



Team-based games: Catalysts for developing psychological safety, learning and performance

Hamieda Parker^{a,*}, Earle du Plooy^b

^a University of Cape Town, South Africa

^b University of Verona, Italy

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ABSTRACT

Psychological safety has recently emerged as a necessity for effective teamwork. We evaluate whether psychological safety can be developed through a team-based game intervention. Using pre-test and post-test data, we find that participants in a team-based game, experience an increase in psychological safety through engaging in the intervention. Post-test data were used to assess relationships between psychological safety, team learning and performance. We find that psychological safety is positively related to performance and team learning. While team learning was also found to be positively related to performance, the hypothesis that team learning mediates the psychological safety–performance relationship, was not supported. The context for this study is a large resource-constrained healthcare organization based in an emerging economy.

1. Introduction

Teamwork is an essential part of operating in pressured environments, such as hospitals, and the multi-disciplinary team is the gold standard of how healthcare is provided to patients worldwide (Edmondson, 2019). Over the last decade, a number of conceptual papers have proposed that games and experiential exercises do much to improve team learning and team performance in the workplace. In recent studies focusing on healthcare organizations such as hospitals, the role of psychological safety in enhancing teamwork has been emphasized (Berzins, Baker, Louch, & Albutt, 2020). Hospitals in the public sector are characterized by resource constraints, high workloads, and numerous risks. These dynamics often hamper the development of psychological safety and negatively affect the overall quality of work of healthcare teams (Han & Roh, 2020).

The term psychological safety is a shared belief held by members of a team that the team is safe for interpersonal risk taking (Edmondson, 2019). Clark (2019) describes psychological safety as a condition in which one feels included, safe to learn, safe to contribute, and safe to challenge the status quo, without fear of being embarrassed, marginalized or punished in some way.

It is understood that cultivating psychological safety is a long-term endeavor for an organization. The team-based game intervention used in this study served as a stimulus to start the organization's initiative to

develop psychological safety. This intervention can thus be viewed as a catalyst to starting a psychological safety initiative, or as a tool that can complement an organization's ongoing efforts to develop psychological safety. O'Donovan, Van Dun, and McAuliffe (2020, p. 16) emphasize that, "creating and maintaining psychological safety will be paramount in dealing with the covid-19 crisis. Healthcare teams will be required to draw on knowledge and learning from all parts of the healthcare system in order to make quick decisions, learn from mistakes and implement changes that will facilitate the safe delivery of care."

Recently, an increasing number of researchers have drawn attention to the use of games to develop certain skills. For example, Sousa and Rocha (2019) examine how a game can be used to develop leadership skills in firms; Lovelace, Eggers & Dyck (2016) examine the use of a simulation to develop critical thinking skills; and Luthans, Avey, and Patera (2008) find that the use of a web-based intervention results in an increase in the psychological capital of participants. Michael and Chen (2005) find that team-based games can work to develop and strengthen certain organizational values in a short stretch of time. However, few studies investigate the use of games in healthcare contexts, and there are no empirical studies that the authors are aware of that look at the use of games as interventions to cultivate psychological safety and team learning in resource-constrained healthcare settings, and this study addresses this gap in the current literature.

This study contributes to the literature on the use of games in the

* Corresponding author at: Graduate School of Business, University of Cape Town, Portsworld Road, Cape Town 8001, South Africa.

E-mail address: hamiedap@gsb.uct.ac.za (H. Parker).

workplace by testing the utility of a team-based game. It also contributes to the research on psychological safety in a number of ways. First, the study responds to the call by Edmondson (1999) to examine psychological safety in different contexts. Second, the study explores the development of psychological safety through this intervention in the healthcare context, which has been noted as a particularly difficult context, in which to develop psychological safety (Han & Roh, 2020). Third, by analyzing pre-test and post-test data, the study provides insights into how the experiential learning environment created by the team-based game can catalyze the development of psychological safety. Fourth, the study investigates the relationships between psychological safety, team learning and team performance. The findings to date regarding the relationships between psychological safety, team learning, and performance have been mixed. Some researchers have found strong direct relationships between psychological safety and performance (Han & Roh, 2020), while others have found that team learning mediates the relationship between psychological safety and performance (Edmondson, 1999). In this study, we contribute to this research stream by testing both direct and indirect, mediated models.

In the following section, this paper describes the conceptual framework used in this study and develops the hypotheses. Then, the paper details the methods employed, and presents the results. Finally, the paper discusses the findings, limitations of the study, avenues for future research, the implications of this study for management practice, and draws conclusions regarding the study.

2. Conceptual framework and hypotheses

The early work of Osborn (1953), in the book *Applied Imagination*, proposed that games can be a powerful way of allowing participants to become innovative and work well as a team. Creativity and innovativeness in healthcare is critical, especially in resource-constrained environments (Edmondson, Higgins, Singer, & Weiner, 2016). Games and the use of simulations in training have received increased interest over the last decade, both as a means to motivate participants (Frazier, Fainshmidt, Klinger, Pezeshkan, & Vracheva, 2017), while also using the ability of the game and simulation environment to replicate the dynamic and interdependent environment found in the workplace (Lovelace, Eggers, & Dyck, 2016).

Luthans et al. (2008) discuss how an online web-based intervention can be used to develop positive psychological capital. Lovelace et al. (2016) find that a web-based simulation program can be used to increase participants critical thinking skills. They contend that team-based games can provide a fertile environment for participants to develop skills essential for teamwork. Michael and Chen (2005) draw attention to how team-based games can foster and reinforce social, cultural and organizational values in a short period of time. They found that the game simulation used in their study allowed project managers to improve their relationship with engineers. Sousa and Rocha (2019) build on this work and show how they effectively utilize a game to develop leadership skills.

Drawing on experiential learning theory, we define learning as “the process whereby knowledge is created through the transformation of experience”, and “knowledge results from the combination of grasping and transforming experience” (Kolb, 1984, p. 41). The context of experiential learning allows participants to develop skills through practice and experimentation, receiving feedback on performance, while affording the opportunity for reflection (Kolb, 1984). We propose that the team-based game intervention used in this study provides a “transformative experience” that catalyzes the development of psychological safety, and we thus hypothesize the following:

Hypothesis 1: Participation in the game is positively associated with psychological safety.

The esoteric history of the psychological safety construct in

healthcare resides in Morbidity & Mortality meetings, which clinicians attend early in their training. Generally referred to as a “no blame and no shame” approach, this construct unfortunately lives mainly within the confines of the Morbidity & Mortality review platform when clinical mistakes are reviewed and examined for system improvement and learning purposes. This limited view fails to capture the richness of psychological safety as a construct and its potential to improve healthcare worker teamwork, so that patient care and patient safety are improved.

Many patients are harmed each year by errors and process failures, and psychological safety has been shown to be a crucial element in organizational efforts to detect and prevent these problems (Edmondson, 2019). In the study of emergency nurses by Han and Roh (2020) they found that psychological safety was a significant predictor of patient safety competency. Psychological safety provides an environment in which questions can be asked, errors can be discussed openly, and learning from errors can occur without the fear of retribution (Clark, 2019). We thus propose that psychological safety will be positively related to a team’s performance.

Hypothesis 2: Psychological safety is positively associated with performance.

Psychological safety today is seen as especially important for enabling learning and change in contexts characterized by high pressure, complex, and essential human interactions, such as hospital operating rooms (Edmondson, Bohmer, & Pisano, 2001) and intensive care units (Valentine, Nembhard, & Edmondson, 2014). Chaudhry, Coyle-Shapiro & Wayne (2011) emphasize that during challenging financial and political periods, the responsibility of an organization is to be creative in solving operational problems. In environments that are rich in psychological safety, creative ideas can be generated more readily by a more empowered team. Working environments that can nurture a creative culture will stand a better chance of prevailing under trying circumstances. This creative culture can be kickstarted through the use of games (Lovelace et al., 2016).

The use of teams in the healthcare sector has become the mainstay of sustainable care delivery. In healthcare, effective teamwork is required to provide quality care, and prevent medical errors. According to Valentine and Edmondson (2016), teamwork is defined as behavioral processes used to complete interdependent work. These behavioral processes comprise actions such as interaction and synchronization of work, while the affective, cognitive and motivational emergent states supporting these processes include respect and psychological safety. Edmondson (2019) examines why healthcare teams fail, and three main reasons are identified. Firstly, the hierarchy in hospitals impedes teamwork. Secondly, frequent changeovers between nurses and caregivers, and staff constraints make teamwork complex. Finally, teamwork faces the difficulty of managing different personalities, at different ranks in a stressful environment.

A study by Edmondson (1999) tested the relationship between team learning and performance and found the following. First, for a team to consistently achieve high levels of performance, its members must actively ask questions, discuss errors, engage in experimentation and reflection, and seek external feedback, that is the team must learn. Second, the shared belief that the team will not embarrass, reject, or punish someone for speaking up is essential for learning to occur in teams, highlighting respect and sharing. Third, adequate resources along with supportive leadership foster a shared sense of trust, cooperation and confidence in the team’s capacity to achieve positive results.

Team learning and growth happens in an environment which is safe for interpersonal risk taking, where individuals feel safe to test the boundaries of their personal knowledge and skillset and venture out to solve complex problems in creative and innovative ways (Edmondson, 1999). Berzins et al. (2020) examine mental health care workers and observe how an environment of safety and trust allows workers to

provide improved care to patients. They find that team psychological safety permits workers to establish environments where it is safe to fail, and where workers can develop multiple solutions to problems together.

Stroebe and Diehl (1994), in their study of creativity in teams, describe participants being unwilling to speak from fear of being judged or evaluated negatively, that is they lack psychological safety. Team learning and team learning behavior is the process by which members interact, acquire knowledge and skills needed for their work, and share information (Argote, Gruenfeld & Naquin, 1999), and this raises the team discourse level to generate performance-oriented ideas. According to Dyer and Nobeoka (2000), team members who learn together and improve their problem-solving skills can create a competitive organization. In exploring the relationship between psychological safety, team learning and performance, this study proposes the following two hypotheses:

Hypothesis 3: Psychological safety is positively associated with team learning.

Hypothesis 4: Team learning is positively associated with performance.

Gibson and Vermeulen (2003) build on the theory of team-learning behavior, defined as a process of experimentation, reflective communication and codification. These three elements are inter-dependent and difficult to replace and serve to influence subsequent research streams. Later, Zellmer-Bruhn and Gibson (2006) identify the factors that influence team learning and its effect on task performance and inter-personal relationships. The findings demonstrated a positive effect on team effectiveness.

Team efficacy is members’ assessment of the team’s ability to perform job-related activities successfully (Walumbwa, Wang, Lawler, & Shi, 2004), and a shared belief that a team’s ability or competency to perform a task will produce a successful outcome. Van den Bossche, Gijssels, Segers, and Kirschner (2006) studied collaborative team learning environments extensively and found that team learning improves the perceived performance of a team and is also known to be positively associated with team efficacy. Edmondson (1999) argued that team learning mediates the relationship between psychological safety and performance and found support for this in examining teams in the furniture manufacturing industry. Kim, Lee, and Connerton (2020) in their study of sales and service companies find that team learning mediates the psychological safety – team effectiveness relationship.

In this study, we draw on these views and although this relationship has not been examined in the context of a team-based game intervention, we propose that team learning is the mechanism through which psychological safety influences performance. We suggest that while psychological safety provides the basic building blocks for creating an environment conducive to teamwork, psychological safety may not have

a direct effect on performance, rather team learning converts psychological safety into tangible benefits, such as increased levels of performance. We therefore hypothesize that team learning mediates the psychological safety–performance relationship. The conceptual framework is shown in Fig. 1.

Hypothesis 5: Team learning mediates the relationship between psychological safety and performance.

3. Methods

For this study, the participants were 100 employees at a South African hospital. The hospital is situated on the East Coast and serves a 120 000-person community. The game was run with the day shift. The game was run in different units and teams were diverse, comprising doctors, nurses and a range of caregiving staff. Each team was made up of four people.

The game, called the “Marshmallow challenge” was used, developed by Peter Skillman in 2002 (Rietveld, 2014). The Marshmallow challenge is a simple and fun game where a team of four individuals receive 20 pieces of dry (uncooked) spaghetti, a strip of masking tape measured to one meter, a ball of wool, scissors and a single marshmallow. The team competes against other teams with the same resources and limitations. The entire group has 18 min to build the tallest structure with only two rules: first, teams must let go of the structure after 18 min, after which the finished structure must stand on its own; second, the whole marshmallow must be stable at the very top. The time countdown is managed by the facilitator and at the end the facilitator measures the structures, and the tallest structure is announced and applauded. Teams were encouraged to discuss their experience together with a facilitator. This reflective conversation allowed participants to think and talk about lessons they could take to the workplace.

The participants anonymously completed a survey before the game, and then again after the game. This pre-test–post-test design was used to assess whether participation in the game influenced the psychological safety of participants, and how psychological safety was associated with team learning and performance.

3.1. Measures

The survey instrument drew on measures used by Edmondson (1999) and Hackman (2002) and used a seven-point Likert scale anchored by “1” – very strongly disagree – and “7” – very strongly agree. We used a two-stage procedure to assess the measures.

First, we used exploratory factor analysis with oblique rotation, and three clear factors emerged with eigenvalues above 1.0. The screen test also confirmed that three factors should be used. Items exhibiting very low factor loadings were removed, and the retained items all had factor

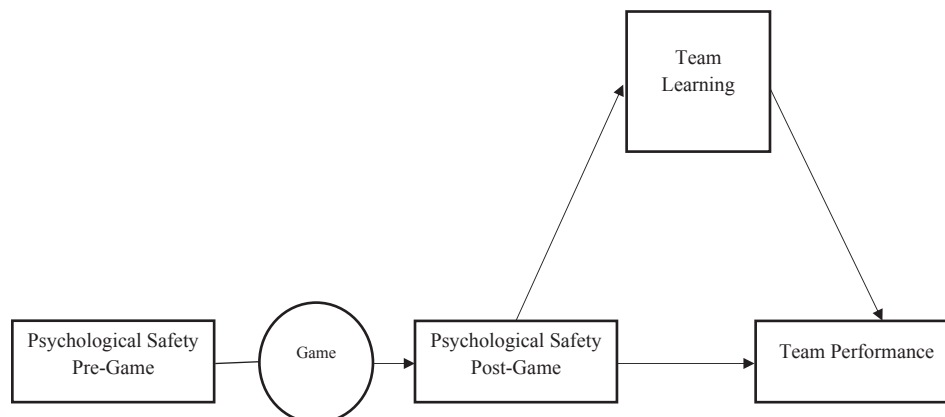


Fig. 1. Conceptual Framework.

loadings above 0.6 (Hair Jr., Anderson, Tatham & Black, 1998). Psychological safety comprised seven items measuring how safe participants felt to speak up, take risks, and seek help. A sample item from the scale is “Members on this team are able to bring up problems and tough issues.” Six of the seven items had factor loadings above 0.6. One of the items had a factor loading of 0.31 and was eliminated from the scale. Team Learning was measured using seven items, examining how inclined the team was to learn and improve. Sample items are: “This team frequently seeks new information that leads us to make important changes”, and “We regularly take time to figure out ways to improve our team’s work processes.” All items loaded as expected and were retained. Team Performance comprised five items exploring the quality of work performance of the team. Four of the items had factor loadings above 0.6. One of the items, “The quality of work provided by this team is improving over time”, had a factor loading of 0.29, and was removed from the scale. Table 1 presents all the items used for each measure and the exploratory factor analysis results.

In the second stage of assessing the measures, confirmatory factor analysis was done on the retained items, using the software package R 3.2.2 (R Core team, 2013) and the PLS predict procedure was used to conduct partial least squares (PLS) analysis. The confirmatory factor analysis results supported the initial exploratory factor analysis, and the overall model indices were as follows: the root mean square error of approximation (RMSEA) was 0.04, the standardized root mean square residual (SRMR) was 0.06, the normed chi-square (chi-square/degrees

Table 1
Exploratory factor analysis.

	1	2	3
Psychological safety			
1. If you make a mistake on this team, it is often held against you	0.71		
2. Members of this team are able to bring up problems and tough issues	0.75		
3. People on this team sometimes reject others for being different	0.77		
4. *It is safe to take a risk on this team	0.31*		
5. It is difficult to ask other members of this team for help	0.81		
6. No one on this team would deliberately act in a way that undermines my efforts	0.85		
7. Working with members of this team, my unique skills and talents are valued and utilized	0.70		
Team Learning			
1. We regularly take time to figure out ways to improve our team’s work processes		0.73	
2. This team tends to handle differences of opinion privately or off-line, rather than addressing them directly as a group		0.75	
3. Team members go out and get all the information they possibly can from others, such as patients or other parts of the organization		0.84	
4. This team frequently seeks new information that leads us to make important changes		0.78	
5. In this team, someone always makes sure that we stop to reflect on the team’s work		0.83	
6. People in this team often speak up to test assumptions about issues under discussion		0.89	
7. We invite people from outside the team to present information or have discussions with us.		0.77	
Performance			
1. Recently, this team seems to be “slipping” a bit in its level of performance and accomplishments	0.79		
2. Those who receive or use the work this team does, often have complaints about our work	0.76		
3. *The quality of work provided by this team is improving over time	0.29*		
4. Critical quality errors occur often in this team	0.83		
5. Others in the company who interact with this team often complain about how it functions	0.85		

Note: A seven-point scale from “very strongly disagree” to “very strongly agree” was used.
* indicates an item that was removed from the scale because of a weak loading (loading below 0.35).

of freedom) was 1.63. The overall model indicated a good fit (Hair Jr. et al., 1998).

To evaluate the reliability and convergent validity of the factors, the Cronbach’s alpha and the composite reliability (CR) was calculated for each factor. The values were greater than 0.7 for each of the Cronbach’s alpha coefficients and for each of the composite reliability statistics computed, which indicates acceptable reliability and convergent validity (Bagozzi & Yi, 1988). To assess the discriminant validity of the measures, the variance inflation factors (VIFs) were computed. None of the VIFs were above 2.0, confirming that the measures have acceptable discriminant validity and that multicollinearity should not create problems in the analysis (Hair Jr. et al., 1998). The average variance extracted was calculated for each measure (these were 0.63, 0.69, 0.59) and as they were above 0.5, acceptable validity is indicated (Hair Jr. et al., 1998). A summary of the psychometric properties of the measures and the correlations between the measures are shown in Table 2.

4. Results

Table 3 shows a comparison of the variables before and after the game, and the results of the paired t-test analysis. The table presents both the significance and effect size of the changes occurring. To test Hypothesis 1, this study compares the mean of psychological safety before and after the game; the paired t-test result, $t(99) = -4.23, p < 0.001$ indicates that the mean had increased significantly after the game, thus supporting Hypothesis 1. The Cohen’s d statistic is a measure of the effect size (magnitude) of the change. For psychological safety, the effect size change from before the game to after the game is Cohen’s $d = -0.62$ ($r = -0.29$), and this signals a moderate, positive effect of the game (Salkind, 2010). Team learning and performance also increased through participation in the game. However, in assessing the effect size changes shown in Table 3, the positive change is much less than the change observed in psychological safety.

In order to test the remaining hypotheses, this study uses the post-test data and conducts Ordinary Least Squares (OLS) regression analysis as presented in Table 4. To test Hypothesis 2, this study regresses psychological safety on performance. As shown in Table 4, Column 1, the coefficient of psychological safety is significantly positive (Beta 0.37, $p < 0.001$), indicating support for Hypothesis 2.

As exhibited in Table 4, Column 2, psychological safety can be seen to have a significant positive relationship with team learning, supporting Hypothesis 3 (Beta 0.41, $p < 0.001$). Additionally, team learning has a significant relationship with performance, supporting Hypothesis 4 (Beta 0.21, $p < 0.01$). In testing hypotheses 2, 3, and 4, we have simultaneously completed the first few steps of the procedure recommended by Baron and Kenny (1986) to test for mediation (that is to

Table 2
Paired t-tests comparison of means before and after the game.

Construct	Mean	S. D	Significance of Group Difference	Cohen’s d Effect size	r Effect size
Psychological Safety Pre-game	4.92	0.81	$t(99) = -423^{***}$	-0.62	-0.29
Psychological Safety Post-game	5.46	0.71			
Team Learning Pre-game	4.72	1.01	$t(99) = -1.95^{***}$	-0.28	-0.14
Team Learning Post-game	5.01	1.08			
Performance Pre-game	4.33	1.33	$t(99) = -3.33^{***}$	-0.41	-0.20
Performance Post-game	4.81	1.22			

Note: $n = 100$ Pre-game, $n = 100$ Post-game.
p-values reflect results of two-tailed tests; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3
Correlation matrix.

Construct	Mean	S.D	Cronbach Alpha	Composite Reliability	AVE	Psychological Safety	Team Learning	Performance
Psychological Safety	5.46	0.71	0.77	0.73	0.63			
Team Learning	5.01	1.08	0.85	0.79	0.69	0.43***		
Performance	4.81	1.22	0.75	0.71	0.59	0.38***	0.23**	1.00

Note: p-values reflect results of two-tailed tests; * p < 0.05; ** p < 0.01; ***p < 0.001.

Table 4
Regression analysis and test of hypothesis 2, 3, 4, 5.

	H2	H3	H4	H5
	Performance	Team Learning	Performance	Performance
Psychological Safety	0.37***	0.41***		0.23***
Team Learning			0.21**	0.09*
R ²	0.15	0.19	0.05	0.13
Adjusted R ²	0.14	0.18	0.04	0.12
F	16.55***	22.86***	5.62**	11.61***

Note: p-values reflect results of two-tailed tests; * p < 0.05; ** p < 0.01; *** p < 0.001.

check whether there are relationships between the independent variable, psychological safety, the proposed mediator, team learning, and the dependent variable, performance). The final step of [Baron and Kenny \(1986\)](#) procedure requires both the independent variable and the proposed mediator to be regressed against the dependent variable. If the independent variable becomes non-significant, there is evidence for full mediation and hypothesis 5 would be supported. [Table 4](#), Column 4 shows that when this is done, psychological safety does not become non-significant (Beta = 0.23, p < 0.001), indicating that mediation is not observed. Hence, hypothesis 5 (proposing that team learning mediates the relationship between psychological safety and performance) is not supported. The results are illustrated in [Fig. 2](#).

5. Discussion

This study found that team psychological safety improved directly after the game, as teams were exposed to an environment that was optimized for idea sharing and creative problem solving. The regression analysis demonstrates that performance and team learning behavior significantly improves with psychological safety. A significant and moderate increase in psychological safety is observed after the game, and while the increase in team learning and performance was significant, it was not as large. This result would support the assertion by [Kim](#)

[et al. \(2020\)](#) that team learning takes a long time to develop and may lag the development of psychological safety. [Kim et al. \(2020\)](#) describe a “learning zone” which is only achieved once the accountability for performance interacts with psychological safety.

The game design used in the intervention established an environment that was conducive to optimal information sharing and feedback. The close-knit teams shared a common goal, and a strong sense of building towards that goal was created. A departmental manager made the following comment shortly after the game: “My experience with it has been that my staff all went into it with apprehension and anxiety and fear of the unknown, and all of them without fail came out of it with a different vibe. They just had energy.” The intervention seemed to have energized the participants as they worked as a team to meet the challenge of the game, and in the process the foundations of creating a psychologically safe environment was being built. The team-based game gave teams a context completely different and unrelated to their usual hospital context. This novel context dismantled the entrenched hierarchy often present in hospitals (for example nurses feeling they cannot question doctors as doctors are the authority). The game stimulated teams to become creative and to collaborate with one another, and it generated a fresh teamwork experience for participants. The low-stakes forum for experimentation and teamwork created by the game, and the facilitated discussion of team members’ experiences after the game, somehow created an opportunity for reflective thinking.

The findings show that psychological safety and team learning behavior display a significant improvement after the game, indicative of the effect created by the game. Using techniques like games and establishing a relatively informal environment adds an element of fun. In this environment, team learning happens easily.

The result that mediation by team learning of the psychological safety–performance relationship is not supported could suggest that psychological safety needs to develop more, and to be present at a higher level, before team learning can operate as a mechanism through which psychological safety influences performance. When psychological safety has not yet reached this level, this mechanism cannot operate. In the context of this study, the game was the first intervention specifically aimed at enabling the development of psychological safety in the

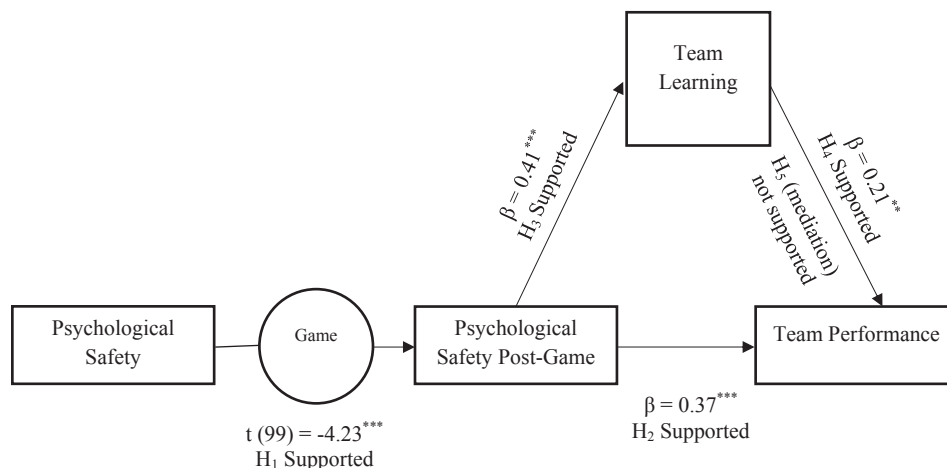


Fig. 2. Results.

hospital setting. The findings of the study provide evidence that the game indeed facilitated the development of psychological safety. However, it would be beneficial to follow up this initial positive intervention with further interventions and organizational initiatives to nurture and grow psychological safety and team learning. The expected positive relationships between psychological safety, team learning, and performance could then manifest themselves more readily in the workplace.

The modern healthcare team is confronted with the challenge of coping with the rapid increase in medical knowledge, increasing specialization of healthcare professionals and more individualized patient care. In addition to the challenge of change management, creative problem solving requires an environment that is safe for inter-personal risk taking (Kessel, Kratzer, & Schultz, 2012). Psychological safety in healthcare serves to alleviate the risk of embarrassment or threat from members of the direct or extended team within an organization (Edmondson et al., 2016). Investments must therefore be made into the development of healthcare teams and their ability to apply creative solutions to the manner in which they deliver services to communities. Healthcare organizations must establish environments conducive to team creativity and nurture a culture where the exchange of ideas can flourish (Kessel et al., 2012).

Communication, idea sharing, and team creativity are useful and crucial to the sustainable provision of quality healthcare. These elements thrive in an environment rich in psychological safety. These conditions can be simulated on a smaller scale using teambuilding activities like games, small group meetings and innovation sessions. Exposing individuals new to these concepts to psychologically safe environments will allow teams to see the effects and as a result develop trust in these systems. The necessary skills and confidence to reproduce this environment in their workspace will develop over time. There is increasing evidence that organizational support, safety climate, and performance are related, implying that psychological safety might involve benefits that extend its influence on work engagement (Rich, Lepine, & Crawford, 2010).

5.1. Limitations to the study and avenues for future research

The study is limited to day shift staff; note that these teams may have different access, motivation or support structures compared to night shift staff. Also, the study was performed in a large health facility which has undergone a series of changes in a relatively short period. A repeat of this study in a different context (with different support structures) could be insightful. Expanding the study to more health facilities would broaden the understanding of psychological safety within a larger geographical region.

For future research, expanding the study to other health facilities in different contexts and of different sizes, and including a control group would yield interesting results for comparison. A longitudinal study would be useful to examine whether psychological safety, team learning, and performance endures over time. Testing the effect of increases in psychological safety on efficiency and health indicators, such as The World Health Organization Sustainable Development Goals (SDG), would also be valuable. Doing similar studies in different organizational contexts would also yield useful insights.

It is predicted that as fears around job security in various contexts escalate, psychological safety will be negatively impacted. There will consequently be a heightened imperative for management researchers to direct more attention to the development of psychological safety in the workplace.

5.2. Implications for management practice

Managers in healthcare contexts face severe challenges, and it is envisioned that these challenges will be exacerbated with the current pandemic. Healthcare teams are required to work in tense, unpredictable environments where they may feel unable to voice concerns.

However, it becomes even more important to develop psychological safety in team members when they need to operate in these types of extreme environments. Employees in other types of organizations are also increasingly facing concerns regarding job losses. This creates an environment of fear, where psychological safety will decrease. Managers need to be cognizant that fear and tension erode the psychological safety of employees, and if this erosion is not addressed, it will create a negative spiral of diminishing team learning and deteriorating performance. The negative effect of eroding psychological safety will create both short-term and long-term losses for firms. Where psychological safety in organizations has already started decreasing, managers face the urgent challenge to halt the decrease, and to find ways to create a climate of safety and to kickstart the development of psychological safety in their teams.

This study provides managers with an insight as to how a team-based game can be used as an intervention to catalyze the development of psychological safety. It further draws attention to the essential relationship between psychological safety, team learning and performance. It thus highlights how managers can use interventions to create a virtuous cycle of increasing psychological safety, higher levels of team learning, and improved performance.

The intervention studied is not a panacea, rather it provides organizations with a tool to activate the process of developing psychological safety, and for those organizations already engaged in developing psychological safety it is an effective way to support and strengthen the organizations' efforts. Psychological safety supports learning. When people feel safe to voice their concerns or report errors, they are more likely to learn from their own and others' mistakes. Where there is no psychological safety, people will try to hide their mistakes and errors, and learning will be hampered.

6. Conclusions

In conclusion, this study contributes to the understanding of how team-based games can be used as a beneficial intervention in the workplace. The study finds that this particular intervention is most effective in developing psychological safety as compared to the other measured constructs, namely team learning and performance. However, a strong positive relationship is found to exist between psychological safety, team learning and performance, and psychological safety can be seen to be an essential antecedent to the development of team learning and the realization of higher levels of team performance. The intervention acts as a catalyst to develop psychological safety and to initiate a subsequent increase in team learning and performance. The cost of the intervention is minimal and can therefore be used effectively in resource constrained environments. As healthcare and other organizations increasingly confront unexpected challenges, the need for teams to learn and innovate, is intensified and it becomes more critical for teams to develop psychological safety.

Performance in healthcare contexts can have serious (life and death) consequences, and hence future research examining how psychological safety can be improved in demanding contexts, is important. Our findings indicate that using team-based interventions even in tough contexts can create a learning experience for participants to develop psychological safety.

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