuous innovation in nursing practice to address evolving patient needs, technological advancements, and systemic challenges. While substantial research has examined innovation adoption in healthcare organizations, the specific psychological mechanisms that enable or constrain innovation within nursing practice environments remain inadequately understood. Psychological safety, defined as the shared belief that one can take interpersonal risks without fear of negative consequences, has emerged as a critical factor in team performance and learning behaviors. However, the precise relationship between psychological safety and innovation in nursing contexts presents theoretical and practical complexities that merit deeper investigation.

This research addresses a significant gap in the literature by examining how psychological safety functions as both an enabler and potential constraint of innovation in nursing practice. Traditional perspectives often assume a linear positive relationship between psychological safety and innovation, positing that safer environments naturally foster more creative and innovative behaviors. Our preliminary observations, however, suggest a more nuanced reality where excessive psychological safety may inadvertently suppress certain types of innovation by reducing the perceived necessity for change or the urgency to challenge existing practices.

The nursing profession operates within unique constraints that differentiate it from other

innovative contexts. High-stakes environments, hierarchical structures, regulatory requirements, and the profound consequences of failure create a distinctive innovation landscape. Understanding how psychological safety operates within these constraints is essential for developing effective strategies to promote nursing innovation that enhances patient care, improves workflow efficiency, and advances professional practice.

This study employs a novel methodological approach that integrates computational social network analysis with phenomenological inquiry to capture both the structural and experiential dimensions of psychological safety and innovation. By developing and validating the Nursing Innovation Safety Climate Inventory (NISCI), we contribute a specialized instrument for measuring psychological safety dimensions most relevant to nursing innovation. Our research questions investigate the nature of the relationship between psychological safety and innovation adoption, identify distinct innovation archetypes within nursing teams, and explore the concept of calculated psychological risk as a catalyst for breakthrough innovations.

2 Methodology

2.1 Research Design

This study employed a convergent parallel mixed-methods design conducted over an 18-month period across 12 healthcare institutions representing diverse settings including academic medical centers, community hospitals, and specialized care facilities. The quantitative strand utilized a longitudinal survey approach with four measurement points, while the qualitative strand employed phenomenological interviews and ethnographic observations to capture rich contextual data. This design enabled triangulation of findings and provided both breadth and depth in understanding the psychological safety-innovation relationship.

2.2 Participants and Setting

A total of 342 registered nurses participated in the study, representing various clinical specialties, experience levels, and organizational roles. Participants were recruited through purposive sampling to ensure diversity across critical dimensions including clinical specialty, years of experience, and organizational context. The sample included 78% female and 22% male participants, with experience ranging from newly graduated nurses to those with over 30 years of practice. Institutional review board approval was obtained from all participating organizations, and informed consent was secured from all participants.

2.3 Instrument Development

The Nursing Innovation Safety Climate Inventory (NISCI) was developed through an iterative process including literature review, expert consultation, and pilot testing. The instrument measures six dimensions of psychological safety specifically relevant to nursing innovation: idea expression safety, failure tolerance, status equality, constructive controversy, resource access safety, and implementation support. Psychometric analysis demonstrated strong reliability with Cronbach’s alpha coefficients ranging from 0.84 to 0.92 across subscales, and confirmatory factor analysis supported the hypothesized six-factor structure.

2.4 Data Collection Procedures

Quantitative data collection occurred at four-month intervals using the NISCI alongside established innovation measures including the Innovation Implementation Scale and the Nursing Practice Innovation Index. Social network data were collected through relationship mapping exercises that identified advice-seeking, information-sharing, and innovation-discussion networks within nursing units. Qualitative data included semi-structured interviews with 45 participants selected through maximum variation sampling, along with 120 hours of ethnographic observations documenting innovation-related interactions and behaviors.

2.5 Data Analysis

Quantitative analysis employed hierarchical linear modeling to account for nested data structures, with nurses nested within units and units nested within organizations. Social network analysis utilized exponential random graph models to examine how network structures mediated the relationship between psychological safety and innovation outcomes. Qualitative data underwent phenomenological analysis using Colaizzi’s seven-step method to identify essential themes and patterns. Integration of quantitative and qualitative findings occurred during interpretation through joint displays and following a weaving approach in the presentation of results.

3 Results

3.1 The Non-Linear Relationship Between Psychological Safety and Innovation

Contrary to conventional assumptions of a linear positive relationship, our analysis revealed a curvilinear association between psychological safety and innovation adoption. Innovation propensity increased with psychological safety up to a moderate level, beyond which additional increases in psychological safety corresponded with diminished innovation outcomes. This inverted U-shaped relationship was particularly pronounced for radical innovations that challenged established protocols and required significant practice changes. The optimal psychological safety range for innovation varied by innovation type, with incremental innovations benefiting from higher safety levels than transformative innovations.

Social network analysis further illuminated this relationship by demonstrating that moderately safe environments fostered more diverse innovation networks characterized by bridging connections across different clinical specialties and hierarchical levels. In contrast, both low-safety and extremely high-safety environments exhibited more constrained network struc-

tures that limited cross-pollination of ideas and approaches. Network centrality measures revealed that innovation champions in optimal safety environments occupied structural positions that enabled them to broker connections between otherwise disconnected groups.

3.2 Identification of Nursing Innovation Archetypes

Through cluster analysis of innovation behaviors and psychological safety perceptions, we identified three distinct innovation archetypes within nursing teams. Adaptive innovators (38% of sample) demonstrated flexibility in modifying existing practices to address emerging challenges and thrived in environments with moderate to high psychological safety combined with clear performance expectations. Procedural innovators (29% of sample) focused on refining and optimizing established protocols and reported highest innovation output in environments with high psychological safety and structured improvement processes. Relational innovators (33% of sample) specialized in developing new approaches to patient communication, interdisciplinary collaboration, and family engagement, and exhibited innovation peaks in environments with moderate psychological safety and strong relational support systems.

Each archetype demonstrated different psychological safety requirements and innovation patterns. Adaptive innovators valued safety for experimentation and learning from failures, procedural innovators prioritized safety for challenging inefficient practices without interpersonal repercussions, and relational innovators emphasized safety for vulnerable conversations and emotional risk-taking. These archetypes were distributed differently across clinical specialties, with critical care units showing higher proportions of adaptive innovators and outpatient settings demonstrating more relational innovators.

3.3 Calculated Psychological Risk as Innovation Catalyst

Qualitative analysis revealed that breakthrough innovations often emerged from situations characterized by calculated psychological risk rather than absolute psychological safety. Nurses described intentional risk-taking behaviors when they perceived that potential ben-

efits to patient care outweighed interpersonal or professional risks. This calculated risk phenomenon occurred most frequently when nurses had strong clinical expertise, situational awareness of organizational constraints, and trusted relationships with colleagues who could provide support if innovations encountered resistance or challenges.

The concept of calculated psychological risk extends beyond traditional psychological safety by incorporating deliberate risk assessment and strategic vulnerability. Nurses engaging in calculated risk demonstrated sophisticated understanding of organizational politics, timing considerations, and implementation strategies that increased innovation acceptance. This finding suggests that innovation cultivation requires not only creating safe environments but also developing nurses' capacities for strategic risk assessment and calculated vulnerability in service of improved patient care.

3.4 Contextual Moderators of the Safety-Innovation Relationship

Our multi-level analysis identified several organizational and unit-level factors that moderated the relationship between psychological safety and innovation. Leadership practices emerged as the strongest moderator, with transformational leadership strengthening the positive aspects of the relationship and transactional leadership amplifying the negative aspects at high safety levels. Resource availability, workload pressures, and interdisciplinary collaboration patterns also significantly influenced how psychological safety translated into innovation outcomes. Units with strong nursing-physician collaboration demonstrated different safety-innovation dynamics than those with traditional hierarchical relationships.

4 Conclusion

This research makes several original contributions to understanding the relationship between psychological safety and innovation in nursing practice environments. By demonstrating the non-linear nature of this relationship, we challenge simplistic assumptions that uniformly

higher psychological safety necessarily promotes innovation. The identification of distinct nursing innovation archetypes provides a more nuanced framework for understanding how different nurses engage with innovation and what psychological safety conditions best support their innovative contributions.

The concept of calculated psychological risk represents a theoretical advancement by integrating intentional risk assessment into psychological safety frameworks. This concept helps explain why some innovations emerge despite significant psychological barriers and why absolute safety may sometimes inhibit the urgency and necessity that drive transformative change. For nursing practice, this suggests that developing nurses' capacities for strategic risk-taking may be as important as creating safe environments.

Methodologically, this study contributes the Nursing Innovation Safety Climate Inventory (NISCI) as a specialized tool for measuring psychological safety dimensions most relevant to nursing innovation. The instrument's validation across diverse healthcare settings supports its utility for both research and organizational assessment purposes. The integration of social network analysis with phenomenological inquiry represents an innovative approach to capturing both structural and experiential dimensions of the safety-innovation relationship.

Practical implications include the need for healthcare organizations to develop differentiated approaches to psychological safety that align with specific innovation goals and nurse archetypes. Rather than pursuing uniform increases in psychological safety, organizations should cultivate environments that support calculated risk-taking and provide appropriate safety levels for different types of innovation. Leadership development should focus on creating the nuanced psychological conditions that enable various forms of nursing innovation while maintaining the reliability and safety required in healthcare settings.

Future research should explore how these relationships evolve during organizational change, crisis situations, and technological transformations. Longitudinal studies tracking the development of psychological safety and innovation capabilities over nurses' careers would provide valuable insights into how these dynamics change with experience and expertise. Addition-

ally, research examining psychological safety and innovation in interprofessional teams would extend understanding beyond nursing-specific contexts to the collaborative environments that characterize modern healthcare delivery.

References

1. Edmondson, A. C. (2018). *The fearless organization: Creating psychological safety in the workplace for learning, innovation, and growth*. John Wiley & Sons.
2. Ellis, D., & Boyd, H. (2022). Psychological safety in healthcare teams: A systematic review of measurement approaches and contextual influences. *Journal of Interprofessional Care*, 36(4), 512-525.
3. Greene, V., & Ellis, D. (2023). Innovation archetypes in nursing practice: A typological approach to understanding change adoption patterns. *Nursing Outlook*, 71(2), 101-115.
4. Institute of Medicine. (2011). *The future of nursing: Leading change, advancing health*. National Academies Press.
5. Kessel, M., Kratzer, J., & Schultz, C. (2012). Psychological safety, knowledge sharing, and innovative team behavior. *Healthcare Management Review*, 37(4), 325-334.
6. O'Donovan, R., & McAuliffe, E. (2020). A systematic review of factors that enable psychological safety in healthcare teams. *International Journal of Quality in Health Care*, 32(4), 240-250.
7. Psychological Safety in Nursing Research Collaborative. (2021). Measuring psychological safety in nursing environments: Development and validation of the NURSES-PS scale. *Journal of Nursing Measurement*, 29(3), 412-430.
8. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.

9. Tucker, A. L., & Edmondson, A. C. (2003). Why hospitals don't learn from failures: Organizational and psychological dynamics that inhibit system change. *California Management Review*, 45(2), 55-72.
10. West, M. A. (2002). Sparkling fountains or stagnant ponds: An integrative model of creativity and innovation implementation in work groups. *Applied Psychology*, 51(3), 355-387.