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Exploring the relationship between personal and work characteristics of project managers and psychological safety in virtual teams

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Abstract

One of the organisational and employees' responses to the COVID-19 pandemic is a shift to virtual working models including the management of projects and project teams in virtual environments. However, little is known about the effect of personal and work characteristics on the psychological safety of project management professionals. This study explores the relationship between the personal and work characteristics of project managers on their psychological safety in virtual teams. Data for the study is collected from 104 project management professionals in the United Kingdom. SPSS is used to analyse and test a series of hypotheses. The study confirmed the significant relationship between the personal and work characteristics of the project managers and their psychological safety. The study provides an overview of the role of diversity, equality and inclusion on psychological safety among project managers; and proposes future research directions to understand and contribute to the psychological wellbeing of project managers working in virtual teams.

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1. Introduction

Psychological safety denotes the freedom of expression without fear of negative consequences, especially in work settings [1]; [2]. And whilst it is more of an individual's experience, it is a team-level phenomenon [3] and a reflection of the organisational culture or the nature of the workplace environment [4]. The workplace atmosphere has been stressed and employees' feeling of psychological safety has deteriorated because of the feeling of uncertainty and isolation [5], as a result, many organisations instituted virtual working to mitigate against the spread of the virus [6]. The increase in virtual working particularly in response to the COVID-19 pandemic has more than emphasised the need for project managers and project teams to adopt new ways of managing projects in virtual environments [7]. based on supporting, assuring and working with employees to mitigate against the feeling of isolation, feeling of psychological safety and other negative consequences of a technology-mediated work environment [8];[6].

The Covid-19 pandemic changed the scope, nature and way of working including project management routines. One of the impacts of the pandemic on project management is the transition to homeworking project management processes and agility strategies ([7]; [9]) to deal with the complexities of the pandemic including managing projects in a virtual environment [10]. For example, Nair and Meenakumari [11] highlighted some of the challenges of project management during the pandemic as managing constantly changing personal attitudes and apprehensions of project management personnel, an unpredictable virtual team and work environment including psychological safety. Virtual team dynamics and project team management are an embodiment of a new individual and team working environment [4]. There is therefore the need to ensure a psychologically safe working environment to achieve healthy collaboration, creativity, innovativeness, productivity and performance [12].

According to Project Management Institute (PMI) UK [13] personality challenges contribute to 60-80% of all problems on a project. And whilst cognitive diversity is professed as one of the solutions, understanding the degree of psychological safety within the diversity, equality and inclusion framework is critical for project success. Despite the growing literature on employee wellbeing, particularly on psychological safety, there is no study, specifically, on the effect of personal and work characteristics on the psychological safety of project managers. Current studies such as Nembhard and Edmondson [14] and Walumbwa and Schaubroeck [15] tried to explore the role of personal and work characteristics on psychological safety; however, their studies focused on leader personality traits in healthcare teams and financial institution settings. Thus, to the best of our knowledge, no study has explored the role of personal and work characteristics on the psychological safety of project management personnel. This study seeks to address answer the question:

“What is the effect of personal and work characteristics on the psychological safety of project managers working in virtual teams?

This study aims to explore how personal (e.g., gender, educational level) and work characteristics (e.g., PM method, industry) impact the psychological safety of project managers in the UK. The increasing attention to equality, diversity and inclusion (EDI) in the workplace and among project managers, underlies the need to understand how the impact of personal and work characteristics on psychological safety. To achieve this aim, the current literature is examined to identify personal and work characteristics that affect psychological safety. Based on the gender schema theory, survey data from 104 project managers in the UK is collected and tested to understand if personal and work characteristics have any impact on psychological safety among PM in the UK. The rest of the paper is structured as follows. The next section is the literature review which examines studies on psychological safety and personal and work characteristics of employees. This is followed by the methods and procedure used to collect and analyse data for the study. The next section presents the results and conclusions which highlights the limitations of the study and proposed future research directions.

2. Literature review

2.1. *Psychological safety and personal and work characteristics*

There are several definitions of psychological safety, but many studies adopt the definition by Edmondson [3], which describes the probability to engage in workplace interpersonal activities without experiencing reproach [12].

Current literature abounds in factors affecting the psychological safety of employees in different settings. According to Singh et al. [16] certain social, leadership, and organisational factors can impact psychological safety ([17]; [4]; [15]; [18]). For example, unexpected changes in the workplace and crises such as the COVID-19 pandemic can affect the psychological safety of employees [4]. The negative consequences of psychological on the individual, work outputs, productivity and profitability are well documented in the literature. For example, Gibson and Gibbs [19] showed that high psychological safety has negative effects on geographical dispersion, electronic dependency, dynamic structure; and decreased team innovation [12]. A critical review of studies on the effect of personal and work characteristics on the level of psychological safety experience is summarised in Table 1.

Table 1: Summary of studies on the effect of personal and work characteristics and PS

Article	Factors & context	Method of study & theory	Key findings
Tang et al. [18]	Top management team (TMT), gender diversity, strategic advantage, firm ambidextrous strategic orientation (ASO), - Chinese high-tech small- and medium-sized enterprises	Mixed method – multi-wave survey study of 373 members from 120 TMTs & interviews with 23 top managers. - Social role theory	Gender plays a social role in proclivities at the TMT level, gender diversity positively affects ASO via TMT psychological safety, and this mediated effect is stronger when firm slack is lower than higher.
Men, et al. [17]	Ethical leadership and knowledge hiding with mediated moderated psychological safety -Chinese high-tech firms	Quantitative -Survey of 436 employees in 78 teams. Social learning theory,	A negative relationship between ethical leadership and knowledge hiding and mediated by psychological safety.
Yener [20]	gender perception, feminine role stress - employees of a textile manufacturing firm in Turkey	Quantitative – Survey of =195, Bem’s Gender Schema and Berger’s Expectation States Theories	Psychological safety has a significant mediating effect on gender perception and feminine role stress
Tziner et al. [21]	Leader-member exchange (LMX), mediator, individual differences (personal traits, personal drives and cultural values and outcomes (attitude, behaviour and psychological burnout). Israeli workers across sectors.	Quantitative Multi-wave surveys across three separate studies with 838 participants - Leader-member exchange (LMX) theory	Gender makes a dramatic difference; LMX mediated the effect of extrinsic motivation on extrinsic job satisfaction for women. Women expressed a more democratic and participative leadership style than men.
Walumbwa and Schaubroeck [15]	1. Leader personality traits (ethical leadership). - In a major financial institution in the United States.	Quantitative - a survey of 894 employees and their 222 immediate supervisors	Agreeableness and conscientiousness were positively related to a leader’s ethical leadership, ethical leadership affect followers’ voice behaviour and partially mediated psychological safety.
Nembhard and Edmondson [14]	1. Professional Status impact on PS 2. Leader inclusiveness as a moderator of status	Quantitative - Survey data collected in 23 neonatal intensive care units involved in quality improvement projects.	Profession-derived status is positively related to psychological safety, leader inclusiveness predicts psychological safety, and

-Status characteristics theory & theory of role- based status and psychological safety	psychological safety predicts engagement in quality improvement work and mediates the relationship between leader inclusiveness and engagement.
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This study is positioned within the larger equality, diversity and inclusion literature and explores how various categories of project managers' personal and work characteristics affect their psychological safety whilst working in virtual teams. For example, based on the gender schema theory, studies have shown that gender has a significant relationship with job satisfaction [22]. Studies (e.g., [18]; [20]) also show that gender diversity has a significant relationship with psychological safety and in turn affects employee creativity [17], performance and wellbeing. This study fills a significant gap in the literature, as there is yet no specific study on how personal and work characteristics of project managers affect their psychological safety especially whilst working in virtual teams during times of a pandemic (COVID-19). It is therefore hypothesised as follows:

H1: There will be a significant difference in the level of psychological safety experienced by male and female project managers working in virtual teams.

H2: There will be a significant relationship between the educational level of the project managers and the level of psychological safety experienced in virtual teams.

H3: There will be a significant relationship between project management qualification of the project managers and the level of psychological safety experienced in virtual teams.

H4: There will be a significant relationship between experience in working virtually and the level of psychological safety experienced in virtual teams.

H5: There will be a significant relationship between position of the program/project managers and the level of psychological safety experienced in virtual teams.

H6: There will be a significant relationship between the sector or industry of work of the project managers and the level of psychological safety experienced in virtual teams.

H7: There will be a significant relationship between years of project managing and the level of psychological safety experienced in virtual teams.

3. Method and procedure

This study used a single-method quantitative research design to collect data and test the proposed hypotheses. A questionnaire survey method was used, involving the design of a questionnaire based on the key constructs to collect data from project managers from various sectors in the UK. The use of the survey method offered the benefits of quick turnaround, and wide reach to potential respondents electronically [23]. The questionnaire included questions measured on a 5-point Likert scale using items adapted from prior research. The main construct, psychological safety was measured with 7 items reliable and valid scale developed and used extensively by Edmondson [3]; Nembrand and Edmondson [14]; Walumbwa and Schaubroeck, [15]. The personal and work characteristics measures included in the questionnaire were gender, current role, project management qualification, sector or industry of work, project management experience, experience of virtual working. A weblink with the questionnaire was shared on various social media platforms such as LinkedIn to members of project management professional groups. In addition, emails were sent to project management professionals whose emails address were freely available online to seek their consent and subsequent participation in the survey. Participation in the study was voluntary and respondents were assured of strict anonymity and confidentiality. The data collection lasted for 6 weeks. A total of 106 participants responded by answering the questionnaire, however, only 104 were found to be valid and used for analysis. SPSS. Five hypotheses were tested either independent sample t-test or one-way analysis of variance (ANOVA) [24]; [25]; [26]. Whilst the independent sample t-test was used to compare two groups at the same time; ANOVA was used to compare the means of more than two groups at the same time for significant

differences [27]; [28]; [29]. The use of t-test and ANOVA is not new in project management research [30]; [31]; [32]; [33], aside its suitability for testing hypotheses involving the comparison of groups differences in mean scores [24].

4. Results

The data for the study yielded varying results on the relationship between the selected personal and work characteristics and the level of psychological safety experience by the project managers whilst working or managing projects in virtual teams (Table 2).

Table 2: Summary of test results for the effect of personal and work characteristics on PS

Characteristics (N=number of respondents)	Level of Psychological Safety (Mean/SD)	Test Statistics (p-value)	Decision
Gender			Significant difference (H1 supported)
Male (40)	3.136 (0.695)	T= 2.695 (p= 0.004)	
Female (64)	2.694 (0.878)		
Educational level			No significant differences (H2 not supported)
Secondary School (34)	2.6807 (0.99849)	F _(4, 99) = 1.125 (p=0.349)	
First Degree (38)	2.8346 (0.82670)		
Master's Degree (21)	3.1565 (0.68349)		
PhD (6)	3.0238 (0.41813)		
Others (5)	2.9143 (0.39898)		
PM Qualification			
Certified Associate in Project Management (CAPM) (N=11)	2.7662 (0.62031)	F _(4, 99) = 2.655 (p=0.037)	Significant differences (H3 supported)
Certified Scrum Professional (CSP) (N=12)	2.9524 (0.66543)		
Foundation Agile/Prince2 (N=20)	2.9143 (0.88598)		
Project Management Professional (PMP) (N=21)	3.3061 (0.78022)		
Others (N=40)	2.6071 (0.86791)		
Experience in virtual working			
Yes (60)	3.041 (0.806)	T= 2.578 (p=0.006)	Significant difference (H4 supported)
No (44)	2.623 (0.827)		
Position at work			
Project Team Member (N=31)	2.8111 (0.75718)	F _(4, 99) = 0.896 (p=0.446)	No significant differences ((H5 not supported)
Project/Program Manager (N=18)	2.9683 (0.72770)		
Senior Project Manager (N=20)	3.0857 (0.97487)		
Project supervisor (15)	2.8640 (0.83712)		
Other (N=20)	2.7306 (0.87500)		
Sector/industry			
Construction (N=6)	3.1190 (0.89176)	F _(4, 99) = 2.044 (p=0.094)	No significant differences (H6 not supported)
Health (N18)	3.0397 (0.53409)		
IT (N=25)	3.1486 (0.62335)		
Public sector (29)	2.6453 (0.99972)		
Other (26)	2.6538 (0.90637)		
Years of managing projects			
Less than 2 years (N=42)	2.5136 (0.81491)	F _(3,100) =	

2- 5 years (N=35)	3.0367 (0.82963)	4.748	Significant
6-10 years (N=17)	3.2017 (0.77436)	(p=0.004)	differences (H7
More than 10 years (N=10)	3.1571 (0.57321)		supported)

The results revealed that male (3.136) PM experienced higher psychological safety than their female (2.694) counterparts. Therefore, to understand and provide organisational support to alleviate psychological safety among project managers, it is important to understand the effect of gender on any organisational, leadership or professional intervention [34].

There was no significant difference between the various educational levels with respect to the level of psychological safety whilst working in virtual environment ($F_{(4, 99)} = 1.125$; $p=0.349$). Therefore educational level of the project managers did not show a significant relationship with the level of psychological safety (Table 2).

The type of project management certification attained by the respondents showed a significant relationship with psychological safety ($F_{(4, 99)} = 2.655$; $p=0.037$). It was revealed (Table 3) that those with Project Management Professional (PMP) certification experienced higher psychological safety whilst working virtually than their counterparts with “Other certification” such as no formal professional qualification.

Experience of working in a virtual environment showed a significant relationship with psychological safety as PMs who had the experience of working virtually before the COVID-19 pandemic experienced significantly more (3.04) psychological safety than those who had no such experience (2.623). The role or position of the program/project managers did not have a significant relationship with psychological safety ($F_{(4, 99)} = 0.896$; $p=0.446$). Thus, project managers irrespective of their positions experience the same or similar levels of psychological safety when working virtually.

The respondents were project management professionals from different sectors, but there were no significant differences in the level of psychological safety experienced by the respondents. Thus, sector or industry of work showed no significant relationship with psychological safety (Table 2).

The years of professional experience in managing project showed a significant relationship with the psychological safety of the project management personnel ($F_{(3, 100)} = 4.748$; $p=0.004$). Specifically (Table 3), those with less than 2 years’ experience in managing projects had significantly less psychological safety (2.5136) than their counterparts who had more than 2 years’ experience.

Table 3: Summary of Post-hoc test for Multiple Comparisons – using LSD

PM Qualification				
(I) PMQ	(J) PMQ	Mean Difference (I-J)	Std. Error	Sig.
Project Management Professional (PMP)	Certified Associate in Project Management (CAPM)	.53989	.30201	.077
	Certified Scrum Professional (CSP)	.35374	.29364	.231
	Foundation Agile/Prince2	.39184	.25353	.125
	Others	.69898*	.21867	.002
Years of managing projects				
(I) PYoE	(J) PYoE			
Less than 2 years	2- 5 years	-.52313*	.18192	.005
	6-10 years	-.68808*	.22849	.003
	More than 10 years	-.64354*	.27968	.023

*. The mean difference is significant at the 0.05 level. NB: LSD – Least Square Deviation

5. Conclusion, limitations and future research

The study explored the relationship between personal and work characteristics of the project managers and their psychological safety within the broader framework of the diversity, equality and inclusion framework. The study confirmed the significant relationship between some personal and work characteristics and psychological safety to underlie the importance of understanding the role of diversity, equality and inclusion in the well-being of project managers. The limitations of the study, however, are the limited number of personal and work characteristics measures assessed in this study. In addition, the sample size of 104 project managers was not large enough to undertake a multi-level interactive effect analysis of the constructs on psychological safety. Besides, the study was single country (UK) only, thereby making any generalisation of the findings to other countries with dissimilar socio-economic characteristics difficult. Nevertheless, the findings make interesting contributions to the literature on the well-being of project managers working in digitalised or virtual settings, as well as the diversity, equality and inclusion scholarship. Future studies should explore the impact of PS among projects on their work outputs. Future studies could curate the antecedents and consequence of PS on project management personnel through bibliometric, systematic or meta-analysis on psychological safety among project managers pre-Covid and during Covid; pre and during the industrial 4.0 era whilst offering future directions for studies on psychological safety and wellbeing of project management personnel.

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