



# Psychological safety and psychosocial safety climate in workplace: A bibliometric analysis and systematic review towards a research agenda

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## ABSTRACT

**Introduction:** Research on workplace safety has seen significant growth in academic and industry-focused literature over the past 20 years. However, the extant literature on workplace safety tends to focus on safety outcomes of physical accidents and injuries while relegating its conceptual and theoretical development to the background. Psychological safety and psychosocial safety climate in the workplace are essential to workers' health and safety. These concepts are crucial in enabling job satisfaction, work engagement, and performance productivity. Progressing the literature on this subject is necessary to keep abreast with the changing dynamics of the post-COVID challenges, such as working from home, isolation, and stress from AI, among others. A significant gap in the extant literature burrows in the lack of conceptual clarity of workplace safety from a psychological perspective and the poor understanding of its substantive effects on organizations. Hence, re-examining workplace safety's conceptual and theoretical foundations from a psychological lens offers a more nuanced understanding of its potential to contribute to employee well-being and organizational resilience, pursuing a better work-life safe and more comfortable working environment. **Method:** This study: (a) synthesizes the theoretical propositions and empirical findings from 990 research articles published between 2000 and 2023 to map the existing body of knowledge about psychological safety and psychosocial safety climate, including their theoretical underpinnings and mechanisms, to offer a state-of-the-art overview of the scope of workplace occupational health and safety research from a psychological perspective; (b) applied a data-based research design adhering to PRISMA; (c) compiled descriptive synthesis and textual narrative syntheses through bibliometric analysis and a systematic literature review; and (d) opens the black box of workplace safety research by presenting significant findings to inform future conceptual, theoretical, and methodological research as well as the practice of workplace safety through the lens of psychology. **Results:** This study's findings further offer managerial implications to workplace safety policy-making and human resource management practices to enhance employees' psychological safety and eliminate workplace psychosocial hazards.

## 1. Introduction

The United Nations' Sustainable Development Goals (SDG) highlight the mission for organisations to promote productive employment and decent work for all (United Nations, 2024). Work health and safety are essential towards achieving the SDGs (Cierniak-Emerych, 2023). Work health and safety (WHS), sometimes known as occupational health and safety (OH&S), refers to a broad range of physical and psychological risks in all workplaces and their management (Safe Work Australia, 2023). Workplace safety includes safety performance and safety outcomes (e.g. accidents and injuries) (Christian et al., 2009). It is positively

associated with employee job satisfaction and the organisation's safety climate (Ayim Gyekye, 2005). Psychological safety refers to 'feeling able to show and employ oneself without fear of negative consequences to self-image, status, or career' (Kahn, 1990, p. 708). Psychosocial safety climate means an organisational climate for employee psychological safety and health (Hall et al., 2010). It refers to shared perceptions regarding 'policies, practices and procedures for protecting worker psychological health and safety' (Dollard & Bakker, 2010). Workplace safety, psychological safety, and psychosocial safety climate are essential psychological aspects of achieving work health and safety.

During the COVID-19 pandemic, countries and organisations have

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implemented radical workplace safety management practices to decrease or manage the risks of infections at work, such as working from home and other hygiene control measures (Falco et al., 2021; Vu et al., 2022). These geospatial isolation measures have ensured workers' physical safety against the virus. However, these physical workplace safety measures may have unintentionally contributed to the heightened global prevalence of mental health issues affecting workers, including anxiety, insomnia, depression, and distress (Pappa et al., 2022; Zhang et al., 2022). Existing occupational health and safety management systems for traditional workplaces fail to support working from home, implying a poor understanding of psychosocial risks associated with workplace safety initiatives (Bentley et al., 2021).

In the post-COVID-19 pandemic, governments worldwide have eased out or relaxed the restrictions and other control mechanisms that were in place towards zero-COVID policy (Mallapaty, 2022). However, psychological safety in the workplace and distress caused by working from home are now under intense scrutiny, given their impact on employees' emotional health and mental well-being (Galanti et al., 2021). Consequently, this trend highlights a new frontier in workplace safety as a pillar of the organisational support system for workers' mental health and organisational climate change where employees balance the benefits of working in a 'virtual' world, in particular, working from home vis-a-vis the cognitive costs of social isolation (Shipman et al., 2023). Such workplace safety management pressure creates an unsettled priority for psychological safety at the individual level of workers (personal factors) (Newman et al., 2017) and the psychosocial safety climate (situational factors) at the organisational level (Dollard & Bakker, 2010).

Amidst the fast-moving uncertainties of post-COVID-19, there is another situation where psychological risks to workers continue to escalate in the context of the engineering manufacturing industry. Workplace safety management in engineering manufacturing companies such as Foxconn Technology Group has attracted increasing attention in the literature given the high incidence of workers' suicides, stress, lack of workplace dignity (Lucas et al., 2013) and poor psychological safety environment (Clegg et al., 2016). Against this background, it has been apparent that workplace safety should be re-examined by going beyond its physical aspects and taking a psychological perspective as the current situation moves towards a post-COVID-19.

This study aims to review the literature on psychological safety and psychosocial safety climate to map out the body of knowledge on workplace safety research. Despite the theoretical importance and practical significance of psychological safety and psychosocial safety climate, the organisational management field has yet to understand this phenomenon fully. Combining psychological safety and psychosocial safety concepts, this study undertakes a comprehensive literature review by analysing the pertinent 990 literature from 2000 to 2023.

This study sought to build on the collective insights from 23 years of psychological safety and psychosocial safety research and make three-fold contributions accordingly. First, bibliometric analysis and systematic literature review open the black box of workplace safety by addressing its psychological aspects based on a robust synthesis of the extant literature. This approach unravels what know and do not know about psychological safety and psychosocial safety and offers a state-of-the-art overview of the research field. This study advances the psychological focus on workplace safety, which has been neglected in the extant literature. Second, the extant literature suggests that no study has yet been conducted that undertakes a holistic and systematic analysis of the main theories of psychological safety and its mediating and moderating effects. Uncovering the antecedents and mechanisms of psychological safety and psychosocial safety and their impacts on individual and organisational variables presents deeper insights into the progress of research in this domain and opportunities for future empirical research. Third, from a practical point of view, this study offers managerial implications for engineers and safety practitioners to address workplace hazards at the shopfloor level and boost their workplace safety from a psychological standpoint. This study

synthesises previous findings and seeks paths for future research on psychological safety and psychosocial safety climate to advance our understanding of workplace safety.

The rest of the paper is presented as follows. Section 2 – Methodology presents the literature searching strategy and data collection protocols. This section is followed by the results and their discussion in Section 3 – Bibliometric Findings and Section 4 Systematic Review Findings. Finally, it concludes with a summary and articulates the main findings' research, managerial, practical and policy implications.

## 2. Review methodology

The research design of this study follows the mixed method approach that involves four phases: (1) determining the research aims, objectives and research questions; (2) designing the research method and selecting the research papers (3) conducting the systematic bibliometric analysis; and (4) undertaking a textual narrative synthesis through a systematic literature review.

### 2.1. Research aims, objectives and research questions

The aim is to take stock of the current research in this field and illuminate future research directions by addressing the critical conceptual, theoretical and empirical omissions in this field. To achieve the above research objectives, this study will (1) present the prevailing state of research on psychological safety and psychosocial safety research, (2) illuminate future research avenues, and (3) offer pragmatic managerial applications of workplace safety. The overarching research questions guiding this investigation are as follows:

*RQ1: What are the influential studies and research themes in psychosocial safety climate and psychological safety in terms of journal characteristics, research disciplines, authors, country and institution affiliation, and duration of research?*

*RQ2: What are the recent research trends and frontiers in this field?*

*RQ3: How do workplace safety, psychosocial safety, and psychological safety climate relate to each other?*

*RQ4: What key theories are used to examine workplace psychology safety?*

*RQ5: What are the moderating and mediating effects of psychological safety reflected in the existing literature?*

*RQ6: What are the research gaps and directions of future research and managerial practice in psychological safety in organisational management?*

### 2.2. Review methods

This study conducted bibliometric and systematic review analyses to answer the above research questions. Following the guidelines of bibliometric research (Donthu et al., 2021) and aided by Co-Occurrence 13.4 and VOS Viewer 1.6.18, this study presents a preliminary descriptive analysis of the mapping of the research specialities or domains in the extant literature (Donthu et al., 2021; Glnzel, 2003; Zupic & Cater, 2015). This process involves a co-citation analysis, co-occurrence analysis and social network analysis. The next step involves a systematic approach (Booth et al., 2021) in content analysis towards generating a textual narrative synthesis (Duriau et al., 2007; Mayring, 2004) of the critical literature to gain deeper insights into the growth and trajectory of research in this field. Furthermore, this study leverages the rigours of thematic analysis (Ozuem et al., 2022) in identifying the main theories underpinning the interactive relationships among psychological safety, psychosocial safety, and workplace safety.

### 2.3. Selection of research papers

This section describes the process of outlet selection, database selection, search strategies, inclusion criteria, and analysis procedures. The scope of the current study is on workplace safety from a

psychological perspective. This study compiled literature review data sources from the Science Citation Index Expanded (SCI-E), Social Sciences Citation Index (SSCI) and Core Collection in Web of Science (WOB). The data extraction strategy is consistent with the existing safety research literature review (Gou et al., 2022). The next step involves a literature search between April 10 and 21, 2023. The search, which generated 9,868 research papers, used the following keywords:

TS= (psychological safety) or TS= (psychosocial safety) and TS= (workplace safety)

Document types = article with the Timespan = 2000–2023

This process also requires setting the exclusion and inclusion criteria to establish the scope and boundaries of the review. The PRISMA diagram in Fig. 1 presents the screening procedures, data identification and search refinement guidelines for reporting (Page et al., 2021). The selection parameters include peer-reviewed journal articles, excluding (1) non-English language items; (2) non-journal articles: conference proceedings, editorial materials, reviews and books; and (3) non-organizational management research areas. This process generated 990 research papers as candidate data sources for bibliometric analysis. This process also identified 28 core studies, according to high citations

and Journal Citation Reports (JCR) Q1 ranking, that were deemed useful in performing a detailed systematic review to ensure robust standards of scholarship.

### 3. Bibliometric findings

#### 3.1. Distributions of publication output

This section presents the findings of this study that address RQ1: *What are the influential studies and research themes in psychosocial safety climate and psychological safety in terms of journal characteristics, research disciplines, authors, country and institution affiliation, and duration of research?* The results of the bibliometric analysis reveal the most relevant authors, institutions, journals, and locally cited articles published on this topic.

Fig. 2 illustrates the distribution trends of research publications from 2000 to 2023, encompassing the domains of psychological safety, psychosocial safety, and workplace safety. Notably, this field has experienced significant growth, reaching 131 publications by the year 2022 since its inception in 2000. Notably, the annual publication counts

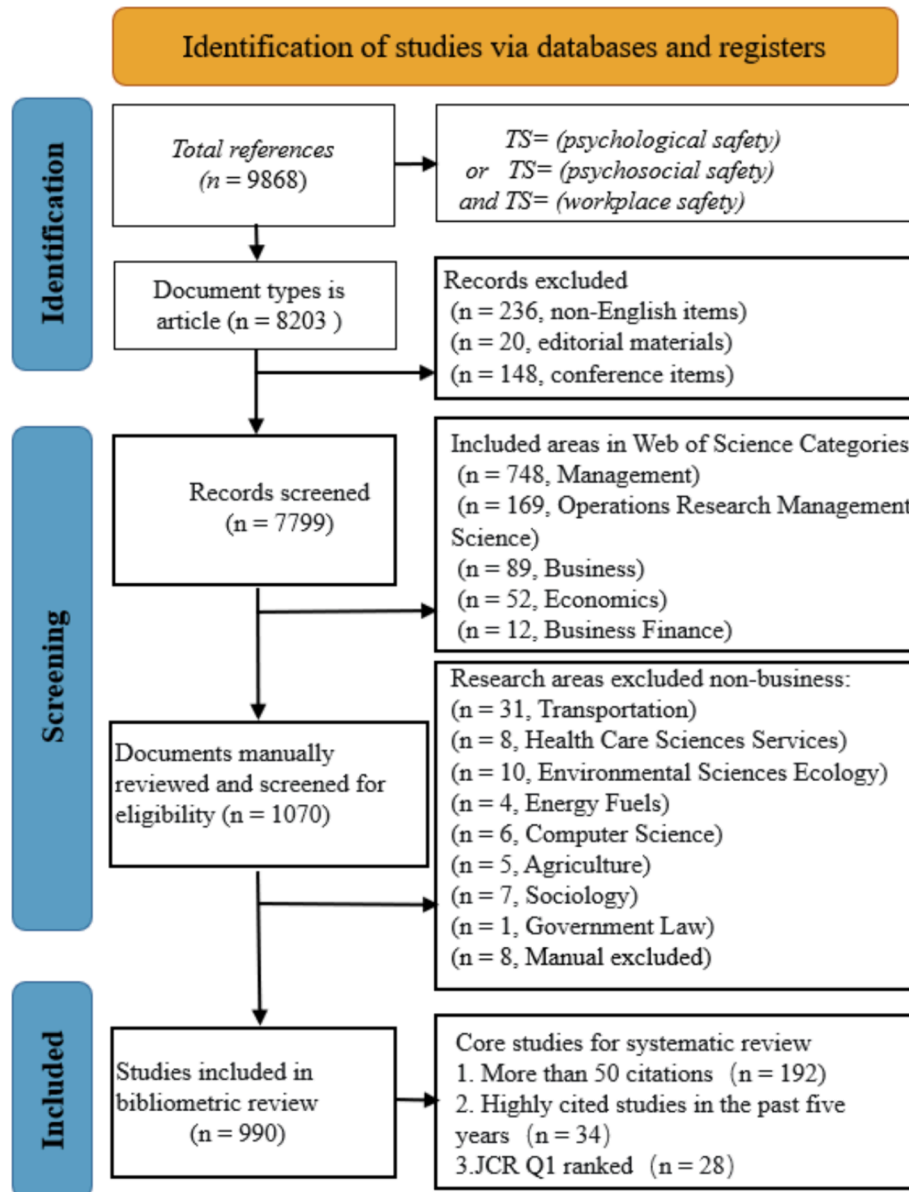


Fig. 1. The PRISMA Diagram.

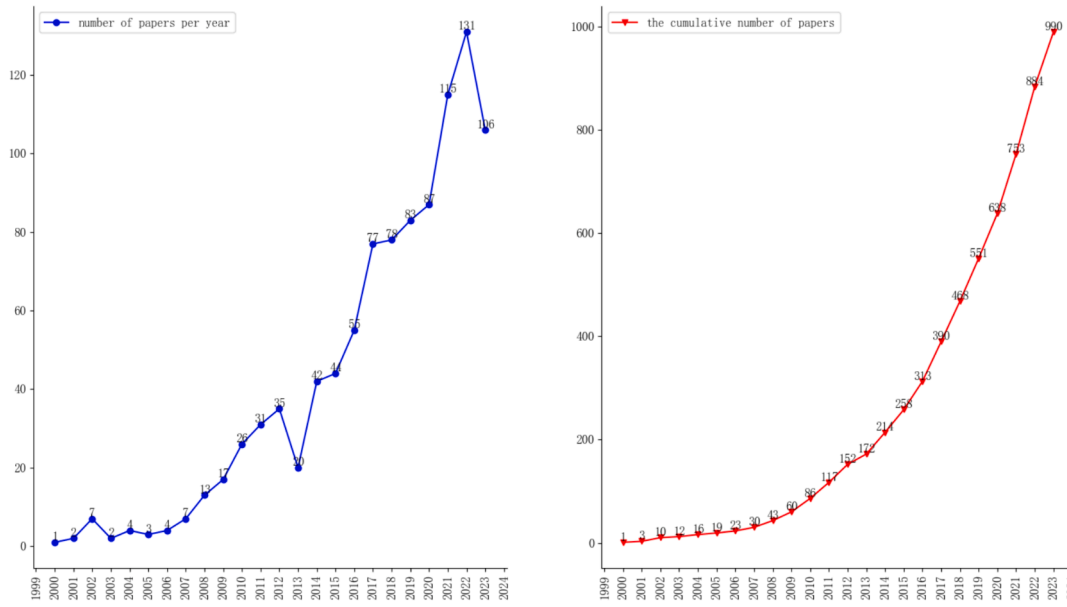


Fig. 2. Number of published documents from 2000 to 2023.

surpassed 100 papers starting in 2020, indicating a surge in academic interest regarding workplace safety and psychological safety, coinciding with the onset of the COVID-19 pandemic.

A total of 990 papers were identified in this study, accumulating 43,785 citations according to the Web of Science databases. Table 1 presents the top 18 highly cited papers with over 400 citations. The most influential study in this field was conducted by Rich et al. (2010), with 1,773 citations. Focusing on the relationships among antecedents, performance outcomes, and engagement, their findings indicate that while

**Table 1**  
Most highly cited academic articles on workplace safety and psychological safety from 2010 to 2023.

Ranking	Cited (times)	Journal	Academic articles
1	1773	Academy of Management Journal	(Rich et al., 2010)
2	1484	Journal of Management	(Anderson et al., 2014)
3	1119	Academy of Management Journal	(Detert & Burris, 2007)
4	964	Safety Science	(Guldenmund, 2000)
5	941	Administrative Science Quarterly	(Edmondson et al., 2001)
6	780	Journal of Organizational Behavior	(Baer & Frese, 2003)
7	761	Academy of Management Journal	(Liang et al., 2012)
8	622	Journal of Applied Psychology	(Walumbwa & Schaubroeck, 2009)
9	494	Organization Science	(Edmondson, 2002)
10	473	Academy of Management Annals	(Williams et al., 2017)
11	458	Journal of Applied Psychology	(Schaubroeck et al., 2011)
12	442	Academy of Management Journal	(Detert & Edmondson, 2011)
13	442	Journal of Supply Chain Management	(Pagell & Shevchenko, 2014)
14	433	Journal of Occupational and Organizational Psychology	(Dollard & Bakker, 2010)
15	431	Safety Science	(Choudhry & Fang, 2008)
16	427	Harvard Business Review	(Garvin et al., 2008)
17	414	Journal of Applied Psychology	(van Dyck et al., 2005)
18	400	Personnel Psychology	(Takeuchi et al., 2009)

job involvement, job satisfaction, and intrinsic motivation acted as mediators, these did not exceed the role of engagement in the relationship among antecedents and effects on job performance. The second highly cited paper is by Anderson et al. (2014), which explores organisational creativity and innovation across different levels and layers. They proposed four promising interfaces: (1) the individual-team interface, where the team adopts an individual’s idea or suggestion; (2) the team-individual (T-I) interface where team processes and phenomena influence individual team members; (3) the team-organization (T-O) interface where team innovation relates to the broader aspects of the organisation or its senior management; and (4) the organization-team (O-T) interface where organizational-level innovation and creativity impact the team.

Table 2 lists the Top 15 most constructive academic journals in workplace safety and psychological safety. Safety Science (Impact Factor IF 6.392) is the key publication on this topic, with 121 papers, followed by the Journal of Applied Psychology (IF 11.802) and the Journal of Nursing Management (IF 4.680).

This study performs the co-citation analysis of academic journals related to this study (2000–2023), which explains the network of documents interconnected with each other through citations (Chen & Liu, 2020). The findings are organised into four clusters. Cluster 1 primarily focuses on safety-related research. Among the journals in this cluster, Safety Science emerges as the major contributor, with 1,030 citations. Cluster 2 centres around management studies: Administrative Science Quarterly is the prominent contributor, receiving 1,913 citations. Cluster 3 pertains to the psychology field, where the Journal of Applied Psychology stands out as the primary contributor with 5,769 citations, indicating the most compelling areas of interest for scholars. Cluster 4, focusing on accounting, demonstrates the least research interest. The Accounting Review emerges as the major contributor in this cluster, receiving 74 citations. Overall, these findings provide insights into the co-citation patterns among journals, highlighting the diverse and multi-disciplinary research areas and the varying levels of scholarly interest within each cluster.

### 3.2. Authors, countries/regions, and organizations

#### 3.2.1. Key authors

The bibliometric analysis identified 2,755 authors from the 990 articles. Fig. 3 illustrates the research productivity of scholars who

**Table 2**  
Top 15 most constructive academic journals related to this study (2000–2023).

Ranking	Journal	Publications	Impact Factor	Citation Count
1	Safety Science	121	6.392	4266
2	Journal of Applied Psychology	37	11.802	4209
3	Journal of Nursing Management	36	4.680	655
4	Journal of Occupational and Organizational Psychology	23	5.119	1286
5	Academy of Management Journal	20	10.979	5444
6	International Journal of Human Resource Management	20	6.026	367
7	Leadership & Organization Development Journal	20	3.923	351
8	Organization Science	20	5.152	1824
9	Group & Organization Management	19	4.290	541
10	Journal of Organizational Behavior	19	10.079	1882
11	Journal of Business and Psychology	18	6.604	238
12	Personnel Review	18	3.228	256
13	European Journal of Work and Organizational Psychology	17	4.867	401
14	Journal of Business Ethics	16	6.331	441
15	Journal of Knowledge Management	16	8.689	308

contributed more than three papers. Carmeli Abraham emerged as the most research-productive authors, having published 13 articles with 1,269 citations over the past two decades. Carmeli and co-authors’

publications spanned the years 2007 to 2022. Their research interests encompass leadership, learning leadership, psychological safety, team trust, learning from failures, innovation, high-quality relationships, knowledge combination capability, team learning, and performance. Their contributions have significantly enriched the scholarly discourse in these areas.

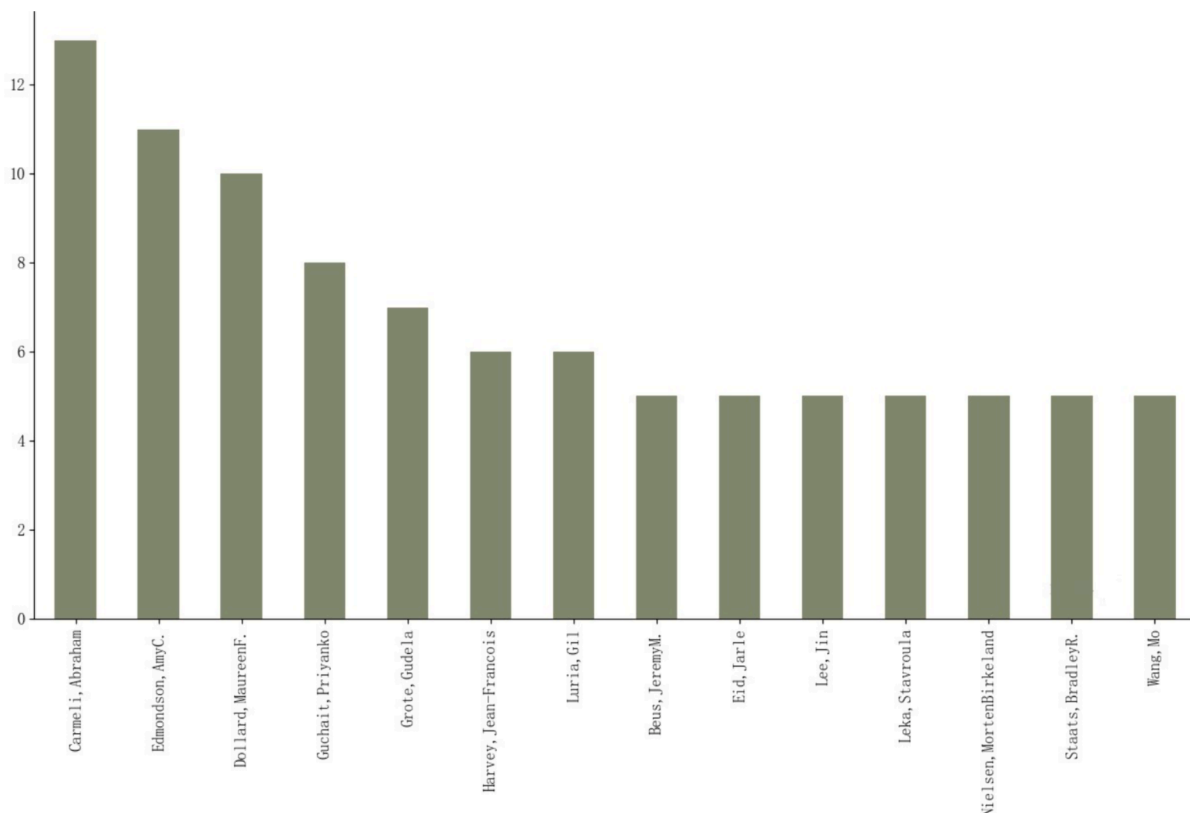
### 3.2.2. Countries/Regions

The retrieved 990 articles cover 68 countries/regions. Table 3 lists the top 15 most research-productive countries/regions. USA, China, and Australia take the top three. 14 out of 15 countries/regions are developed countries, placing more research attention on psychological safety than developing countries.

Figure 4 provides an analysis of research output in the United States. It reveals an interesting trend in publication activity over the years. In

**Table 3**  
Top 15 most contributing countries/regions on workplace safety and psychological safety from 2000 to 2023.

Ranking	Country or territory	Publications	Citation Count
1	USA	375	25,013
2	China	177	6931
3	Australia	118	2970
4	England	106	4728
5	Netherlands	79	4687
6	Canada	70	2454
7	Germany	48	2541
8	Spain	38	1444
9	France	34	1204
10	Pakistan	30	682
11	South Korea	30	666
12	Norway	29	683
13	Italy	28	596
14	Israel	27	1970
15	Taiwan	27	757



**Fig. 3.** The top 14 most productive authors on workplace safety and psychological safety from 2000 to 2023.



2001, US researchers published only two papers in this domain. However, the number of publications per year had surpassed ten by 2010. Since 2011, the average annual publications have consistently exceeded 15 research papers. Remarkably, yearly publications reached a remarkable 375 in 2023, marking a tenfold increase compared to 2010. This substantial growth highlights the emergence of numerous research hotspots in the United States dedicated to studying psychological safety.

This study identified the geographical data collection choices of reviewed articles. Aided by VOS viewer, this study developed a clustering system of the 41 countries/regions with more than five publications. Fig. 5 offers a comprehensive analysis of the collaboration patterns among 41 countries/regions that have contributed more than five publications in the field (Chen et al., 2020). Cluster mapping describes the quantitative measurement of the presence of clusters across regions within a country or group of countries (Ketels, 2017). The co-occurrence rates among these countries/regions were used to identify clusters represented by distinct colours. Each cluster signifies a group of collaborating countries/regions sharing common research interests. The size of the nodes within each cluster indicates the main contributors.

This process identified five clusters, primarily situated within the domains of business, economics, and psychology. As the red Cluster 1 indicates, major contributors include England, Netherlands, France, Norway, Italy, and Belgium. Their research focuses on Psychology, Business and Economics. The contributions of the USA, Canada, Germany, Pakistan, South Korea, and Switzerland predominantly drive the green Cluster 2. Their research interests span Psychology (Applied), Management, Business & Economics, Nursing, and Operations Research & Management Science. Within the blue Cluster 3, Spain, Israel, Portugal, Brazil, and Greece emerge as the primary contributors. Their research revolves around Business, Management, and Economics.

The yellow Cluster 4 highlights Australia, New Zealand, the United Arab Emirates, Chile, and Vietnam as significant contributors. Their research focuses on transportation, transport, and healthcare science and services. Lastly, the purple Cluster 5 comprises China, Turkey, Taiwan, and Denmark as the significant contributors. Their research primarily focuses on social and educational aspects, including social issues, behavioural sciences, geriatrics and gerontology, health sciences and services, and urban studies. These clusters provide valuable insights into the collaborative research efforts and areas of emphasis across different countries and regions within the field.

### 3.2.3. Organizations

Table 4 presents the top 14 research institutions actively contributing to the field of workplace safety and psychological safety, with

more than ten publications each. The leading institution is Erasmus University Rotterdam from the Netherlands, with 23 publications. Notable research institutions in the USA include the University of Maryland, Harvard University, and the University of Houston. Additionally, major contributors from Australia include Queensland University of Technology and Curtin University. Fig. 6 further shows the three main collaborative network clusters among institutions. The University of Maryland has the highest total link strength at 155. Harvard University has the highest total link strength at 187. The Erasmus University Rotterdam has the highest total link strength at 126.

### 3.3. Research trends and frontiers

This section presents the findings that address RQ2: *What are the recent research trends and frontiers in this field?*

#### 3.3.1. Keywords distribution analysis

Table 5 displays the top 15 keywords ranked by frequency, highlighting the key research areas of focus among scholars. “Psychological Safety” holds the highest frequency, followed by “Behavior” and “Performance” in the second and third positions, respectively. The keyword “Work” is ranked fourth, underscoring its significance in scholarly investigations. This ranking emphasises the prominence of Psychological Safety, Behavior, and Performance as primary research interests among scholars.

#### 3.3.2. Narrative themes

This study attempted to unravel how researchers in this field have explored psychological safety and psychosocial safety across different themes. Towards this end, this study analysed the 2,680 co-occurring literature keywords (Fig. 7) with a threshold value of 10, aided by VOS Viewer. These keywords were grouped into four clusters, with the size of the spheres in the co-occurrence analysis graph indicating their frequency and status as research hotspots. In addition to the key building blocks of these two concepts in workplace safety research, review articles naturally fall into four categories (clusters).

Cluster 1 (Leadership) consists of 13 keywords: leadership, safety climate, psychosocial safety climate, work engagement, diversity, nurses, authentic leadership, COVID-19, meta-analysis, organisational climate, occupational health and safety, workplace bullying, and psychological capital. Research in Cluster 1 suggests that the influence of leadership on employee job participation and workplace bullying may be moderated by psychosocial safety climate and organisational climate. Notably, studies focusing on nurses, occupational health and safety, and

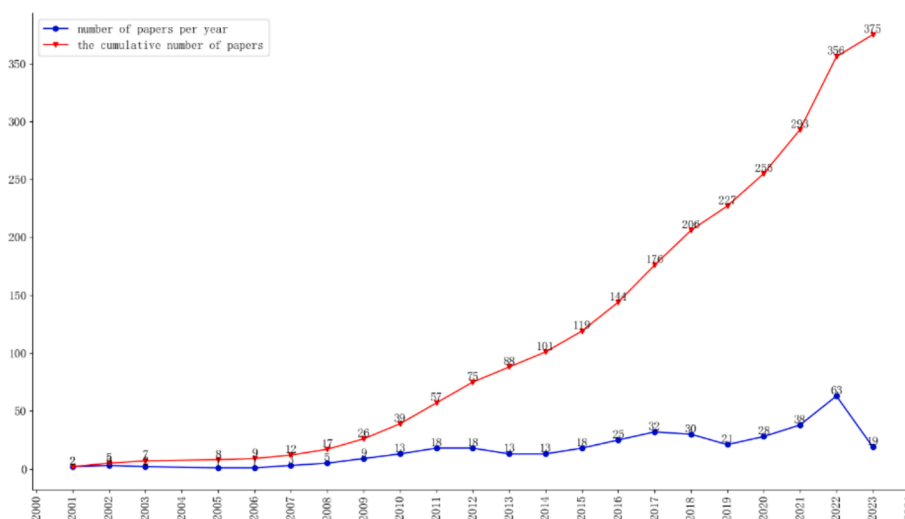


Fig. 4. Number of published articles on psychological safety by researchers from the USA (2000–2023).

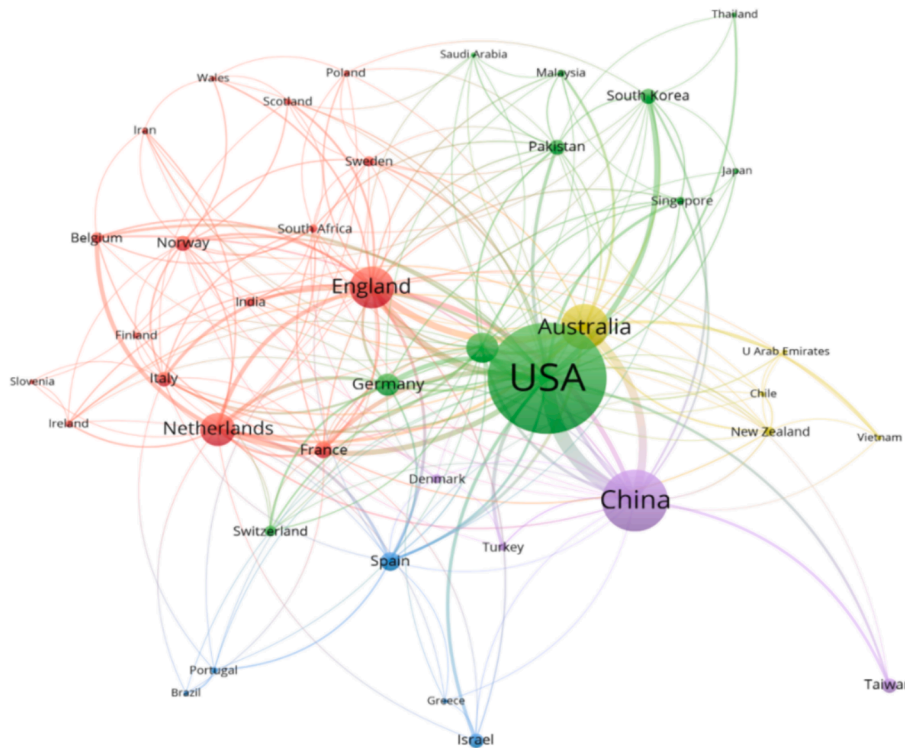


Fig. 5. Cluster map of countries/regions on workplace safety and psychological safety from 2000 to 2022.

Table 4

Top 14 most contributing organisations on workplace safety and psychological safety from 2000 to 2023.

Ranking	Name of Institutions	Location	Publications
1	Erasmus University Rotterdam	Netherlands	23
2	University of Maryland	USA	18
3	Harvard University	USA	16
4	Michigan State University	USA	15
5	University of Huston	USA	15
6	Queensland University of Technology	Australia	13
7	Curtin University	Australia	13
8	University of North Carolina	USA	12
9	Pennsylvania State University	USA	12
10	Zhejiang University	China	11
11	Hongkong Polytech University	China	11
12	Monash University	Australia	11
13	University of Nottingham	UK	11
14	University of Bergen	Norway	11

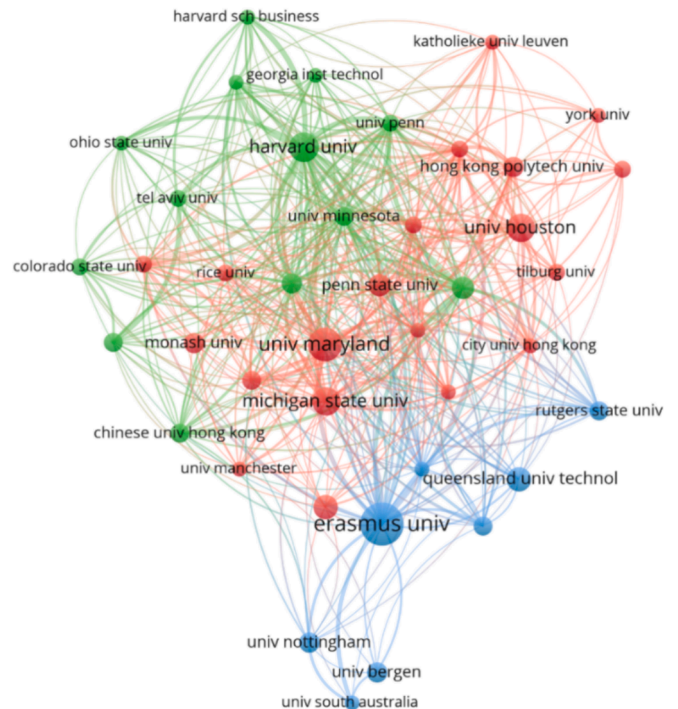


Fig. 6. Cluster map of organisations researching this field from 2000 to 2023.

COVID-19 have emerged. The inclusion of “meta-analysis” indicates the importance of this research approach alongside quantitative and qualitative studies.

Cluster 2 (Learning) comprises 11 keywords: psychological safety, creativity, team, knowledge sharing, innovation, organisational learning, learning, transformational leadership, performance, knowledge hiding, and project management. It demonstrates that the relationships between psychological safety, team psychological safety, and performance (creativity, innovation) are influenced by knowledge sharing, knowledge hiding, organisational learning, transformational leadership, and project management, which enhance performance and capabilities.

In Cluster 3 (Team), the eight most prevalent keywords are team learning, team performance, team creativity, trust, team psychological safety, employee creativity, task conflict, and team innovation. This cluster highlights the impact of team learning and trust on team psychological safety and team performance (including creativity and innovation), with task conflict playing a significant role in this context.

Cluster 4 (Engagement) indicates a close interaction between safety concepts and voice. The presence of a safe environment enables both leaders and employees to engage in voice behaviour more easily.

Overall, these clusters of keywords offer insights into various aspects of research, including leadership, psychological safety, team dynamics, innovation, and the importance of creating safe and supportive environments for employees to voice their opinions.

**Table 5**  
Occurrences of 15 authors' keywords (from high to low).

Ranking	Label	Weight (Occurrences)
1	Psychological Safety	212
2	Behaviour	95
3	Performance	81
4	Work	78
5	Model	48
6	Mediating Role	47
7	Management	47
8	Culture	44
9	Safety	38
10	Antecedents	37
11	Job-Satisfaction	32
12	Teams	31
13	Leadership	31
14	Transformational Leadership	30
15	Safety Climate	29

Table 6 provides the average publication dates (average year of publication) for the top ten authors' keywords. Notably, the keyword "knowledge hiding" has the most recent average publication date, suggesting increasing research interest in this area. Following that is "COVID-19," indicating the significant impact of the pandemic on the global economy and various industries, prompting scholars to conduct research in the context of COVID-19. The following six keywords, namely "team creativity," "team innovation," "meta-analysis," "nurses," "work engagement," and "authentic leadership", all have average publication dates after 2019, indicating their status as recent research hotspots closely aligned with current trends.

Figure 8 illustrates the year-on-year changes in the prominence of the top 15 high-frequency keywords from 2000 to 2023. During the early stages, scholars showed increasing interest in keywords such as safety climate, psychological safety, behaviour, culture, work, and performance. Notably, the attention towards performance peaked in 2005 and gradually declined thereafter. Conversely, since 2009, scholars' focus on psychological security has consistently remained higher than other keywords, indicating its enduring status as a prominent research topic of interest.

**3.3.3. Research frontier identification**

The topic-weighted time zone chart, depicted in Fig. 9, visualises the

keywords weighted by their year, time zone and frequency. The size of the points corresponds to the frequency of each keyword, with more prominent points indicating higher research interest. Keywords that appear more frequently are represented by more significant points, signifying their prominence in scholarly investigations. Moreover, the position of a keyword on the time axis indicates its relevance to recent academic research, with keywords towards the right side being more contemporary and potentially current hotspots. This analysis considered keywords with a frequency of 18 or more times. Notably, the most significant point on the chart, representing the keyword "psychological safety," emerged around 2018, indicating its status as a prominent and recent topic of academic research. Other keywords like "performance", "work," and "behaviour," which also have more prominent points around 2017, demonstrate significant research interest.

Furthermore, keywords with more prominent points after 2018 include "team creativity," "psychological safety climate," "diversity," "knowledge sharing," "work engagement," "organisation," "creativity," and "mediating role." These keywords suggest potential hot topics for research in recent years.

Fig. 10, the burst keywords detection diagram, highlights the sudden emergence of keywords and provides insights into future research trends. A burst refers to a frequency surge of a particular type of event (CiteSpace, 2024). A total of 60 keyword mutations were detected between 2000 and 2023. Notably, in 2020, the keyword "COVID-19" emerged, indicating a significant focus of scholars on the pandemic during that year. Additionally, the resource conservation theory was

**Table 6**  
Average publication year (from 2000 to 2023) of 10 author keywords (from late to early).

Ranking	Label	Score (average publication per year)
1	knowledge hiding	2021.5556
2	Covid-19	2021.2727
3	team creativity	2020.1053
4	team innovation	2019.8
5	meta-analysis	2019.6923
6	nurses	2019.3889
7	work engagement	2019.3684
8	authentic leadership	2019.1333
9	task conflict	2018.9091
10	psychosocial safety climate	2018.9



**Fig. 7.** Keywords Network Visualisation.



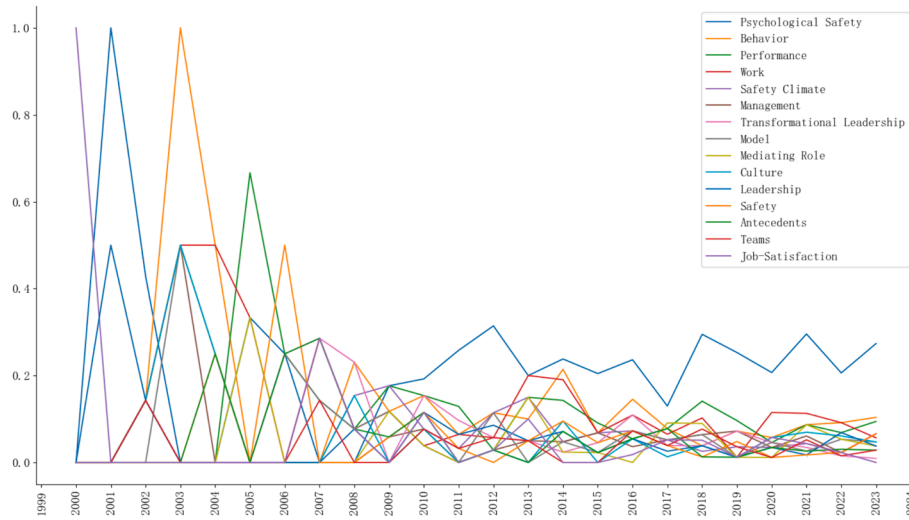


Fig. 8. Keywords year by year attention change chart.

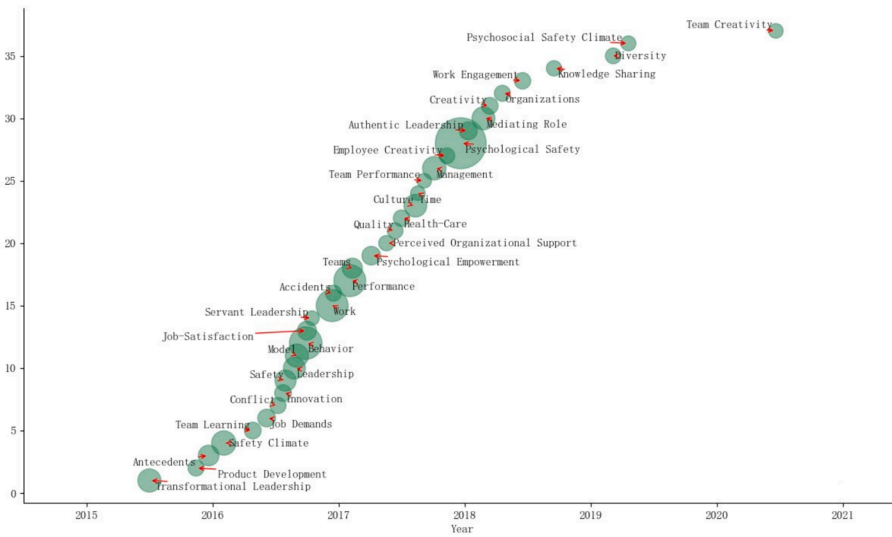


Fig. 9. Topic-weighted time zone chart.

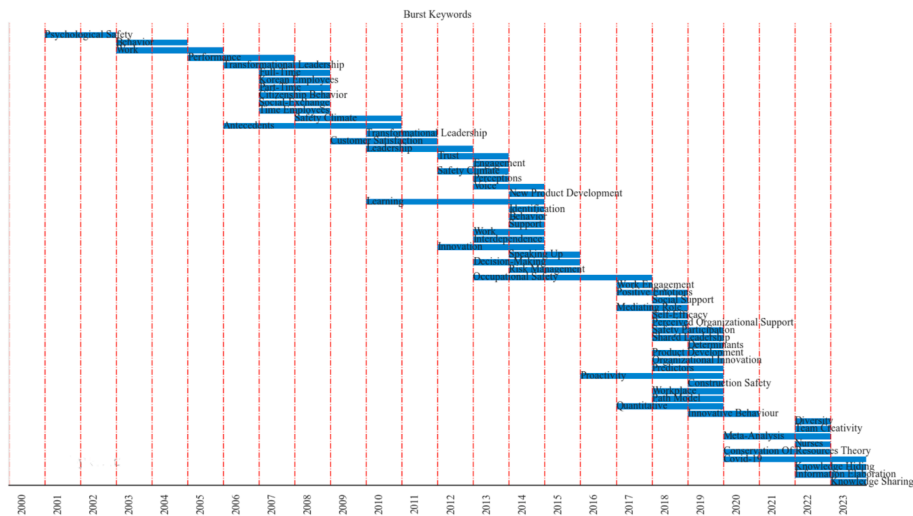


Fig. 10. Burst Keywords detection diagram.

also detected in 2020.

In 2022, several keywords emerged, including “diversity”, “team creativity”, “nurse,” “information elaboration” and “knowledge hiding”. These keywords gained the attention of scholars during that year. Furthermore, in 2023, the keyword “knowledge sharing” surfaced, becoming an object of scholarly interest over the past two years. It is noteworthy that keywords such as “team creativity,” “knowledge hiding”, and “knowledge sharing” are closely related to psychological safety, representing promising research trends in the field.

#### 4. Systematic review findings

This study conducted thematic and qualitative content analyses (Mayring, 2004) of 28 influential articles on psychological safety. Appendix 1 provides a comprehensive review of the theoretical foundations and relevant literature.

##### 4.1. Main theories of psychological safety

To shed light on RQ3: *What key theories are used to examine workplace psychology safety?* and RQ4: *How do workplace safety, psychosocial safety, and psychological safety climate relate to each other?* This study conducted a statistical comparative analysis of theories in 28 articles (Journal Citation Reports Metrics: JCR ranked at Q1) cited more than 50 times in the last five years. As shown in Table 7, 37 key theories underpin the studies in the literature, suggesting an increasingly diversifying and evolving theoretical landscape of psychological safety research. Notably, *Diversity theory* (Edmondson & Harvey, 2018b; Vandekerckhof et al., 2018), *Social learning theory* (Men et al., 2020; Peng et al., 2019), and *Psychological contract theory* (Newaz et al., 2019; Shuffler et al., 2018) emerged as trendy theoretical foci.

This study suggests that future investigations may consider *social learning theory* (Bandura & Walters, 1977) in examining psychology safety and offering in-depth theoretical explorations. *Social learning theory* indicates that individuals can learn appropriate behaviour through role modelling by observing the behaviours of others (Bandura, 1977; Liden

**Table 7**  
Theory frequency statistics.

Theory	Ratios	Theory	Ratios
Diversity Theory	5.26%	Team Coaching Theory	2.63%
Social Learning Theory	5.26%	Person-Environment Theory	2.63%
Psychological Contract Theory	5.26%	Relational Attachment Theory	2.63%
Theory of Systems Psychodynamic	2.63%	Theory of Team Climate	2.63%
Conservation of Resources Theory	2.63%	Self-Perception Theory	2.63%
Social Exchange Theory	2.63%	Social Information Processing Theory	2.63%
Uncertainty Reduction Theory	2.63%	Psycap Theory	2.63%
Job Demands-Resources Theory	2.63%	Social Cognitive Theory	2.63%
Affective Events Theory	2.63%	Theory of Self-Efficacy	2.63%
Team Learning Theory	2.63%	Climate for Conflict Management	2.63%
Regulatory Focus Theory	2.63%	Risk Perception Attitude Framework	2.63%
Theory of Resources–Challenges Equilibrium	2.63%	Transactional Theory of Stress and Coping	2.63%
Person-Supervisor Fit Theory	2.63%	Effort-Recovery Model	2.63%
Signaling Theory	2.63%	Conservation of Resources	2.63%
Theory of Enrichment-Based	2.63%	Behavioral Activation and Behavioral Inhibition Systems	2.63%
Theory of Depletion-Based	2.63%	Social Identity and Self-Categorization Theory	2.63%
Kahn’s Psychological Conditions	2.63%	Leader-Member Exchange Theory	2.63%
Mental Model Theory	2.63%		

et al., 2014). For example, Peng et al. (2019) utilised *Social Learning Theory* at the team level to propose a theoretical model demonstrating how self-centred leaders impede team creativity through psychological safety and knowledge hiding. Moreover, drawing on *social learning theory*, Men et al. (2020) investigated the relationship between ethical leadership and knowledge hiding, measuring it at the individual level. The empirical findings revealed a negative correlation between ethical leadership and knowledge hiding, while psychological safety mediating this relationship. Future research could further explore the application of *Social Learning Theory* to psychological safety at the organisational level, which can contribute to understanding psychosocial safety climate. This study reveals that *Organizational Support Theory* and *Organizational Learning Theory* are emerging as theoretical frameworks for studying psychological safety in working from home/online offices. These theories have demonstrated their applicability and significance in understanding and exploring psychological safety in remote work settings.

These review findings underscore the importance of exploring psychological safety and psychosocial safety climate antecedents as a research frontier. A promising area of study is team creativity and knowledge hiding. Team creativity refers to new ideas developed by a group working together to improve “products, services, processes, and procedures” (Shin & Zhou, 2007, p. 1710). Team creativity is important in organisations and is closely related to information elaboration. Huang and Liu (2022) noted that psychological safety climate and cognitive demands were positively related to team creativity through information elaboration. Liu et al. (2022) further showed that experiencing tension and information elaboration mediated the relationship between task conflict and team creativity. Knowledge hiding refers to a person’s intentional concealment or withholding of knowledge requested by others (Connelly et al., 2012, p. 65). It is a preventive coping mechanism in response to the threat of dark personality traits in managers (Soral et al., 2022); for example, Agarwal et al. (2022) proposed that psychological safety mediates the effect of abusive supervision on knowledge hiding. Furthermore, high self-esteem weakens this effect. Employees with high self-esteem are less affected by abusive supervision on psychological safety and knowledge hiding; however, this effect is amplified by more co-reflection, as employees with more co-reflection are also more susceptible to abusive supervision in terms of psychological safety and knowledge hiding.

##### 4.2. Research method, object, and context

The literature review findings map out key research methods used in the extant literature: quantitative methods (N=19), qualitative methods (N=3), mixed methods (N=1), meta-analysis articles (N=3) and review articles (N=2). It is worth highlighting the appearance of the term “mediating role” in Figure, emphasising quantitative empirical findings on the role of psychological safety. A notable lack of qualitative research methods in existing literature calls for future scholarly investigations.

The research object of nurses has received significant attention. The keyword “nurses (2019.3889)” appeared on the average publication date, indicating considerable research attention to the psychological safety of nurses, which is directly coupled with the COVID-19 pandemic. Other research groups, such as engineer workers and teachers, received limited attention.

This study further highlights the limited studies that examined psychological safety and psychosocial safety climate in the research context of China. The COVID-19 lockdown in China has recently become more salient than in other countries (Mallapaty, 2022). Nevertheless, there are insufficient empirical findings in China. The empirical findings on psychological safety in China contain certain limitations. Currently, research objects mainly come from 11 information and technology companies in a major city in Northern China (Hu et al., 2018); 6 companies operating in South China from industries of manufacturing, information technology, and architectural design (Peng et al., 2019); 96

knowledge work teams from high-tech organisations in Eastern China (Men et al., 2020); human resource managers in 50 organisations in Beijing, Shanghai, Wuhan and other 12 cities in China (Tu et al., 2019), and one information technology company in Beijing, China (Lin et al., 2020), etc. The current studies in China have limitations in research contexts and participant groups, severely constraining the generalizability of research findings.

#### 4.3. The Mediating and moderating effect of psychological safety

This section presents our findings that address RQ5: *What are the moderating and mediating effects of psychological safety reflected in the existing literature?* This study outlines a comprehensive overview of the mediating role of psychological safety at the individual, team, and organisational levels, as shown in Appendix 2. At the individual level, existing research has extensively employed Kahn's psychological conditioning framework (Kahn, 1990) as a mediating mechanism. Lin et al. (2020) examined the mediation of psychological meaning and psychological safety between helping behaviour and work participation. Jiang et al. (2019) demonstrated the mediating effect of psychological safety on the negative relationship between knowledge hiding and job productivity. Men et al. (2020) found that psychological safety mediated the relationship between ethical leadership and knowledge hiding. Tu et al. (2019) also proposed that a psychologically safe atmosphere mediated the link between ethical leadership and team creativity. At the team level, Hu et al. (2018) revealed that psychological safety mediated the relationship between leader humility and team creativity, with team power distance as a moderator. Peng et al. (2019) highlighted the mediating role of team psychological safety in the relationship between selfish leadership and team creativity. At the organisational level, Singh et al. (2018) suggested that psychological safety mediated the connections between perceived organisational support, supervisor support, colleague support, and organisational embeddedness in globalisation. Regarding the moderating effect of psychological safety, Vandekerckhof et al. (2018) found that psychological safety moderated the adverse and indirect impacts of social-emotional wealth separation on top management team decision quality.

The above findings indicate a greater emphasis on individual-level research on the mediating role of psychological safety, while studies at the team and organisational levels are relatively limited. Future research is encouraged to enhance investigations at these levels. Additionally, the moderating effect of psychological safety has received insufficient empirical verification and should be further explored.

## 5. Future research direction

This study synthesises previous research and seeks avenues for future research on psychological safety and psychosocial safety climate. This section presents the findings towards addressing RQ6: *What are the research gaps and directions of future research in psychological safety in organisational management?*

Although scholars have recently produced insightful frontier research work on workplace safety management (Vu et al., 2022), occupational health and safety management (Bentley et al., 2023), safety and security research (Gou et al., 2022), the scant knowledge on psychological safety and psychosocial safety climate presents a gap to understand the key attributes and mechanisms behind whether and how organisations demonstrate their sustainable commitment to improving their workplace safety from a psychological standpoint consistently. This study reveals the limited understanding of psychological safety and psychosocial safety climate dimensions in the extant literature. The following section presents the suggested directions for future research based on this key finding.

### 5.1. Challenges and potential of increase in institutional complexities

Amidst fast-moving organisational complexities and post-Covid, more positive research opportunities co-exist. This includes a lack of explicit theorising, criticality and managerial awareness of the urgency for psychological safety and psychosocial safety climate at the institutional-wide level to handle rapid changes involving digital disruptions to employees' job roles, employment security, and work-from-home flexibilities. First, there is a need to grow the literature on how managers and organisations across the globe demonstrate their commitment towards workplace safety and psychological safety amidst diverse institutional environments. Institutions define the formal and informal rules that shape the behaviour of managers and their respective organisations (Scott, 2008). In developing countries, such as China, where the institutional environments could be better developed than those found in advanced economies, an important question arises on how well psychological safety and psychosocial safety climate are institutionalised in diverse organisational configurations. Second, future studies may also explore psychological safety and psychosocial safety climate in the context of small to medium-developing economies other than China. These developing economies suffered immensely during the COVID-19 pandemic, given their limited resources that heavily impaired the adoption of workplace safety measures, let alone managing the psychological impact of the pandemic on employees across industries. Hence, studies focusing on these economies will enrich this study's current understanding of the contextual imperatives of workplace safety. Furthermore, comparing workplace safety practices among organisations in developed vs developing economies can generate meaningful data that can inform empirical investigations and the practical development of initiatives and measures such as HRM practices that are fit for purpose and context. Third, the institutionalisation of psychological safety and psychosocial safety climate significantly varies depending on the industry context. Comparative studies that will examine workplace safety in the manufacturing and service sectors, private, public, and not-for-profit sectors, among others, have the potential to generate a practical and industry-based body of knowledge on how to set up, nurture, and sustain workplace safety given the unique conditions in each industry.

### 5.2. Troubling lack of methodological attention

Yet, increased empirical exploration and massive research investigation have yet to be paralleled by the increased attention to construct measurement. The extant literature highlights the need to undertake research in this domain using multi-level and longitudinal approaches. A multilevel research design allows for an incisive investigation of workplace safety by bridging the field's micro (i.e., employee level)-macro (i.e., team and organisational levels) gaps.

This study calls upon future research to use the following methods. First, a longitudinal method to investigate how and why firms institutionalise psychological safety and psychosocial safety climate and the changes and impacts arising over time will have significant theoretical and practical implications. This study's findings also highlight the need for more ethnographic and case-specific studies to delve deeply into the implementation, integration and institutionalisation of an organisation's psychological safety and psychosocial safety climate. Future studies will unpack and unravel deeper insights to inform theory development in this domain.

In light of measurement, this study's findings suggest that the psychological safety and psychosocial safety climate constructs are undergoing rapid conceptual evolution. Future studies that closely examine these constructs' measurement and psychometric properties, including the development and use of formative or reflective indicators, will inform the robust, valid, reliable and generalisable conceptual development and application across various contexts. The analytical advancements over the past ten years, aided by the widespread availability

and accessibility of statistical tools, enable the determination of the nature, amount and magnitude or extent of effects of contingency variables on workplace safety. For instance, future studies may employ the necessary condition analysis (NCA) (Dul et al., 2023) to determine with substantive predictive accuracy the extent to which variables are essential for workplace safety to be in place or work in a given organisational setting.

Future studies in data collection may also focus on fleshing out best practices in workplace safety from the psychological aspect. This research endeavour has the potential to generate practical managerial and organisational data on how workplace safety is implemented on the ground. In a similar vein, studies that examine workplace safety implementation have the potential to identify national, regional or global standards. Data from these studies will strategically inform policymaking at the country, regional, bilateral, or multilateral levels.

## 6. Conclusion

The thriving psychological safety and psychosocial safety climate research field is expanding fast. This study evaluates prior research literature statistically and systematically to inform scholarship growth and development by unravelling rich findings to six research questions, including the characteristics of publications, institutional collaborations, research themes and trends and illuminating research frontiers. Yet addressing workplace safety's health and safety implications from the psychological aspect is imperative: the SDGs suggest that improving working conditions and promoting workers' health and safety are essential to a sustainable global economy (UnitedNations, 2024). In response to exacerbating workplace safety concerns, psychological safety is a critical concept that has important implications for employees' workplace performance, which is linked closely to the psychosocial safety climate at the organisational level. In the wake of the increasingly imminent threats posed by workplace psychosocial hazards (Derdowski & Mathisen, 2023), this literature review uncovers the extant knowledge of the psychological safety and psychosocial safety climate concepts, their underpinning theories and their antecedents, moderating and mediating effects.

This robust systematic literature review is the first of its kind that delves deeply into the more nuanced investigations of psychological safety and psychosocial safety climate in the post-COVID era. The findings present an incisive scrutiny of the research gaps in the extant literature on the topic and offer novel insights towards progressing the scholarly growth of the field. Firstly, despite a sustained and growing research interest in exploring workplace safety from the psychological aspect, this study highlights the highly fragmented research domain, characterised by widely dispersed findings and convoluted theoretical perspectives. This study established the geographical coverage of reviewed research, demonstrating the intensification of scholarly attention to the topic and the growth of topic-related studies on a global scale. Secondly, inconsistent findings prevail regarding psychological safety's mediating and moderating effects. These disagreements call for future empirical investigations to expand, extend, re-validate or recalibrate previous findings across various contexts. Thirdly, the phenomenon of working from home post-COVID further supports the need for a more concerted effort from the global research community to ask better questions and seek better answers about workplace safety from a psychological standpoint. This study has integrated current knowledge to address the aforementioned gaps by presenting this systematic review and bibliometric analysis. Psychological safety in the workplace is urgently needed to keep up with the changing dynamics of post-COVID, including work-from-home isolation, stress of AI, etc., which are important to workers' psychological health and safety. Therefore, this study hopes that future research will benefit from the literature review findings to delve deeper into empirical investigations of the subject.

This study is not without limitations. The current research approach only considered peer-reviewed journal articles written in English. As the

findings indicate insufficient empirical findings in China during COVID-19 in English peer-reviewed journal articles, future studies may consider extending this study by examining peer-reviewed journal articles written in Chinese and other non-English languages for triangulation purposes. Despite this, the thematic literature review analysis only considered JCR Q1-ranked journal publications with high citations. Future studies may consider different journal rankings criteria together with JCR, such as the ABDC (Australian Business Deans Council) list.

In light of practical contributions and managerial implications, the findings from this study, via illuminating the psychological safety and psychosocial safety climate, further provide recommendations for HR managers, work health and safety (WHS) practitioners and senior management in organisations, to invest in creating favourable work conditions and effective human resource management (HRM) practices to prevent psychosocial hazards and implement workplace safety management.

First, this study is a valuable resource for HR managers and WHS practitioners, facilitating a deeper exploration into strategies for promoting employee well-being and organisational resilience while fostering mentally healthy workplaces. While many HR practitioners currently implement mental health support programs, such as yoga and mindfulness meditation (Johnson et al., 2020), to help employees with stress relief and self-regulation, this study questions whether these approaches are sufficient. Instead, this study argues that these 'pain killers' interventions merely alleviate pain symptoms temporarily without diagnosing the underlying issues related to psychological safety. Encouragingly, the study advocates for a proactive approach, suggesting that HR managers and WHS practitioners should regularly survey employees' psychological safety and actively interview employees' voices on work-life quality. By doing so, organisations can develop evidence-based frameworks for implementing more effective mental health strategies in the workplace. This shift towards a more comprehensive understanding of employee well-being is crucial for fostering a supportive and thriving safe work environment.

Second, this study emphasizes the necessity for leaders to foster organisational psychosocial safety climates, aligning WHS with corporate strategy. It suggests that executive teams reduce bureaucratic control, transitioning from efficiency and capitalism-driven approaches to ones emphasizing employee compassion (George, 2014), particularly for engineering and technology companies like Foxconn Technology Group (Hung, 2011). Managers should recognize that employee productivity has a psychological component rather than a purely system focus on controlling the workforce. Leaders should foster autonomy, recognition, and personal growth opportunities for employees to promote workplace safety from a psychological perspective. This paper's integration of psychological safety and psychological social safety provides a solid knowledge background for managers and decision-makers to understand employees' decreasing work motivation (Veazie, 2014) and disengagement at work (Kahn, 1990), fear of failure in making critical business decisions (Dong, 2022), employee and their trust in leaders (Sarkus, 2019), team creativity and organisational learning (Liu et al., 2021).

Third, this study urges HRM and WHS policymakers to align workplace guidelines with the National Mental Health Commission standards for creating mentally healthy workplaces (Commission, 2019). It emphasises the need to enhance the efficacy and transparency of HRM ethical codes, particularly regarding conflict of interest, psychological bullying and harassment, and hazard reporting channels, to foster a supportive psychosocial safety climate.

Finally, from a strategic organisational standpoint, psychological safety and the institutionalisation of a psychosocial safety climate in workplaces should be at the core of the strategic governance agenda of organisations across the globe. As shown in this literature review, the lessons from the pandemic underscore a singular message to top organisational decision-makers: that organisations rise and fall depending on how well they address the physical and psychological



well-being and welfare of their most valuable resource: their managers and employees. Instituting an organisation-wide system and culture of psychosocial safety, as opposed to a piecemeal activity, should be a strategic priority in organisational consolidation, rebuilding, resilience and sustainability towards meeting the challenges of the future.

**CRedit authorship contribution statement**

**Rebecca Kechen Dong:** Data curation, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. **Xiaomei Li:** Data

curation, Formal analysis, Investigation, Methodology, Software, Validation, Visualization, Writing – original draft. **Hernan 'Banjo' Roxas:** Conceptualization, Project administration, Resources, Writing – original draft, Writing – review & editing.

**Declaration of competing interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Appendix 1:. A summary of theory categories and implications**

Ranking	Theory	The Main Content of the Theory	Source
1	Diversity Theory	Diversity is a constituent structure consisting of three types of diversity (content expertise, functional background, network relationships, industry experience), difference (pay, income, prestige, status, authority, power) and separation (views, beliefs, values, attitudes).	(Edmondson & Harvey, 2018a; Vandekerckhof et al., 2018)
2	Social Learning Theory	Individuals can learn appropriate behaviour through the process of role modelling, by observing the behaviour of others.	(Men et al., 2020; Peng et al., 2019)
3	Psychological Contract Theory	Implicit commitment and reciprocal obligations are fundamental components, although it has also been argued that expectations play a role in forming psychological contracts.	(Newaz et al., 2019; Shuffler et al., 2018)
4	Theory of Systems Psychodynamic	In-depth exploration of people’s experiences and situations at different moments in their working lives.	(Petriglieri et al., 2019)
5	Conservation of Resources Theory	Individuals will seek to establish, retain and maintain resources.	(Steed et al., 2021)
6	Social Exchange Theory	The provision of services by one person for another is done with the expectation and trust that such services will be reciprocated in the future.	(Curcuruto & Griffin, 2018)
7	Uncertainty Reduction Theory	Reduces predictability and manageability, thereby threatening one’s sense of control.	(Tu et al., 2019)
8	Job Demands-Resources Theory	When managers express positive (negative) emotions, employees generate positive (negative) emotions, which leads to positive (negative) emotion contagion	(Wu & Wu, 2019)
9	Affective Events Theory	Positive or negative events that employees encounter in the workplace (e.g. positive or negative emotions expressed by supervisors) trigger associated emotional responses (e.g. positive or negative emotions of employees), which in turn shape employees’ attitudes and behaviours at work	
10	Team Learning Theory	Team learning is a team-level learning process, based on individual learning, but it exceeds the sum of the individual learning of the team members.	(Koeslag-Kreunen et al., 2018)
11	Regulatory Focus Theory	People self-regulate through two co-existing systems to meet different needs in the pursuit of goals: (1) promotion-centered strategies and (2) prevention-centered strategies.	(Wolfson et al., 2018)
12	Theory Of Resources–Challenges Equilibrium	There is a balance between the individual’s pool of resources and the challenges they face.	(Finsterwalder & Kuppelwieser, 2020)
13	Person-Supervisor Fit Theory	When “people and work environment are well matched”, beneficial results can be achieved.	(Xu et al., 2019)
14	Signaling Theory	Actions and behaviours convey a person’s intentions and preferences	
15	Theory of Enrichment-Based	Providing help can motivate providers and improve their well-being through increased resources.	(Lin et al., 2020)
16	Theory of Depletion-Based	Engaging in helping behaviours can lead to psychological stress for the helper as helping others is laborious, resource-consuming and interrupts the helper’s regular work tasks.	
17	Kahn’s Psychological Conditions for Engagement	The extent to which employees are engaged in their work (i.e., work engagement) is determined by three psychological conditions: (1) psychological significance or whether it is worthwhile to engage in the behaviour; (2) psychological safety or whether it is safe to perform the behaviour; and (3) psychological resource availability or whether they have spare resources to perform the behaviour.	
18	Mental Model Theory	When team members have similar cognitive representations of their tasks and teamwork, they are better able to anticipate each other’s needs and actions, better able to engage in more effective task strategies, better able to engage in meaning-making as a team, and better able to manage contingencies in the team performance cycle	(Shuffler et al., 2018)
19	Team Coaching Theory	Direct interaction with the team, designed to help members coordinate and make appropriate use of their collective resources in completing the team’s work	
20	Person-Environment Theory	Employees experience positive outcomes when there is congruence between their needs (defined as an individual’s preference or desire for the presence of a resource or characteristic in the work environment) and supply (defined as the extent to which the resource or characteristic is present in the work environment)	(Ehrhardt & Ragins, 2019)
21	Relational Attachment Theory	The cumulative experience of feeling connected, attached, and close to others in the workplace	
22	Theory of Team Climate	Two interpersonally oriented team factors that link leader humility to team creativity: (a) information sharing, the process of exchanging ideas and information among members (and (b) psychological safety, the extent to which members perceive the team to be free of interpersonal threats	(Hu et al., 2018)
23	Self-Perception Theory	Individuals understand their emotional, cognitive and other internal states by ‘inferring their emotions, cognitions’ and observing their own dominant behaviours and/or the circumstances in which they occur	(Jiang et al., 2019)

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Ranking	Theory	The Main Content of the Theory	Source
24	Social Information Processing Theory	An individual's perceptions, attitudes and behaviours are a function of the information available to them and usually originate in the immediate social environment	(Peng et al., 2019)
25	Psycap Theory	An individual's psychological capital may be influenced by the organisational environment, which in turn affects their behaviour	(Wang et al., 2018)
26	Social Cognitive Theory	Individual behaviour is influenced not only by the environment, but also by the role of psychological perception, which depends to some extent on individual characteristics	
27	Theory of Self-Efficacy	Self-efficacy is considered to be a prerequisite for effective response. It is a process of self-evaluation in which individuals assess their ability to manage threatening situations	(Shahrour & Dardas, 2020)
28	Climate For Conflict Management	Employees' assessment of the organisation's conflict management process and how fair and predictable the pattern of interaction between managers and employees is perceived to be in this regard	(Einarsen et al., 2018)
29	Risk Perception Attitude Framework	can help classify people into groups with such attitudes (i.e., by determining their perceived risk and the validity of their individual beliefs)	(Wang et al., 2019a)
30	Transactional Theory of Stress and Coping	A person may find a transaction stressful when he or she perceives it as harmful, threatening or challenging to his or her well-being	(Jahanzeb & Fatima, 2018)
31	Effort-Recovery Model	Captures the process by which the demands of work require individuals to expend effort and suggests the subsequent detrimental effects on individuals if they lack or are unable to replenish their energy	(Steed et al., 2021)
32	Conservation of Resources	Individuals will seek to establish, retain, and maintain resources	
33	Behavioral Activation And ehavioral Inhibition Systems	Much human behaviour is regulated by two functionally independent, biologically based self-regulatory systems, namely the set of processes that guide goal selection and goal-directed effortful action	(Sherf et al., 2021)
34	Social Identity and Self-Categorization Theory	Leaders can mobilize followers through collective pronouns (i.e., we, US, OUR) that implicitly emphasize the superior team or organizational identity	(Weiss et al., 2018)
35	Leader-Member Exchange Theory	There are different relationships between leaders and subordinates – some are of high quality, characterized by equal exchange and trust ("in-group"), while others are of low quality, characterized by little opportunity to change and influence subordinates ("out-group")	

**Appendix 2:. Mediating effects and moderating effects of psychological safety**

Source	Number Of Citations	Journals	Definition of psychological safety	Measurement (Questionnaire instrument)	Mediating effects or Moderating effects	Key findings
(Hu et al., 2018)	393	Journal of Applied Psychology	Team psychological safety refers to a team as a safe place for risk-taking (Edmondson, 1999), and captures the interpersonal environment that relates to creativity-related factors such as risks, obstacles, and uncertainties.	Edmondson's (1999) four items scale	Mediating effects	Leader humility was negatively related to team psychological safety in teams with a high-power distance value, whereas the relationship was positive yet nonsignificant in teams with low power distance. Furthermore, team information sharing and psychological safety were both significantly related to team creativity.
(Jiang et al., 2019)	203	Journal of Organizational Behavior	Edmondson (1999) suggests that psychological safety underscores a sense of safety regarding self-expression and interpersonal risk-taking	Edmondson's (1999) three items	Mediating effects	The negative effect of knowledge hiding on psychological safety was greater under higher levels of organizational cynicism, as was the indirect effect of knowledge hiding on thriving via psychological safety.
(Peng et al., 2019)	155	Journal of Business Ethics	Team psychological safety refers to a shared perception regarding the consequences of interpersonal risks in the team (Edmondson 1999).	Edmondson's (1999) scale	Mediating effects	Self-serving leadership not only reduced team psychological safety, but also induced team knowledge hiding, both of which ultimately affected team creativity.
(Men et al., 2020)	173	Journal of Business Ethics	According to Edmondson (1999), psychological safety describes a psychological state characterized by mutual respect and interpersonal trust, in which individual employees are comfortable being themselves and engage in interpersonal risk-taking.	Liang, J., Farh, C. I., & Farh, J. L.'s (2012) five-item scale.	Mediating effects	the effect of ethical leadership on knowledge hiding was contingent on a mastery climate.
(Tu et al., 2019)	152	Journal of Business Ethics	Kahn (1990) defined psychological safety as "the sense of being able to show and	Liang et al.'s (2012) five-item scale.	Mediating effects	Psychological safety climate mediated the relationship between ethical leadership and

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Source	Number Of Citations	Journals	Definition of psychological safety	Measurement (Questionnaire instrument)	Mediating effects or Moderating effects	Key findings
(Singh et al., 2018)	127	Journal of Organizational Behavior	employ oneself without fear of negative consequences to self-image, status, or career" (p. 708) Psychological safety is defined as a person's ability to display and employ his or her true self without any fear of negative consequences (Kahn, 1990)	Chrobot-Mason and Aramovich's (2004, 2013) three-item scale	Mediating effects	the three forms of team-level creativity. Social support resources emanating from the organization and the community were positively associated with embeddedness in each domain, and psychological safety mediated these relationships.
(Lin et al., 2020)	78	Journal of Management	Psychological safety refers to the extent to which employees believe they are "able to show and employ themselves without fear of negative consequences to self-image, status, or career" (Kahn, 1990: 708)	May, D. R., Gilson, R. L., & Harter, L. M's (2004) three-item scale	Mediating effects	Psychological safety mediates the positive relationship between helping behaviour and job involvement. Psychological safety and job involvement sequentially mediate the positive relationship between former helping behaviour and subsequent helping behaviour. Worry mediates part of the relationship between a person's perceived risk and their actual self-protective behavior
(Wang et al., 2019b)	133	Tourism Management	Tourist worry is defined as "a person's attempt to psychologically resolve a problem related to travelling, where the outcome is perceived as uncertain and includes the possibility of a negative outcome" (Larsen, Brun, & Øgaard, 214 2009, p. 261)	Chien, Sharifpour, Ritchie, & Watson'2016) item	Mediating effects	Worry mediates part of the relationship between a person's perceived risk and their actual self-protective behavior
(Jahanzeb & Fatima, 2018)	175	Journal of Business and Psychology	Defensive silence involves the use of relevant thoughts, information, or opinions as a form of self-protection based on fear (Van Dyne et al., 2003, p. 1367). Emotional exhaustion has been defined as a feeling of being emotionally overextended and tired from work (Wright & Cropanzano, 1998, p. 489)	Van Dyne, Ang, & Botero'(2003) five-item Maslach and Jackson' (1981) seven-item	Mediating effects	Defensive Silence Mediates the Link Between Work Ostracism and Interpersonal Deviance. Emotional Exhaustion Mediates the Link Between Work Ostracism and Interpersonal Deviance. Defensive silence and emotional exhaustion consecutively mediated the link between work Ostracism and interpersonal deviance.
(Newaz et al., 2019)	120	Safety Science	Individuals' beliefs about mutual security obligations can be inferred from implicit or explicit commitments (Walker and Hutton, 2006)	Walker' (2013) 12 items	Mediating effects	The psychological safety contract mediates the relationship between management safety commitment, supervisor safety behaviour, colleague safety behaviour and worker safety behaviour respectively
(Curcuruto & Griffin, 2018)	125	Safety Science	Emotional commitment. Employee safety behaviour is the perceived expression of an employee's social expectations of the organisation for their direct involvement in the management of safety-related issues (Hofmann, Morgeson, & Gerras, 2003). Formal supervisors of teams and workgroups, as well as other managerial roles, can influence the level of motivation for workers to participate in safe citizenship initiatives by social expectations of safety Clarke & Ward, 2006; Conchie, 2013). Psychological ownership is defined as the state in which individuals feel that the ownership goal of pro-social and proactive safe citizenship behaviours, or a part of that goal, is theirs, and reflects the individual's awareness of,	Vandenberghe, Bentein and Stinglhamber' (2004) four items Zohar and Luria' (2005) nine-items Curcuruto, Mearns, & Mariani (2016)' four items	Mediating effects	Individual affective commitment toward their organization is a mediator of the influence of team safety climate, safety participation on affiliative-oriented safety citizenship behaviours by the individual. Team safety climate mediates the relationship between organisational support and an individual's emotional commitment to their own organisation and personal psychological ownership. Psychological ownership mediates the effects of team safety climate and organisational support on individual change-oriented safe citizenship behaviours.

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Source	Number Of Citations	Journals	Definition of psychological safety	Measurement (Questionnaire instrument)	Mediating effects or Moderating effects	Key findings
(Wu & Wu, 2019)	99	Management Decision	thoughts about, and beliefs about the ownership goal (Pierce, Kostova, & Dirks, 2001) Schaufeli and Bakker (2004) identified work engagement as a positive psychological state related to self-actualisation and work. Surface acting refers to employees simply accepting the emotional expressions required by the organisation, such as facial expressions, tone of voice and posture; however, these employees may actually be annoyed by the content of their work (Grandey et al., 2013)	Schaufeli and Bakker' (2004) scale Grandey' (2003) scale	Mediating effects	Employee engagement mediates the positive effect of employees' positive emotional feelings on their innovative behaviours. Surface acting mediates the negative effect of employees' negative feelings on innovative behavior.
(Vandekerkhof et al., 2018)	105	Journal of Management Studies	Psychological safety is a shared belief that the team is safe for interpersonal risk taking without fear of embarrassment, rejection or punishment (Edmondson, 1999).	Edmondson's (1999) seven-item	Moderating effect	The negative effect of socio-emotional wealth separation on behavioral integration is mitigated by psychological safety and even turns into a positive effect at high levels of psychological safety. Psychological capital moderated the relationship between safety-related stressors and safety participation. Psychological capital moderated the relationship between three safety-related stressors, namely: safety role ambiguity, safety role conflict, interpersonal safety conflict, and safety participation. The four sub-dimensions of psychological capital, i.e., self-efficacy, hope, optimism, and resilience moderated the relationship between safety-related stressors and safety participation.
(Wang et al., 2018)	173	Safety Science	Luthans (2002) applied psychological capital is considered a state of mind or a spirit with a positive state of mind	Luthans, Youssef, & Avolio' (2007b) 24-item scale	Moderating effect	Psychological capital moderated the relationship between safety-related stressors and safety participation. Psychological capital moderated the relationship between three safety-related stressors, namely: safety role ambiguity, safety role conflict, interpersonal safety conflict, and safety participation. The four sub-dimensions of psychological capital, i.e., self-efficacy, hope, optimism, and resilience moderated the relationship between safety-related stressors and safety participation.
(Einarsen et al., 2018)	324	International Journal of Human Resource Management	Workplace bullying refers to a persistent and frequent interpersonal hostility involving some degree of formal or informal power imbalance between members of an organisation (Samnani & Singh, 2012)	Revision of the nine core items of the (NAQ-S; Einarsen, hotel, & Notelaers, 2009; Notelaers & Einarsen, 2008)	Moderating effect	When levels of climate for conflict management (CCM) were low, CCM was most strongly associated with work engagement through bullying. At stronger levels of CCM, bullying did not appear to mediate the relationship between CCM and work engagement, thus suggesting that a strong CCM prevents bullying and the potential negative effects of bullying on work engagement.
(Weiss et al., 2018)	142	Leadership Quarterly	Team members who share membership in the same professional group as the team leader (in-group team members) can be addressed more effectively using implicitly inclusive language ("we") than team members from a different professional group (out-group team members) (Weiss et al., 2018).	We created a dichotomous variable coded 1 = in-group team members (physicians) and 0 = out-group team members (nurses) (Weiss et al., 2018).	Moderating effect	Implicit inclusive leader language and professional group membership interact to affect team member voice such that team members belonging to the same professional group as their leader (in-group members) speak up more when leaders use more "WE"-references than team members belonging to a different professional group as their leader (out-group members). Explicit inclusive leader language and professional group membership interact to affect team member voice such that team members belonging

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Source	Number Of Citations	Journals	Definition of psychological safety	Measurement (Questionnaire instrument)	Mediating effects or Moderating effects	Key findings
(Wolfson et al., 2018)	101	Journal of Applied Psychology	organizations employ lean staffing levels and operate with larger spans of control than in the past. As a result, individuals have less “free” time to learn, and supervisors have less time to support on the job learning... yet, sufficient time is critical for informal learning (Wolfson et al., 2018). A nonpunitive climate is characterized by a shared belief that individuals can openly discuss medical errors and identify potential hazards (Kim, An, Kim, & Yoon, 2007).	Five items Six items (Wolfson et al., 2018)	Moderating effect	to a different professional group as their leader (out-group members) speak up more than team members belonging to the same professional group as their leader (in-group members) when team leaders use explicit invitations and appreciations of team member input. Staffing level moderates the positive relationship between promotion focus and informal field-based learning (IFBL) behaviours such that the relationship becomes stronger as staffing level increases. Staffing level moderates the positive IFBL behaviours—change in performance relationship such that the relationship becomes stronger as staffing level increases. Nonpunitive climate moderates the positive IFBL behaviours—change in performance relationship such that the relationship becomes stronger as nonpunitive climate increases.

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