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Emotional resilience for wellbeing and employability: The role of learning and training

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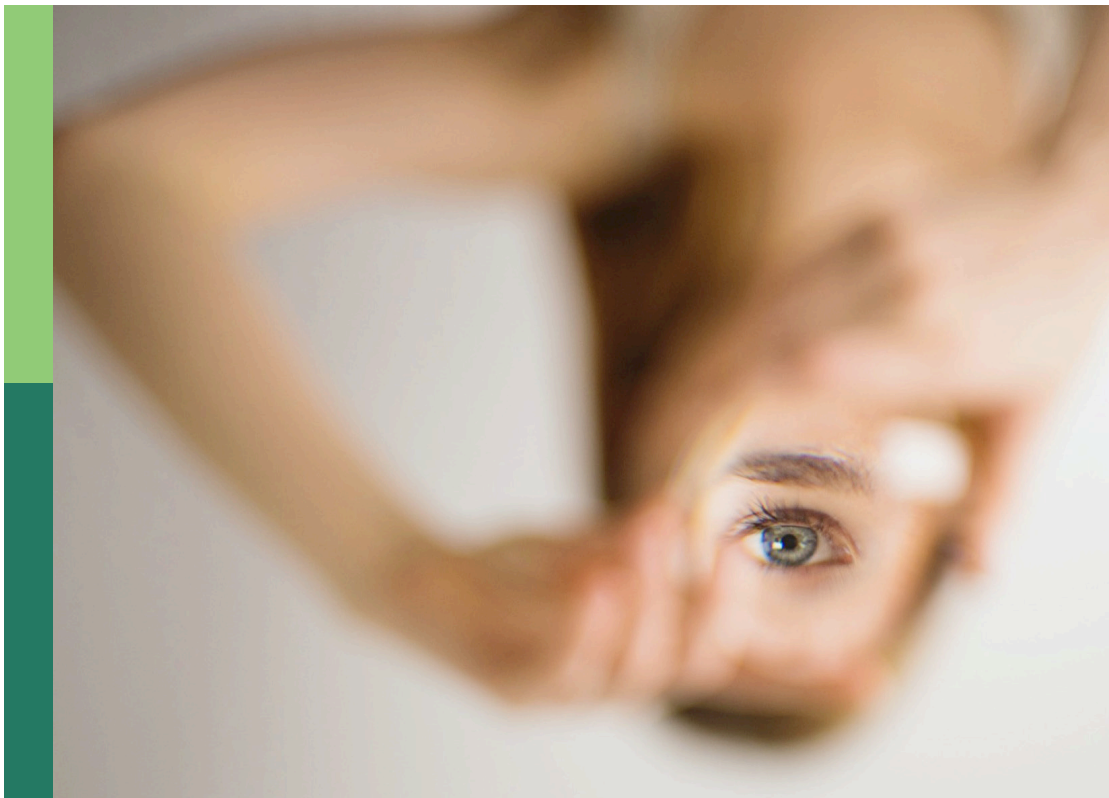

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Emotional resilience for wellbeing and employability: The role of learning and training

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Editorial: Emotional resilience for wellbeing and employability: the role of learning and training

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Editorial on the Research Topic
Emotional resilience for wellbeing and employability: the role of learning and training

Introduction

Developing emotional resilience, the cornerstone of wellbeing in modern human life, plays a key role in the journey to adulthood and a fulfilling career. This essential set of skills plays an important role in the journey to adulthood and is integral to professional success. Emotional resilience not only helps individuals cope with life's transitions but also enables them to overcome the challenges that arise along life's path. It acts as a shield against the stresses of everyday life, promoting wellbeing and productivity. Therefore, learning and training in emotional resilience is becoming increasingly important for individuals and organizations seeking to enhance employee performance.

In recent decades, research on emotions has led to the discovery of foundational components that can be incorporated into curricula tailored to the development of emotion-based knowledge and skills. However, a broad exploration of the emotional landscape can leave obvious gaps in the field of learning and education for emotional resilience, especially in the area of the links between emotional resilience, wellbeing and employability. It is in this context that this theme aims to provide evidence-based insights to broaden the range of learning methodologies and teaching practices that promote emotional resilience.

The Research Topic, entitled "*Emotional Resilience for Wellbeing and Employability: The Role of Learning and Training*," included 11 papers presenting descriptive and experimental research, as well as methodological suggestions, from an education and training context that focuses on the development of emotional resilience. These 11 contributions provide research-based solutions on how emotional resilience training contributes to employability and wellbeing.

First field: resources of emotional resilience for employability and wellbeing

When exploring the connection between emotional resilience, employability, and wellbeing, two key categories of resources are essential: personal and organizational. The contributions to this Research Topic have primarily focused on personal resources, such as self-efficacy (BagdŽiuniene et al.), vocational calling (Navickiene and Vasilis Vasiliauskas), grit (Ismail et al.), compassion (Lane et al.), strengths of character, self-regulation, mental agility (Bekesiene et al.), organizational commitment, job embeddedness, and hardiness (Ferreira et al., 2024). These resources are trainable and are the main focus of the research presented in this Research Topic.

Simultaneously, organizational resources, including decent work (Yan et al.), elevated levels of leader-member exchange (LMX) (Song et al.), team cohesion, and peer support (Kanapeckaite and BagdŽiuniene), have been underscored as pivotal elements with significant positive implications for bolstering employees' psychological resilience. In the following sections, important studies will be examined that clarify the reservoir of emotional resilience resources that are relevant to promoting employability and improving wellbeing.

Organizational resources and self-efficacy. In research on the emotional resilience of teachers, BagdŽiuniene et al. argues that emotional resilience, defined as the innate ability to navigate, manage, or cope with emotionally challenging situations, is closely linked to teachers' professional and personal resources at work. By examining the combination of teachers' professional environment and personal characteristics, BagdŽiuniene et al. found that teachers' emotional resilience is positively correlated with specific job characteristics such as feedback, autonomy, social support, and professional development opportunities, as well as with teachers' self-efficacy. These two categories of resources—professional and personal—show a positive relationship with teachers' emotional resilience. The cultivation of positive emotions and the ability to maintain emotional equilibrium are important in helping staff to cope with stressful situations and to carry out their daily tasks effectively. Previous studies have already highlighted the contribution of emotional resilience in fostering positive teacher-student relationships (Hagenauer et al., 2015). At an organizational level, the prevalence of positive emotions plays an important role in maintaining a stable workforce and fostering sustainable teaching careers (Lee et al., 2021). Thus, research highlights the positive influence of emotional resilience in enhancing teacher wellbeing. Extending this line of research, BagdŽiuniene et al. found that teachers' emotional resilience mediated the positive relationships between job resources, self-efficacy and teacher wellbeing. Job resources and self-efficacy have a direct positive effect on wellbeing and at the same time act indirectly through emotional resilience as a mediating factor. It is also worth noting the inverse relationship between emotional resilience, job resources, self-efficacy and teachers' intention to leave their current school. Teachers who value the resources provided by their school, have self-confidence and believe in their professional effectiveness are less likely to consider leaving their educational institution.

Vocational calling and self-efficacy

Focusing on personal resources the study of Navickiene and Vasilis Vasiliauskas on cadets revealed the central role of vocational calling, in shaping psychological resilience. The study examined the moderating effect of vocational calling on the relationship between cadets' resilience and career outcomes, revealing the significant conditional influence of vocational calling on this relationship. Equally important among these personal resources is self-efficacy, which is highlighted in the results of the study by Navickiene and Vasilis Vasiliauskas, as a crucial mediating mechanism that strengthens the link between psychological resilience and professional achievement. As a comprehensive mediator, self-efficacy highlights the pathway through which psychological resilience profoundly influences an individual's professional achievements and potential career outcomes. The findings of this study provide valuable insights into the interplay of personal resources, specifically vocational calling and self-efficacy, and elucidate their role in determining how psychological resilience ultimately influences desired outcomes, such as professional achievements.

Grit for career advancement

Study Ismail et al. confirms that developing grit, as a protective resilience factor, enables individuals to persist and make consistent progress toward employability. Individuals with grit possess qualities of self-regulation, enabling career mobility through the setting of pragmatic goals and actively seeking new opportunities for professional growth. In addition, grit promotes effort, which in turn cultivates active career resilience, enabling individuals to adapt to challenges and use change for career advancement. Moreover, grit boosts confidence in one's ability to take independent action and demonstrate leadership skills, which is essential for employability.

Organizational commitment, job embeddedness, and hardiness

According to Ferreira et al. (2024), organizational commitment, job embeddedness and hardiness significantly predict employees' psychological resilience and career adaptability. In analyzing these relationships, Ferreira et al. (2024) found that organizational commitment has the greatest influence when analyzing human resources in global digital mindset and financial services organizations. The other two factors, job embeddedness and hardiness, also contribute but to a lesser extent. This suggests that promoting job engagement is key to increasing employees' resilience and adaptability in the workplace.

Compassion in professional practice

Adapting positively to challenges in professional life and leading to wellbeing requires more than just emotional resilience.

Lane et al. highlight the importance of cultivating compassion in medicine and promoting patient-centered practice. Compassion, defined as an affectionate motivation to reduce the suffering of others, can benefit medical professionals, recipients of compassionate actions, and the medical systems that support them. Lane et al. found that despite the benefits, several factors inhibited the enactment of compassion, including a toxic culture in medical education, disrespect, and time constraints. These factors in organizational culture highlight potential threats to emotional wellbeing in a professional setting. If not managed effectively, these challenges can undermine the ability to sustain compassionate care and effectively manage the demands of the profession. However, it is important to note that compassion is not a fixed trait, but rather something that can be cultivated and grown through experience. This can be achieved in an educational environment.

The role of decent work

Organizational resources are as well important as personal in improving psychological resilience in the workplace. The Yan et al. study supports this assertion, as it was designed to evaluate the impact of decent work on employee innovation. Decent work is an organizational resource that aims to provide equal opportunities and promote a sense of security and dignity among employees. According to Yan et al. research, decent work can be considered an organizational resource that positively impacts fostering innovative behavior among individuals who practice it. Additionally, it can help mitigate the likelihood of burnout. However, the study shows that the impact of organizational resources on worker burnout and general wellbeing is not always direct, especially when considering multifaceted factors.

The role of team cohesion and peer support

The interdependence of organizational and personal resources of psychological resilience is found in the study by Kanapeckaite and BagdŽiuniene. The study provide evidence that that team cohesion and peer support in the military have a positive impact on psychological resilience. Additionally, individuals with greater resilience are more committed to the organization and experience higher levels of wellbeing. The results suggest that individual psychological resilience mediates the relationship between team characteristics and commitment and wellbeing (Kanapeckaite and BagdŽiuniene).

Structural equation modeling was used by Ferreira et al. (2024). To facilitate data analysis, BagdŽiuniene et al. and Navickiene and Vasilis Vasiliauskas effectively utilized the PROCESS macro 3.5v, a tool developed by Hayes and Scharkow (2013). Kanapeckaite and BagdŽiuniene tested relationships between variables using the IBM SPSS Statistics 29v and SPSS AMOS 29v software, the smart PLS 3.0 was used by Song et al., and Yan et al. analyzed the data by hierarchical linear model (HLM). Additionally, Bekesiene et al. specifically employed the Decision-making Trial and Evaluation Laboratory (DEMATEL) method to discern relationships among criteria and allocate weight coefficients.

Taken together, these studies highlight the complex and intertwined nature of emotional resilience and its dependence on multiple interactions between personal characteristics and the organizational environment, confirming its essential role in promoting employability and wellbeing in the workplace.

Second field: training and education for emotional resilience at work

Organizational impact of training initiatives

In addition to fostering a supportive organizational culture and making use of various resources, organizations can actively support their employees in cultivating emotional resilience through tailored training and education programmes aimed at strengthening relevant competencies. In addition to fostering a conducive organizational culture and leveraging various resources, organizations can actively support their employees in cultivating emotional resilience through tailored training and educational programs aimed at strengthening relevant competencies. This can be seen in the randomized controlled trial evaluation conducted by Plant et al., which highlights the potential impact of organizational training initiatives. The significant interaction effect between treatment group and time period was identified by employing a mixed MANOVA analysis (Plant et al.). The study found that vitality training, which uses behavior-change techniques, significantly increased employees' energy levels while reducing stress. Worth noting is the promising implication of these outcomes in positively influencing indicators associated with burnout, evident upon the conclusion of the vitality training experiment.

Foundations in psychological resilience training in organization

The fundamentals of psychological resilience training could be found in positive psychology theory according to Bekesiene et al.. An individual's ability to effectively adapt to challenging circumstances could be trained, as successful adaptation depends on two main assumptions: the experience of stress and the subsequent positive response of the individual in his or her own best interest. Positive psychology posits numerous determinants of emotional resilience, prompting an investigation into the most important factors. Bekesiene et al. sought to address this inquiry through a reductionist approach to resilience training, identifying key competencies. Recognizing the contextual variability of resilience, the study by Bekesiene et al. focused on the military environment using two groups of experts: those versed in domestic conflicts and those with extensive experience in international military missions. Evaluating the widely acclaimed Master Resilience Training (MRT) programme, which is recognized for its effectiveness in military resilience training, Bekesiene et al. found that although different competencies become more relevant in different stress contexts, the composition of

the main competencies that contribute to the resilience of a soldier remains consistent. The entire program of emotional resilience can be focused on three main competencies and their development: strengths of character, self-regulation, and mental agility.

Organizational resources for psychological resilience

Song et al. discovered that orientation training, when combined with high levels of leader-member exchange (LMX), can function as an organizational resource that directly and positively affects newcomers' Psychological Capital (PsyCap). PsyCap refers to an individual's positive developmental state and is a personal resource for psychological resilience. The research indicates that organizational resources, such as orientation training, have a significant impact on personal resources. The study conducted by Song et al. demonstrates a predictive relationship between orientation training, an organizational resource, and an individual's work engagement, a personal resource. Additionally, the research presents conclusive evidence that emphasizes the interconnectedness and simultaneous development of these two types of psychological resilience resources, highlighting their interdependence.

These research findings highlight the significant impact that tailored training programmes and educational initiatives can have on improving emotional resilience in organizations. Such initiatives not only strengthen individual competencies, but also provide a solid foundation for sustained well-being and engagement in the workplace.

Further perspectives

Based on research findings resented in this Research Topicseveral future perspectives in emotional resilience learning and training for wellbeing and employability could be drawn.

Research into effective intervention strategies

The research presented in this Research Topicdemonstrates that interventions promoting the development of psychological resilience yield positive results. There is evidence that vitality training, which employs behavioral change techniques, significantly increases employees' energy levels while reducing stress (Plant et al.). Additionally, orientation training, when combined with high levels of leader-member exchange (LMX), has a positive effect on individual work engagement and employees' psychological capital (Song et al.). In the future, it would be valuable to explore mentoring models and interventions that promote emotional resilience, in addition to curricula. This should take into account contextual and institutional barriers. Lane et al.'s study on compassion in medicine and the promotion of patient-centered practice highlights potential threats to emotional wellbeing in a professional setting due to organizational culture. Further research could explore the impact of institutional support on the development of psychological resilience. Specifically, examining the impact of institutional policies, resources, and support systems on staff would be useful. Furthermore, it is crucial to investigate the systemic modifications required to foster psychological resilience in employees. This could significantly enhance the emotional wellbeing of employees.

Repeated measures and longitudinal studies

One limitation observed in most of the studies presented in this Research Topicis their cross-sectional nature, where data were collected at a single point in time. To provide psychological resilience training research, repeated measures and longitudinal studies are of great value, as illustrated by the studies of Plant et al. and Song et al.. These studies illustrate the benefits of using repeated measures and provide a clearer understanding of the evolving landscape of emotional resilience development. Encouraging the wider use of these methods in future research would provide a more comprehensive view, allowing changes to be tracked over time. In addition, their use facilitates the establishment of precise causal relationships between variables, while mitigating the biases often associated with cross-sectional data.

Expanding research across different fields, national cultures, and geographic regions is essential to enhance the generalizability of findings concerning emotional resilience training for wellbeing and employability. The research outcomes highlighted in this Research Topicprovide insightful perspectives on resilience in various domains, encompassing the resilience of teachers (BagdŽiuniene et al.), military personnel and military applicants (Bekesiene et al.; Navickiene and Vasilis Vasiliauskas; Sedlačík et al.; Kanapeckaite and BagdŽiuniene), medical practitioners (Lane et al.), as well as knowledge workers (Ferreira et al., 2024; Yan et al.). These studies emphasize the distinctiveness of each domain and the various personal and organizational resources that contribute to building psychological resilience. In this Research Topic, Plant et al. and Ismail et al. present research outcomes from multiple fields of activity, providing a more comprehensive understanding of resilience training across varied settings. The combined insights from these studies highlight the importance of acknowledging different emotional models and subtle nuances within resilience education in different contexts that could be extended in further research.

Author contributions

RS: Writing – original draft, Writing – review & editing. SB: Writing – original draft, Writing – review & editing. SH-M: Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Discovering compassion in medical training: a qualitative study with curriculum leaders, educators, and learners

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Background: Compassion is considered a fundamental human capacity instrumental to the creation of medicine and for patient-centered practice and innovations in healthcare. However, instead of nurturing and cultivating institutional compassion, many healthcare providers cite the health system itself as a direct barrier to standard care. The trend of compassion depletion begins with medical students and is often attributed to the culture of undergraduate medical training, where students experience an increased risk of depression, substance use, and suicidality.

Objectives: This qualitative study aims to develop a more comprehensive understanding of compassion as it relates to undergraduate medical education. We used focus groups with key stakeholders in medical education to characterize beliefs about the nature of compassion and to identify perceived barriers and facilitators to compassion within their daily responsibilities as educators and students.

Methods: Researchers conducted a series of virtual (Zoom) focus groups with stakeholders: Students (N =14), Small Group Advisors (N =11), and Medical Curriculum Leaders (N =4). Transcripts were thematically analyzed using MAXQDA software.

Results: Study participants described compassion as being more than empathy, demanding action, and capable of being cultivated. Stakeholders identified self-care, life experiences, and role models as facilitators. The consistently identified barriers to compassion were time constraints, culture, and burnout. Both medical students and those training them agreed on a general definition of compassion and that there are ways to cultivate more of it in their daily professional lives. They also agreed that undergraduate medical education – and the healthcare culture at large – does not deliberately foster compassion and may be directly contributing to its degradation by the content and pedagogies emphasized, the high rates of burnout and futility, and the overwhelming time constraints.

Discussion: Intentional instruction in and cultivation of compassion during undergraduate medical education could provide a critical first step for undergirding the professional culture of healthcare with more resilience and warm-hearted concern. Our finding that medical students and those training them agree about what compassion is and that there are specific and actionable ways to cultivate more of it in their professional lives highlights key changes that will promote a more compassionate training environment conducive to the experience and expression of compassion.

KEYWORDS
medical education, well-being, compassion, burnout, healthcare, training

1. Introduction

Compassion, the affectionate motivation to help alleviate suffering, is crucial to the purpose, function, and structure of health systems (Lown, 2014; Sinclair et al., 2016; Cochrane et al., 2019; Trzeciak and Mazzarelli, 2019). Neurobiologically distinct from empathy, compassion builds on the empathic concern that can arise in response to suffering and includes the motivation and intention for improving the well-being of another (Singer and Klimecki, 2014). Compassion can lead to profound benefits for the individual experiencing compassionate motivation, the recipients of compassionate actions, and to the systems that support their emergence (Trzeciak and Mazzarelli, 2019). Moreover, patients and their families, providers, and health organizations identify compassion as a hallmark of quality care (Paterson, 2011; Sinclair et al., 2016; Cochrane et al., 2019; Trzeciak and Mazzarelli, 2019). For patients, physician compassion is linked with improved clinical outcomes (Hojat et al., 2011; del Canale et al., 2012), greater patient satisfaction (Wang et al., 2018), and adherence to treatment (Neumann et al., 2007). Of benefit to health systems, compassionate physicians order fewer unnecessary tests and referrals (Bertakis and Azari, 2011), commit fewer major errors (West et al., 2009), and are less likely to be sued for malpractice (Moore et al., 2000). For the provider, the experience of compassion is associated with positive affect (Stellar et al., 2015), pro-social motivation (Mascaro et al., 2013), improved resilience (Klimecki et al., 2014), and has even been proposed as an antidote to burnout (Singer and Klimecki, 2014; Neff and Dahm, 2015; Trzeciak and Mazzarelli, 2019).

Despite the beneficial qualities of compassion, the professional and organizational cultures of allopathic medicine have increasingly adopted policies and positions that create barriers to compassionate care, rather than facilitating it (Shanafelt et al., 2019). Excessive preauthorization and documentation, staff shortages, focus on relative value units and patient volume, and limited appointment lengths contribute to disturbing rates of provider/physician depression, substance abuse, and even suicide, all of which likely disturb a provider's capacity for compassion (Sprang et al., 2007; Lancet, 2019; Shanafelt et al., 2019; The National Academy of Medicine, 2019; Trzeciak and Mazzarelli, 2019). Moreover, even though they are buffered from the burden of clerical medicine, there is a measurable atrophy of compassion among medical students (Hojat et al., 2009). Quickly after matriculation into medical training, students exhibit similar rates of burnout, depression, substance use, and suicide as the physicians training them (Ludwig et al., 2015; Jackson et al., 2016; The National Academy of Medicine, 2019; Dyrbye et al., 2021). It is imperative that deliberate steps are taken to inure future providers from the degradation of compassion and overwhelming burnout so pervasive in their chosen career path (Neumann et al., 2011). Undergraduate medical education (UME) offers a unique opportunity to operationalize compassion interventions and curricula designed to entrain sustainable compassion. Medical students spend a large portion of their training away from the bedside, in the relative safety and structure of classrooms and simulations. Additionally, compared to residents and faculty, students have limited and purposefully regulated responsibility for patient care; their primary responsibility is to learn (Liaison Committee on Medical Education, 2022). Developing the tools and skills required to maintain their compassion and resilience as they grow intimate with human suffering and the successes and failures of medicine would benefit their own well-being, the patients they serve, and the teams they will lead. Yet, despite the evidence for the value of compassion, two recent systematic reviews found that current approaches to compassion training are of limited duration, designed primarily for developing individual compassion rather than institutional, and created as adjuncts to the core curriculum rather than as an integrated, longitudinal, multi-faceted approach to compassion cultivation (Patel et al., 2019; Sinclair et al., 2021a). These approaches can be overly burdensome to students and teachers and are often less effective than curricula that incorporate a systematic culture of compassion (Michalec, 2009; Neumann et al., 2011).

We hypothesize that making compassion cultivation a central part of the content and pedagogies utilized in undergraduate medical training would produce profound benefits for medical students, those training them, and ultimately the healthcare systems and patients they serve. In order to develop a more comprehensive approach to compassion cultivation in medical training, we conducted a series of focus groups with medical students and educators to query their conceptions of compassion. We sought to identify how key stakeholders in undergraduate medical education describe compassion, as well as the factors that facilitate and inhibit the enaction of compassion in their day-to-day professional environment.

2. Materials and methods

2.1. Study overview

To address our aim, we conducted a series of virtual (Zoom) focus groups with key stakeholders: small group advisors (SGA), medical curriculum leaders (MCL), and medical students (MS) between October 2021 and January 2022. The study was conducted in accordance with approval from our university's institutional review board and all study participants provided informed consent.

2.2. Participants

We used convenience sampling to recruit between 4 and 12 participants per focus group. To facilitate conversation and to better ensure that stakeholders felt comfortable and safe to share their responses (Ayala and Elder, 2011), focus groups were subdivided by participant role in medical education: medical students ($n = 14$), small group advisors (SGAs; $n = 11$), and medical curriculum leaders (MCLs; $n = 4$). SGAs planned a professional development seminar to accommodate the focus groups and MCLs were recruited by direct email. Students were recruited by listserv emails sent to all currently

TABLE 1 Medical student demographics.

Age	20–23	2
	24–27	9
	28–31	3
Gender	Cis Female	10
	Cis Male	4
Ethnicity	Black or African American	4
	Hispanic or Latin	1
	White or Caucasian	7
	Asian or Pacific Islander	2
Years in Medical school	<1 year	4
	1+ year	4
	2+ years	1
	3+ years	4
	4+ years	1
Years Since Completing Undergrad	<1 year	2
	1+ year	3
	2+ years	4
	3+ years	2
	4+ years	3

enrolled MD students and offered a $15 gift card for their participation. Our inclusion criteria consisted of the current school of medicine students and faculty; we had no exclusion criteria. To ensure that SGAs and MCLs felt safe to share their beliefs and to better ensure the anonymity of these small populations, we did not acquire demographic data for these groups; MS demographics data were collected by Qualtrics survey during recruitment and are summarized in Table 1.

2.3. Focus groups

Focus groups queried stakeholders' general beliefs about compassion using an interview guide that was created prior to the focus group sessions. We asked the participants about their conceptions of the nature of compassion, whether they conceived of compassion as sustaining or draining, whether and how compassion can be cultivated, and what supports or hinders their experience of compassion in their day-to-day responsibilities. We reached saturation with available educators and held an additional focus group with students to confirm the saturation of themes.

2.4. Analysis

Focus groups were recorded, transcribed, and the transcripts were then anonymized. We used MAXQDA.20 to manage and thematically analyze the transcripts. We first familiarized ourselves with the data by reviewing the interview guide and all transcripts to generate a preliminary codebook of themes identified by researchers. Then, two researchers (CL and EB) independently used this preliminary codebook to thoroughly review the transcripts and identify any salient themes missing from the codebook, to reduce redundancy of themes, and establish any identified hierarchical grouping. After this, the entire research team discussed codes to reconcile any coding differences, to ensure concordance and reliability, and to finalize the codebook. The finalized codebook was used to generate reports in MAXQDA.20 for which the results are described below.

3. Results

3.1. Defining compassion

Assessing student and educator conceptions of compassion revealed striking similarities in the descriptions across the three stakeholder groups. Emergent themes included that compassion is more than empathy (themes and representative quotes found in Table 2). All stakeholder groups characterized compassion as an emotional arousal that is more than empathy and typified by motivated action to address another's suffering. A second emergent theme was that compassion is ineffable. All stakeholder groups acknowledged a felt somatic sense of compassion that they reported could not be described by words and made the experience of compassion feel more impactful to them. A third theme was that compassion can be cultivated. There was unanimous agreement across all focus groups that compassion is not a fixed trait, but rather something that can be cultivated and grown with age and experience.

3.2. Positive influences on compassion

Participants identified factors that facilitate the enaction of compassion in their day-to-day professional environment (themes and representative quotes found in Table 3). Again, there was a significant overlap in answers across stakeholder groups. The importance of self-care and meeting one's basic needs to maintain compassion emerged as a central theme in every focus group. Participants discussed self-care in terms of attending to their own needs, including adequate sleep, self-regulation, therapy, spiritual practice, and spending time with a nurturing community of colleagues and loved ones. All focus groups also identified the importance of life experiences, which exposed them to diverse people and helped build cognitive empathy for others' perspectives, as supportive of compassion. For students, this theme extended to the experiential learning they received in their medical training. They acknowledged that their medical training challenged their compassion when they spent most of their time behind computers and studying for written exams. Rather, it was the experiential learning opportunities where they felt compassionate intentions arise. Finally, students were more likely than educators to express the importance of compassionate role models and teachers to cultivate compassion in their training, often providing specific exemplars of compassion.

3.3. Negative influences on compassion

Participants also identified factors that inhibit the enaction of compassion in their day-to-day professional environment (themes and representative quotes found in Tables 4, 5). Emergent themes regarding the hindrances to compassion were slightly more varied

TABLE 2 Defining compassion.

Theme	Representative quote
Compassion is more than empathy	"So, I think [compassion is] similar to empathy, but I think it implies more of an active role, maybe. That it entails perceiving the suffering of others, but not just perceiving, but being moved by it, being inspired by it, being pushed to do something about it." (MS)
	"I think when I hear the term compassion, it has a connotation of action for me. Like I am, in addition to putting myself in someone else's shoes, there's some action that I am taking to alleviate their suffering or whatever they are experiencing. And so that to me, is one of the key differences that sets compassion apart [from empathy] is because there's an action element." (SGA)
Compassion is ineffable and somatic	"I think compassion maybe is I feel for you. Like basically you are going through something does inspire something inside of me. And I may not understand completely, but I feel for you, is compassion." (MS)
	"I think there's a little bit more to it in terms of the sort of inexpressible, indescribable, emotional state that I feel when I see somebody who's hurting, that is a little bit bigger" (SGA)
	"I feel like compassion is something that comes really deep from within. I can be very empathetic to a patient, but to really feel what they are going through, I do not know if I could really describe it. It's, you are almost going through the journey with them and you feel it almost on a physical level." (MCL)
Compassion can be cultivated	"I think like compassion can be learned with knowledge and like, I feel like people's beliefs about things can always change over time. And the more you learn, the more you can, you can grow your compassion." (MS)
	"I also feel like compassion is something that I think sort of naturally grows with age. I mean, in healthy aging and healthy social development." (MS)
	"I also think you can improve upon compassion and teach people ways to show it and maintain it under stress." (SGA)
	"I also think it has something to do just with life experience and not only just in medicine, but just living. As, you know, just getting more appreciation for the human condition. And so, I think there's definitely a capacity to increase one's compassion." (SGA)

SGA = small group advisor, MS = medical student, MCL = medical curriculum leader.

between stakeholder groups. Differences were highlighted in their discussion regarding the culture of medical education. Students primarily described how the culture, content, and pedagogies of medical education were more likely to drain their compassion than bolster it. They discussed an overemphasis on book learning and multiple-choice exams, as well as experiencing a toxic culture on the wards. SGAs, on the other hand, were more likely to describe instances of burnout, futility, and disrespect as barriers to their compassionate intentions. They expressed a sense of hopelessness and exhaustion when their efforts to support patient care and student development confronted the limitations and failures of the health system and undergraduate medical licensing requirements. SGAs also expressed that disrespectful behavior created a barrier to their compassionate motivations. Whether it came from patients, colleagues, or students, and regardless of whether it was directed at them, their colleagues, or public health efforts in general, incivility was consistently noted as a barrier. Finally, all groups acknowledged time constraints as a major barrier to their experience of compassion. This included having time to complete professional responsibilities, time to take care of themselves, time to spend with colleagues and loved ones, as well as enough time to teach and learn the requisite content prior to graduation.

4. Discussion

Compassion is central to quality health care and antithetical to harmful states of burnout that so many healthcare professionals experience. Although medical education offers a formative time for sustainable compassion training, rather than preparing medical students for the rigors of practicing medicine, many students do not receive the training and support necessary to maintain their compassionate motivations in the face of personal and health systems limitations, often with devastating consequences (Hojat et al., 2009). Beyond measurable declines in compassion, within a short time of starting training, students experience increases in burnout, substance use, depression, and death by suicide (Ludwig et al., 2015; Jackson et al., 2016; The National Academy of Medicine, 2019; Dyrbye et al., 2021). Moreover, studies examining the root causes of both the increase in mental distress and the decline in compassion point to the larger culture of medicine and have done so for decades (Pence, 1983; Neumann et al., 2011; The National Academy of Medicine, 2019). Rather than promoting the individual and collective benefits afforded through the expression of compassion, medical students are quickly inculcated with a mindset of "perfectionism, lack of vulnerability, and low self-compassion" (Shanafelt et al., 2019).

With the ultimate goal of facilitating the development of a comprehensive compassion curriculum for undergraduate medical education, this study examines how medical students, junior and senior small group advisors, and deans and directors of medical curricula conceive of compassion in the medical training environment. We also explored these key stakeholders' perceptions of how their day-to-day routines and responsibilities support or hinder their compassion. When participants define compassion in their own terms, there is remarkable concordance across both educators and students with the definition commonly found in the scientific literature (Goetz et al., 2010; Trzeciak and Mazzarelli, 2019; Mascaro et al., 2020). Across all focus groups, participants described compassion as an ineffable motivation that is more than empathy, demands action, and can be cultivated. Participants' understanding that compassion is more than empathy is consistent with what has been identified as contributing to compassion's apparent buffering effects to empathic distress and burnout (Singer and Klimecki, 2014; Trzeciak and Mazzarelli, 2019). Additionally, their identification of the ineffable felt sense of compassion is consistent with the

TABLE 3 Positive influences on compassion.

Theme	Representative quote
Self-care	"It's hard to be compassionate when you are completely zapped of all your energy, and not getting to take care of yourself really well."(MS)
	"Because we get busy and we just go, I find myself just running in and out of rooms and, you know, not really pausing to take that time for my own compassion for myself to even eat or do anything…how do we improve the compassion for ourselves? Because if we do that, we are going to be more compassionate toward others." (SGA)
	"Well, I think burnout is definitely a thing. And then maybe projects that are motivated initially by compassion can get warped. You can sort of forget about your initial motivations, but I think that actually speaks to the importance of these sort of daily rituals and practices of reminding yourself of that meaning so that you do not get burnt out." (MS)
	"I'm thinking [compassion] is closely aligned with juggling too many things… And so, kind of always working in that space where you feel like am I with integrity, able to actually take on the various roles that I'm being asked to do." (MCL)
Life experiences	"Having lived in other cultures for a significant number of years in my life, I became accustomed to looking at things through other people's eyes. And as an educator, that's what I consider my responsibility to be, is to get people to look at things through other people's eyes. The system of licensing physicians does not encourage that. Convincing medical students that they should do that…is what my job is all about" (MCL)
	"I think that one of the big things that changes our ability to empathize or feel compassionate for other people is about lived experience. And sometimes when somebody is different than us and we have no perceived connection to that person, then it's very hard to feel a sense of connection with them. But as you interact with a person as you build shared community or shared connection or you just have sometimes really like life overturning experiences, [it] will just really change your perspective on something. And I think those can all change how you interact with and perceive other people's situations." (MS)
	"I do not think my compassion has increased and simultaneously decreased as much in my life as, as it has been in med school…those times of just like studying, all we are doing is like book stuff and lectures and whatnot, I think it's a lot easier to lose compassion. But then it's moments like certain moments at OPEX, or even like my CLSM or something. I think experience is a lot more, experience is, I think experience is definitely a lot more powerful of a teaching tool." (MS)
Role models	"Well, one thing that just came to mind that helps cultivate compassion. I think in the, I do not know if it's the day-to-day thing, but I really am impressed by the chaplains that work at the hospital. So, getting to shadow the chaplains is something that I've taken advantage of and found to be extremely powerful. And just to see things from their perspective." (MS)
	"I had a pretty extraordinary OPEX [out-patient experience] preceptor. Who taught me a lot about the way I want to speak to patients and how I want to be and treat my team. She modeled compassion for herself, for her patients, for the whole, like the nurses, the RT's, the clinical researchers. Like she was so, so impactful that I went to OPEX every week instead of every other week, because I loved her that much. And I think it was really great to get that experience, especially as an M1/M2 cause I was like, wow, like this can be amazing." (MS)
	"I almost think that the most, like what's been most helpful for me in terms of like, seeing how compassion can be done in medicine is by example." (MS)

SGA = small group advisor, MS = medical student, MCL = medical curriculum leader.

physiological regulatory effects associated with compassion, including changes in stress and immune responses (Pace et al., 2010; Stellar et al., 2015). Just as anger can be felt in our bodies as tightness in our jaw, increased heart rate, or a sense of agitation, compassion has a somatic experience that researchers are uncovering is associated with widespread physiologic benefits (McCraty and Zayas, 2014; Stellar et al., 2015; Kirby, 2017; Volynets et al., 2020). Regarding the prospect of potential intervention, previous research has identified the belief that compassion is not a fixed trait – which was unanimous in our study population – as a prerequisite for effective compassion training (Sinclair et al., 2021b).

With respect to the factors of their day-to-day responsibilities that support their compassion, participants consistently identified the importance of life experiences. For students, they valued the experiences that put them in contact with others, but contrarily shared how they spend most of their time dedicated to over-simplifications in lieu of humanistic, context-dependent, whole-system science. Educators, on the other hand, talked more about the experiences they or their students may have had before coming to medical school "in the real world," (i.e., not necessarily during formal medical training). For all groups, although self-care was seen as conducive and necessary for their compassion, participants also acknowledged how self-care was anathema to medical culture. The apparent importance of role models for student compassion highlights the harmful downstream effects of a system in which so many of their mentors and educators are burned out, under-resourced, and limited in their own compassionate reserve (Shanafelt et al., 2019). It follows from this that one of the best ways to cultivate sustainable compassion among medical students is to support their educators.

Confirming the above limitations to supporting student and educator compassion during undergraduate medical training, participants pointed overwhelmingly to the "status quo" as an active barrier to their day-to-day compassion. For students, this barrier emerged in relation to general lecture and test formats,

TABLE 4 Negative influences for students.

Theme	Representative quote
Culture, content, and pedagogies of medical education	"I think medicine is a very interesting field where it's very focused on compassion, but I think there's also a lot of pressure on us to perform at the highest level in like all these different things. And to be very competitive and to be very on top of our game and academic and all these things. And I think that kind of culture takes away, oftentimes, from our ability to actually be compassionate to our patients. And so I think fundamentally the culture does not actually support it, even though we say that that is like an important part of medicine." (MS)
	"I'm like, people learn more from seeing. If medical students are going to be taught about compassion, and when you go on the wards, all you see is non-compassionate people around you. You'd be more likely to forget all you have learned and really, yeah. I think people really, I mean, such a human thing to be like the people you are with most of the time. So I guess I'm wondering how that compassion will spread to the people who are teaching medical students on the wards, and not just 18 months that we get in class." (MS)
	"I think those times of just like studying all we are doing is like book stuff and lectures and whatnot. I think it's a lot easier to lose compassion, and all those other, I guess, kindness type traits." (MS)
	"We sit through the bioethics lectures in class and they are just like this weird detached abstract theory. I'm just like, I do not have time for this. This is this is it's borderline pointless sometimes. And when you are not paying attention to like real people that you are going to serve 1 day and all you are doing is sitting in lecture and whatever, if you overemphasize any one thing, man that's, that's exhausting" (MS)
	"[There is] an opportunity for our generation of physicians to do better, that like people do not go through their education with traumatizing experiences from someone who's screaming at them for being incompetent, when like the point is that we are incompetent because we are trying to learn. And I am sure that nobody has gone through this without having an experience like that, but maybe like we can be better. And maybe that's the point. Yeah, it's tough." (MS)
Time constraints	"I think it feels like a med school with, you know, all the things are crammed into it, just seems at odds with like living a life of compassion in some senses because like most of the time I feel like a lot of us do not even have enough time and room to be compassionate towards ourselves, our friends who live in different states, our family and stuff like that. A lot of outside relationships sort of get pushed to the side for a lot of people. And then like in that sense, it's hard to have compassion." (MS)
	"I think just like time is like a big factor a lot of times as a barrier to compassion. I'm thinking about when I was on internal medicine, I had a patient who was really struggling and I ended up spending a decent amount of time every day, just talking to her about random things. It was just 30 min every morning. It was really nice…it's not even like medical care, you know. I am literally just sitting with her…I could tell she really appreciate it. And I really enjoyed it as well. And then as the rotation got busier, that became less and less possible." (MS)
	"I think it feels like med school – you know, all the things are crammed into it – just seems at odds with like living a life of compassion in some sense. Because, like most of the time I feel like a lot of us do not even have enough time and room to be compassionate towards ourselves, our friends who live in different states, our family and stuff like that. A lot of outside relationships sort of get pushed to the side for a lot of people. And then like in that sense, it's hard to have compassion." (MS)

MS = medical student.

specific clinical and non-clinical learning opportunities, and certain behaviors of potential mentors. Compounding this sentiment was a sense that there was not enough time in the day to accomplish all their academic demands, let alone attend to their personal well-being. For educators, a sobering and honest discussion of burnout and their sense of futility when fighting a poorly incentivized health system made clear that maintaining their compassion is often a practice of sheer individual will. Without institutional support, educators expressed how disrespect could challenge their ability to be compassionate towards others, regardless of circumstances. This sentiment also highlights a potential impact of the COVID-19 pandemic on our results, as many educators shared how the increased demand on the healthcare infrastructure stressed their already limited bandwidth, leaving little room for a compassionate understanding of those who are impolite, disregard public health measures, or endanger others. Again, time constraints permeated every discussion with educators and contributed to a sense of hopelessness among SGAs and MCLs.

This study had several limitations. Beyond the small sample size of this study, the general limitations of convenience sampling create the potential for sampling bias. Focus groups should allow for a natural flow of conversation, and the resulting probing questions varied slightly from group to group. Additionally, while this study targeted UME, medical students and their formal educators are not siloed. The perspective of graduate medical education and continuing medical education, as well as the beliefs of nurses, pharmacists, social workers, support serves, administrators, industry, and patients, would help further elucidate the role of compassion in training future physicians. Additionally, future work can build upon the findings from this research by examining conceptions of compassion held at other institutions to examine whether our findings generalize to other undergraduate medical schools and to the broader medical training landscape. Continuing this work will be critical to developing a comprehensive approach to cultivating compassion within medical education and sustaining an effort to mend the professional culture of healthcare.

TABLE 5 Negative influences for faculty.

Theme	Representative quote
Burnout, futility, and disrespect	"Becoming overly frustrated with systems can definitely impact my ability to feel compassion." (SGA)
	"When you have a huge number of very needy patients and you sort of take all of them on, it's really hard to- because you in some ways carry that burden a little bit yourself also. And I find that if I were seeing 10 half days of clinic a week, I do not think I would have enough left of me to keep giving to my patients and take care of myself." (SGA)
	"I mean it, you know, people's lives are really hard. And when you have got five people in a row that are maybe in abusive situations, or maybe homeless, or you just see no way out for them and you are doing the best that you can, and you are trying to find supports that do not exist for them. And they want to live and they want to do well. And you know that you have medication that could help them do well, but there's 40 other things in the way of that. And you are trying to figure that out, but those, those supports do not exist. I mean, and you feel those people's pain and it's really tragic." (SGA)
	"I think probably the biggest piece for me is disrespect towards me or towards other people of a group that I'm working with…I can feel sort of a wall coming up that makes it more challenging for me to be compassionate." (SGA)
Time constraints	"I think the students feel often, some students I'm talking to, feel overwhelmed with the amount of things [they] are being asked to take on or learn or feel deeply engaged in at one time. And it becomes impossible, right, to actually be committed to all of those things in the way one has perhaps envisioned themselves to be." (SGA)
	"I think time is a really big one for me. And I know that, outside of fatigue or stress, that if I start to feel that I am running very short on time, for example in clinic, I think I get worse at showing compassion." (MCL)
	"I think we have to take the time and have the opportunity to know each other. On somewhat of a personal level, a little bit." (SGA)
	"Time. I mean the four-letter word always. Right. And I do not, I mean, definitely with patients…and same thing with students, you know. Just life, you know, it's hard to sit there and say, okay, I'm going to invest. And once I do, once I stop myself and say, okay, this is about the other person, everything else is like, well, how important are those other things anyway, but yeah, I think time is the biggest. Time." (MCL)

SGA = small group advisor, MCL = medical curriculum leader.

5. Conclusion

Medical students, those training them, and current patients are desperate for programs and interventions that prioritize and facilitate compassion in healthcare. Given the widespread benefits for those receiving, those expressing, and even those promoting compassion, it seems imperative that prompt and deliberate actions are taken to cultivate compassion in all aspects of medicine. To help with that endeavor, this research identifies the day-to-day facilitators and barriers to compassion in medical training. The sample is small, and it would be appropriate to continue studying the issue with a larger sample. Further research can develop more granular, actionable steps to inculcate the foundation of medical instruction with a culture conducive to creating the next generation of physician. Armed with sustainable compassion, these future leaders in medicine can persevere in greater numbers and help promulgate compassionate care for themselves, their colleagues, and their patients.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Emory University Institutional Review Board. The ethics committee waived the requirement of written informed consent for participation.

Author contributions

CL conceived the study, helped develop the interview guide, IRB proposal, and initial code book, co-led focus groups, transcribed the recordings, and coded the transcripts. EB provided feedback on the interview guide, IRB proposal, and codebook. She co-led focus groups, coded the transcripts, and provided substantive feedback on the manuscript. JM secured the grant proposal that funded this work and provided guidance and oversight on the IRB proposal, interview guide, conduct of the focus groups, analysis, and interpretation. She also provided substantive feedback on several drafts of this manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Assessment of physical activity among adolescents: a guide to the literature

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Purpose: The aim of this article is to systematically review articles and annual reports concerning young peoples' physical activity (PA) and linking this to considerations of the state and national defense.

Method: A systematic search of the literature included an analysis of publications accessible in global databases and other available books, student papers, and projects. The articles and reports were categorized based on year of publication, methods used, age of respondents, sample size, country, and digital object identifier (DOI).

Results: The result of this search is an overview of the extent and manner in which the worldwide scientific community is addressing the current situation and the long-term development of the physical fitness of adolescents. This publication also maps to what extent professional publications and articles are addressing PA from the perspective of the needs of armies and armed forces of various countries around the world.

Conclusions: The article provides a systematic overview of methods used to measure PA, and an overview of articles dealing with assessing PA. The examined articles indicate that from the perspective of not only national defense, but also health and overall quality of life, in particular, we need initiatives to encourage and motivate young people to increase their everyday PA. The research therefore also includes an overview of factors that may considerably influence PA. The results ascertained in this publication will be used, *i.a.* for investigating a longitudinal defense research project of the Ministry of Defense of the Czech Republic in which the authors are participating.

KEYWORDS

physical activity, fitness tests, adolescents, military, state defense

Introduction

This article aims to systematically map whether the global scientific community is addressing the current situation and long-term development of physical fitness in the adolescent population, and if it is, then to what extent and in what manner. This article also aims to check whether such professional publications and articles are looking at physical activity (PA) from the perspective of the armed forces of countries around the world.

One reason for this publication is that the team of authors is involved in the project BODY—Physical Fitness of the Population as a Risk Factor for Ensuring the Defensive Capacity of the Czech Republic (*TELO–Tělesná zpusobilost populace jako rizikový faktor pro zabezpečení obranyschopnosti Ceské republiky*). This is a defense research project of the Ministry of Defense of the Czech Republic in the programme: Development of the Armed Forces of the Czech Republic, main objective: Personnel Preparation (project OYUOB20200001, 2021).

The project aims at designing certified methodologies for selecting and training individuals to deal with physical and mental stress according to the standards of the Czech Armed Forces. These methodologies will be based on a study of the actual physical fitness of students of secondary and vocational schools. This study will include proposals for changing educational and training programmes dealing with developing physical fitness, and to further develop unified approaches to testing and monitoring physical fitness in connection with Ministry of Defense (especially the Czech Armed Forces) requirements. In addition, a functional database will be built enabling the long-term tracking and evaluation of selected criteria and descriptors of physical fitness.

In these COVID or post-COVID times, the project and its expected results are all the more valuable, as the project also has features of a longitudinal study, mapping the development of physical fitness after the resumption of face-to-face learning.

For the reasons stated above, a systematic search and analysis of available publications was out, drawing upon not only professional articles and publications contained in worldwide databases, but also those absent from such sources, namely books, student papers and projects published at the national level.

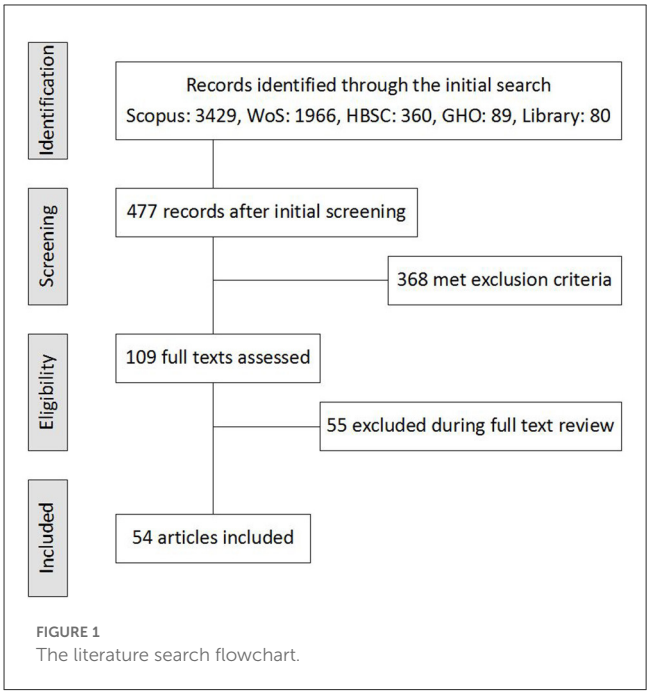

FIGURE 1
The literature search flowchart.

Methods

Strategy for the Literature search

We conducted a search within the electronic databases Scopus, Web of Science, HBSC (Health Behavior in School-Aged Children), and GHO (Global Health Observatory). Search terms included the key words: "physical," "fitness," "adolescents," "measuring," "military," and "cadets," and the terms were combined in groups of three or four with Boolean operator "and." The year range was first set to 2016–2021. However, several papers from earlier years were added to which the search was led by references in articles. In addition, on the national level we conducted an analysis of available publications and articles, books, student papers, and projects archived in the Moravian Library in Brno since 2006. The search was carried out by all authors with the assistance of a librarian.

Search outcome and eligibility criteria

The literature search was conducted in two phases. The first consisted of screening the titles and abstracts of records obtained from the databases. There were almost 6,000 articles produced from the initial search phase, i.e., after a search within the databases and library using the key words mentioned above. The primary screening of the titles and abstracts within the databases narrowed down the number of relevant records to approximately 8% of the initial number of articles.

In the second phase of the search, the full texts of the articles were assessed for eligibility. Papers and studies were excluded if they

- concentrated only on specific sports activities (such as basketball, football, etc.) and their influence on PA,
- focused only on psychological aspects connected to physical fitness,
- examined solely medical issues (e.g., the impact of surgery, effects of specific disorders),
- did not have a full text available, and
- were published as a full text in languages other than English or Czech.

After removing ineligible articles, the authors selected 109 of the rest for more in-depth study. From this set of articles, 55 papers were excluded because they did not concentrate on PA in connection with its measurement (either using tests or questionnaires), or they connected PA with cognitive processes, or they compared the influence of different organized PAs, or else they did not have a digital object identifier. Finally, 54 articles were included into the systematic review. The overall search strategy is summarized by a flowchart diagram (Figure 1).

Data were retrieved and recorded from the full texts of the included articles: namely the title, authors, and year of publication, and also data describing age, sample size, methods, and country.

Results and discussion

Overview of the published studies

PA is one of the main factors influencing one's health, psyche, and overall quality of life. Yet, according to World Health Organization (WHO) estimates, 81% of individuals aged 11–17 years are physically inactive, as they carry out moderate- to high-intensity PA for <60 min per day (World Health Organization, 2014). In recent years several organizations, expert associations and initiatives have emerged in the field of public health with the main objective of drawing attention to problems associated with

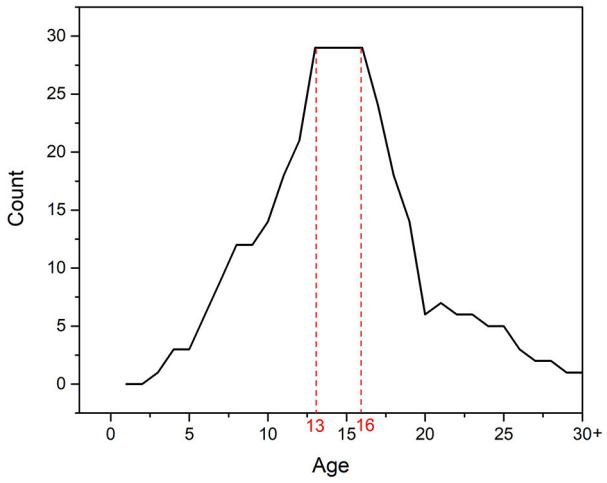

FIGURE 2
Number of relevant articles with regard to the age of respondents.

physical inactivity. One example is Health Behavior in School-aged Children (International Coordinating Centre, 2021), which is an international alliance (now including 50 countries and regions across Europe and North America) addressing the lifestyles of adolescents aged 11–15 years. This alliance connects scientists from all over the world to cooperate in a cross-national survey of school students. Another noteworthy project is the international project IPEN ADOLESCENT (International Physical Activity and the Environment Network, 2021) sponsored by the United States' National Institutes of Health and coordinated by the research group International Physical Activity and the Environment Network. The project is primarily focused on understanding the relations between the built-up environment, objectively monitored PA, sedentary behavior, and obesity in adolescents.

Data from our literature search cover the age range from 3 to 28 years. Only one examined publication also included older respondents. Most articles included in the search related to adolescents aged 13–16 years (Figure 2).

Methods of measuring PA

To date, a wide range of methods has been used to measure PA in children and adolescents. These include self-reporting methods such as questionnaires, activity logs, and diaries, as well as objective measures of PA such as direct observation, heart rate monitoring, accelerometers, and pedometers. Certain selected methods for measuring fitness and PA (or combinations of such methods) are shown in Figure 3. Specifically, these methods are: PA test (T), anthropometry (A), cardiorespiratory fitness (C), accelerometer measurement (M), biochemical analysis (B), and a questionnaire survey (Q). The number in brackets shows the number of articles included in the search that used such a combination of methods and corresponds to the column "Method" in Table 1. The combination of a PA test and anthropometry was used most often. This combination supplemented with a questionnaire was also common.

To get an accurate picture of fitness, it is appropriate to supplement a questionnaire survey with a PA test, because some studies point out that respondents tend to overestimate the time spent doing PA, and when estimating time spent doing moderate to high intensity PA, also include low-frequency activities (Wallston et al., 1978). Overestimating one's PA may also result from the broad spectrum of PAs given (Fogelholm et al., 2006).

Thus, data obtained from a questionnaire may be distorted due to subjective assessment. For this reason it seems advantageous to combine a questionnaire with physical testing, even though the correlation between the perceived and actual level of PA is significant (Štefan et al., 2019).

The physical fitness of adolescents is assessed by means of various test batteries (Marques et al., 2021). In this articles included in the search, FITNESSGRAM is the most common (Clark et al., 2015; Laurson et al., 2015; Welk et al., 2015; Davis et al., 2016; Cadenas-Sanchez et al., 2017; Júdice et al., 2017; Agostinis-Sobrinho et al., 2018; Chen et al., 2018). The specific components of the FITNESSGRAM® are curl-ups (abdominal strength and endurance), push-ups (upper body strength and endurance), sit and reach (flexibility of the hamstrings and the lower back), the Progressive Aerobic Cardiovascular Endurance Run (PACER) test (CRF), and BMI (measure indicating the appropriateness of a young person's height/weight ratio) (Júdice et al., 2017). Other test batteries used were e.g., EUROFIT (Tishukaj et al., 2017; Corredor-Corredor et al., 2019; Štefan et al., 2019), the ALPHA-FIT test battery (Fernández et al., 2017; Chrismas et al., 2019), and the BOUGE physical fitness battery (Vanhelst et al., 2016). The variation of these test batteries results in difficulties when comparing them. Methods do exist, nonetheless, that make it possible to mutually compare batteries (they are based on *z*-scores), but this topic will be addressed in another article.

The overall characteristics of studies are summarized in Table 1. It shows the year of the article's publication, the methods used for assessing fitness or PA (see the legend to Figure 3), the age and number of respondents included in the study, the country of the research, and the digital object identifier (DOI) of the journal article.

Individual factors in relation to PA

Longitudinal studies that would make it possible to identify changes of movement behavior in the course of adolescence and analyse the effect of such changes on the health of an individual are not available. Studies typically examine the relationship between PA and an individual's health in terms of both the psychological and physical aspects of the individual, in particular in connection with obesity (Köchli et al., 2019; Ruedl et al., 2019), with BMI (Bi et al., 2019), with cardiometabolic risk (Roldão da Silva et al., 2020), or with adherence to a specific diet (Galan-Lopez et al., 2019), but without any long-term monitoring of the tested individuals.

Vigorous PA as well as greater and increasing muscular fitness in youth are associated with lower levels of blood pressure across the adolescence (Agostinis-Sobrinho et al., 2018). Vigorous PA, good cardiorespiratory fitness and a healthy weight (BMI) are associated with mental wellbeing and quality of life (Lang et al.,

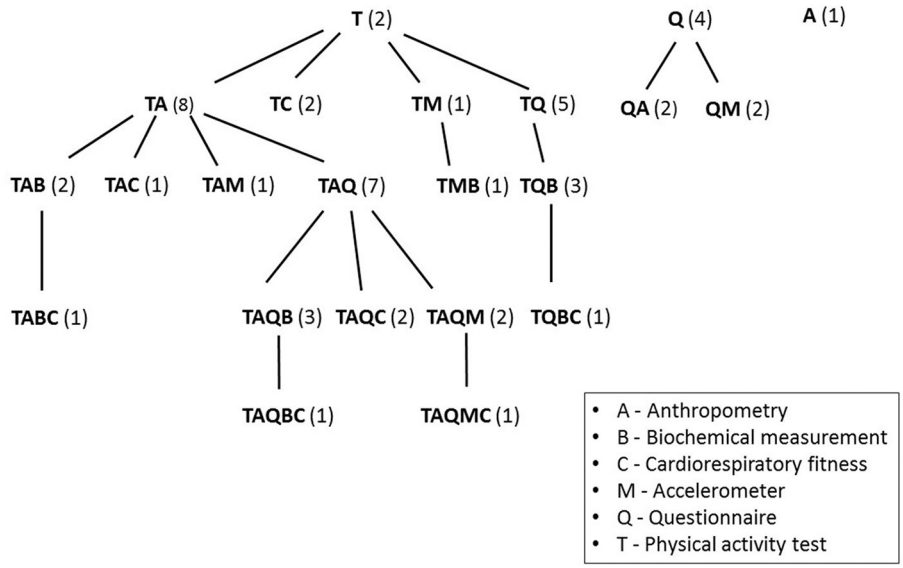

FIGURE 3
Methods (and combinations of methods) for measuring fitness and PA.

2019). Percentage of fat is ranked as the most important correlate for Total, Physical and Psychosocial HRQoL (Health-Related Quality of Life) (Tsiros et al., 2017; Eddolls et al., 2018).

Many studies assess the role of physical fitness on mental wellbeing and health or, conversely, the role of mental health on physical performance (Fossati et al., 2021). The positive relationship between physical activity and mental health is well established, and the COVID-19 pandemic has increased people's attention to the positive effects of physical activity (Fossati et al., 2021; Nie et al., 2021; Lou et al., 2023).

Physical activity releases endorphins, the so-called "happiness hormones," which can improve mood and reduce feelings of anxiety and stress. Achieving physical goals and improving fitness can lead to increased self-esteem and a sense of achievement. This positive effect on self-esteem can also carry over into other areas of life. Regular physical activity can also help improve sleep quality (Dolezal et al., 2017; Wang and Boros, 2021).

Physical exercise (PE) induces structural and functional changes in the brain, which that has huge benefits for cognitive function and wellbeing. Physical activity is also a protective factor against neurodegeneration (Mandolesi et al., 2018). Studies show that regular exercise can improve memory, concentration and decision-making (Mandolesi et al., 2018; Marin Bosch et al., 2021).

There are also studies which support an association between low physical fitness and depressive symptoms. There were 300 soldiers included into the study. Depressive symptoms were 60% lower for soldiers in the high fitness category (odds ratio: 0.40; 95% confidence interval: 0.19–0.84) compared with soldiers in the low fitness category (Crowley et al., 2015).

Physical activity declines with age. For example, according to a Norwegian study (Lagestad et al., 2018), at the age of 14, 61% of boys were classified as active, while at the age of 19, only 11% were physically active. Furthermore, body mass index increased during the period for both genders, while oxygen uptake decreased. Similar results are also shown by one study (Niessner et al., 2020) which examined the development of physical fitness in German youth and provided its percentile curves, and another study (Weston et al., 2019) which assessed, as part of a preliminary study, the PA of younger school children. The attitude to PA also changes with age—see the study (Kuśnierz et al., 2020) which shows that younger children prioritize the "fun" aspects of PA whereas for older children "fitness" is more important. Therefore, it is important to develop good habits and a healthy lifestyle in childhood. This increases the chance that they will be maintained into adulthood.

It turns out that PA is influenced by the environment in which we live, the options we have and are able to utilize. Increased opportunities for fitness and recreation were significantly associated with increased adolescent PA (Nicosia and Datar, 2018). Similar conclusions were also derived in one study (Arena et al., 2019) that examined health behaviors to fitness measures among boy scouts, which showed a clear difference between average adolescents and those who were members of a scout association.

Schools seem to be an ideal environment for supporting PA. However, education systems differ and the requirements placed on students as well as the availability of organized activities vary. There are hardly any studies that compared education systems (Bauman et al., 2011; Lee and Choi, 2011). For students it is important to participate in organized PAs, or to be a member of a sports club. Such participation has a positive effect not only on people's physical attributes, but also on their social and psychological situation. The broader the range of organized activities offered, the better the PA of students (Zullig and White, 2011). The recommendations for vigorous PA are met by 45.9% of Czech boys and 33.4% of girls; and by 64.5% of Polish boys and 51.3% of girls. Participation in organized PA was the main correlate to achieving recommendations for vigorous PA (Frömel et al., 2018).

Another important factor is gender. Studies suggest that boys are more competitive in sports than girls and participate

TABLE 1 List of articles concerning the assessment of physical fitness of adolescents; "L" written beside the year means that it was a longitudinal study, and "m" written beside the country means that the study was focused on soldiers (or conscripts) in the given country.

Year	Method	Age	Sample size	Country[a]	DOI
2021	T, Q	11–13	971	FI	10.1111/sms.13847 (Joensuu et al., 2021)
2021	T, Q, B	13	795	IE	10.1177/1356336X20917416 (O'Keeffe et al., 2021)
2020	Q	13–19	1,340	PL	10.3389/fpubh.2020.00466 (Kuśnierz et al., 2020)
2020 L	T, C	3–17/ 4–23	3,742	DE	10.3389/fpubh.2020.00458 (Niessner et al., 2020)
2020 L	T, Q, B	13–14/ 16–17	93	BR	10.1016/j.jesf.2020.06.002 (Roldão da Silva et al., 2020)
2020	Q,	12–17	128	US m	10.3390/ijerph17010024 (Pearlman et al., 2019)
2020	Q, A	19–26	1,243	LT m	10.3390/ijerph17030783 (Mieziene et al., 2020)
2020	T, A, Q	15–18	1,036	HR	10.13112/PC.2020.4 (Kasović et al., 2020)
2020	T, M	19	34	FI m	10.1249/MSS.0000000000002092 (Jurvelin et al., 2020)
2019	T, Q, B	21	537	US	10.18666/TPE-2019-V76-I1-8462 (Burner, 2019)
2019	T, A, Q	18–26	186	QA	10.1371/journal.pone.0223359 (Chrismas et al., 2019)
2019	T, A	7–18	17,618	CH	10.1371/journal.pone.0220863 (Lang et al., 2019)
2019	T, Q, B, C	6–17	3,800	CA	10.24095/hpcdp.39.3.02 (Arena et al., 2019)
2019	T, A, Q	15–17	1,036	HR	10.1371/journal.pone.0219217 (Štefan et al., 2019)
2019	T, A, Q	11–17	99	US	10.7759/cureus.6262 (Arena et al., 2019)
2019	T, A, B, C	7–8	1,246	CH	10.1016/j.rmed.2019.105813 (Köchli et al., 2019)
2019	T, A	6–18	560	AT	10.3390/ijerph16214117 (Ruedl et al., 2019)
2019	T, A, Q, M	14–16	233	ES	10.1016/j.scispo.2018.10.014 (Corredor-Corredor et al., 2019)
2019	T, A	8–10	80	GB	10.1123/pes.2018-0135 (Weston et al., 2019)
2019 L	T, A, Q, C	18–19	1,008,787	SE m	10.1016/j.jadohealth.2019.02.016 (Lissner et al., 2019)
2019	T, A, C	13–16	413	EE	10.3390/ijerph16224479 (Galan-Lopez et al., 2019)
2018	T, A, Q, C	8–11	122	AU	10.1123/jmld.2016-0076 (Barnett et al., 2018)
2018	T, A, Q, M, C	11–13	576	GB	10.1007/s11136-018-1915-3 (Eddolls et al., 2018)
2018	T, Q	13–15	382,259	TW	10.1038/s41598-018-34370-2 (Hsieh et al., 2018)
2018	T, A	17–18	28	RU m	10.7752/jpes.2018.s5300 (Kudryavtsev et al., 2018)
2018	T, C	11	265	US	10.1186/s12889-018-5107-4 (Hsieh et al., 2018)
2018	T, A, Q, B, C	12–18	734	PT	10.1007/s00431-018-3164-4 (Agostinis-Sobrinho et al., 2018)
2018	Q	15–17	1,846	CZ,PL	10.21101/cejph.a4521 (Frömel et al., 2018)
2018 L	Q, M	14 (19)	116	NO	10.3389/fpubh.2018.00097 (Lagestad et al., 2018)
2018	T, A, Q	6–18	335,810	GR	10.3389/fnut.2018.00010 (Arnaoutis et al., 2018)
2018	Q	12–13	749	US	10.1016/j.amepre.2018.01.030 (Nicosia and Datar, 2018)
2017	T	14–17	143	ES	10.1007/s00431-016-2809-4 (Fernández et al., 2017)
2017	T, A, M	10–17	2,698	PT	10.1186/s12966-017-0481-3 (Júdice et al., 2017)
2017	T, A, Q, B	13–16	444	E6[b]	10.1016/j.jsams.2016.08.003 (Cadenas-Sanchez et al., 2017)
2017	T, M, B	7–12	365	CZ	10.1186/s12199-017-0629-4 (Gába et al., 2017)
2017	Q, A	10–19	3,337	IN	10.7860/JCDR/2017/27080.10870 (Dave et al., 2017)
2017	T, A	12–13	31	KR	10.12965/jer.1735132.566 (Cho and Kim, 2017)
2017	T, A	14–15	354	RS	10.1186/s12889-017-4727-4 (Tishukaj et al., 2017)
2017	T, A	13–18	14,794	KR	10.7570/jomes.2017.26.1.61 (Lee et al., 2017)
2016	T, A, Q, M	18+	1,607	E7[b]	10.1371/journal.pone.0150902 (Marsaux et al., 2016)
2016	T, A, B	14–16	357	US	10.18666/TPE-2016-V73-I1-5903 (Davis et al., 2016)

(Continued)

TABLE 1 (Continued)

Year	Method	Age	Sample size	Country[a]	DOI
2016	T, Q	8–16	174	FR	10.1111/cpf.12202 (Vanhelst et al., 2016)
2015	T, A, Q, B	9–19	1,467	US	10.1371/journal.pone.0138175 (Barnett et al., 2015)
2015	T, A, B	12–19	410	HU	10.1080/02701367.2015.1042800 (Laurson et al., 2015)
2015	T, A, Q, B	10–18	2,602	HU	10.1080/02701367.2015.1043231 (Welk et al., 2015)
2015	T	13–14	324	UA	10.7752/Jpes.2017.S5237 (Galan et al., 2017)
2015	T, A, Q	18–28	300	US m	10.1249/MSS.0000000000000396 (Crowley et al., 2015)
2013	Q, M	16–19	659	FI	10.1186/s12889-016-3880-5 (Hankonen et al., 2017)
2012	T, A	4–80	31,349	FR	10.1136/bmjopen-2012-001022 (Nassif et al., 2012)
2008	T, Q	13–18	71	NO	10.1186/1471-2288-8-47 (Rangul et al., 2008)
2007	A	19–26	140	FI m	10.1249/mss.0b013e318155a813 (Mattila et al., 2007)
2006	T, Q	11–16	94	BR	10.1590/s0034-89102006000600009 (Florindo et al., 2006)

[a]ISO country codes (Alpha-2). [b]E6 = GR, DE, FR, HU, AT, ES; E7 = DE, GR, IE, NL, PL, ES, GB. The identification of methods is identical to that used in Figure 3 (A, anthropometry; B, biochemical analysis; C, cardiorespiratory fitness; M, accelerometer; Q, questionnaire; T, PA test).

in extracurricular activities more often (Chrismas et al., 2019). Boys had significantly higher actual and perceived object control competence (ball skills), moderate-to-vigorous PA (MVPA), cardiorespiratory fitness, and upper and lower musculoskeletal fitness than girls (Barnett et al., 2015, 2018; Clark et al., 2015). The decrease in girls' PA could be linked to the fact that during their adolescent years a high percentage of girls do not like PE classes. It is therefore advisable to create PA programmes that are also attractive for girls, and that make it possible to use flexibility, which is one of the disciplines in which girls are better than boys (Lee et al., 2017). Thus, it is useful to ascertain which sports bring the greatest joy to adolescents. According to one study (Wilkinson and Bretzing, 2011), girls preferred fitness units to sports units. As for fitness activities, the activities most popular with girls include pilates, aerobics, step aerobics, and kickboxing (Wilkinson and Bretzing, 2011). These are good lifetime activities that students can easily do on their own at home, rather than having to find a team to play the sport with or attend a specific facility.

Sports performance or movement activities of children in general are also considerably influenced by motivation from their parents (Wiersma, 2001) and coaches (Atkins et al., 2015). Studies (García Bengoechea et al., 2017; Oliveira-Brochado et al., 2017) show that the mapping the psychological background of respondents could be important in relation to motivation for doing sports.

There are hardly any studies examining the topic in a manner that might coincide with our particular interest, i.e., studies connecting PA and (pre)military service. Where such studies exist, they focus on a selected specific characteristic or circumstances relating to the army. An early study from 2007 (Mattila et al., 2007) refers to the fact that existing physical training programmes are not able to provide the optimal level of functional readiness required by military students and officers attending military universities to perform professional tasks. The solution to this problem, according to scientists, is to successfully adapt modern techniques of intensive functional training (crossfit) into the physical training process of cadets and military students. All the studies we managed to find (Table 1) agree that PA and healthy behavior have been on the decline in recent years. This decline usually involves changes in the level of PA in relation to other factors, such as the body composition of healthy male Finnish conscripts (Jurvelin et al., 2020), eating patterns, alcohol consumption, cigarette smoking, and e.g., psychological distress in Lithuanian military conscripts (Mieziene et al., 2020); other factors include BMI, weight status, and socioeconomic status in Swedish conscripts (Lissner et al., 2019). Elsewhere (Jurvelin et al., 2020), PA is studied in connection to the training load during basic training experienced by Finnish conscripts, where it is recommended during military service to customize the physical training of conscripts as much as possible in relation to their fitness levels. The most recent study (Pearlman et al., 2019) focuses on the families of military dependents, namely on adolescents aged 12–17; however, the study assesses so-called weight-based teasing with the factors: BMI, eating disorders, and psychological effects.

The systematic review is not without its limitations. The terms selected to identify the relationship between PA and military readiness, although very thorough, may have excluded documents that did not meet the criteria set. The search was carried out in only four databases, with the addition of publications archived in the library. It is also possible that some studies are missing, which may slightly bias the review; it is not clear whether such studies are unpublished or were published in local languages and therefore could not be retrieved. Nevertheless, the main contribution of this review is the number of articles reviewed to describe the methods of measuring and individual factors influencing the PA in adolescents and to identify the gap in the topic of our interest, i.e., the studies connecting PA and (pre)military service.

Conclusion

The field of PA and fitness in adolescents is addressed by a broad community of experts, but there are no publications concerning PA and (pre)military service. There are also no longitudinal studies.

The search authors specially focused on this type of publication, but despite their efforts they did not find any other publications than those listed in Table 1. In addition to the list of articles in Table 1, the search includes a list of methods that are currently used to assess physical fitness. The method most commonly used in the examined articles was the combination of a PA test and anthropometry. Combing these two methods with a questionnaire was also common. Among other things, the search also dealt with factors that may influence movement activity and factors influenced by movement activity.

PA in adolescents is one of the important factors influencing the health and life of adolescents and, consequently, the army of the given country. The Czech Army recruits new members from among the adult citizens of the Czech Republic with a clean criminal record and appropriate education, capabilities, age, and health. Training after the commencement of service requires the use of methods and means that are appropriate for the level of new recruits and that will secure the minimum required level of overall preparedness. Motivated, capable, well-trained and qualified military personnel are necessary for the success of any army. Therefore, the planning and management of training requires information about the condition of selected target groups of citizens of the Czech Republic, so that the training system is prepared for the condition of future participants and where appropriate supplemented with new features. The results ascertained in this publication will be used in the project BODY—Physical Fitness of the Population as a Risk Factor for Ensuring the Defensive Capacity of the Czech Republic. In this project the following tools will be used (as in the articles above): questionnaire survey (Q), biochemical analysis (B), anthropometry (A), a PA test (T), and cardiorespiratory fitness (C). We found only one study of this extent and type (International Coordinating Centre, 2021). We will supplement the aforesaid methods with psychological questioning (questionnaire NEO-PI-R).

The project BODY began in 2020 and will be investigated until the end of 2023. In 2020, partly owing to the negative development of the COVID-19 pandemic, only the first "preparatory" stage of the project was carried out. The first major tangible results will be achieved after the comprehensive monitoring of target groups of students attending secondary and vocational schools (and elementary schools, if appropriate) within the following catchment areas: nationwide, rural, urban, and city. The required data will be gathered in a manner ensuring that the obtained sample characterizes the target population with sufficient precision. In each of these target groups we will monitor, on an individual basis, the condition of the body, musculoskeletal system, selected movement abilities and skills, the change dynamics of selected blood analytes, and mental health once a year. The data will be statistically processed and, on the basis of their 3-year course, we will approximate their possible development.

The project will include an analysis of the degree of divergence between the approximate and desired situation with regard to the expected needs not only of the Czech Army, but an entire society currently affected by the post-COVID syndrome. Based on the information gathered, we will propose modifications to the current teaching of PE at secondary schools (and basic schools, if appropriate), together with recommendations for changes to the content of preparatory courses run prior to testing the fitness of potential recruits to the Czech Army.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Exploring the mediating role of PsyCap in the relationship between orientation training and work engagement: the perspective of COR and SRT theories

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In the domain of organizational socialization, a new research paradigm and trend concerns work engagement path way to studying newcomer assimilation through the lens of *socialization resource theory* (SRT). Drawing on theories of SRT and COR (*conservation of resources*), the present study develops and validates an integrative model, in which the effect of orientation training on work engagement involves the mediator of PsyCap and moderators of leader-member exchange (LMX) and education. SmartPLS 3.0 was used to analyze the data with 567 respondents with 5,000 bootstraps from 3- to 5-star hotels in Mainland China. The empirical results indicate that newcomers' PsyCap fully mediates the relationship between orientation training and work engagement. They also suggest that education and LMX, respectively, moderate the effects of orientation training on PsyCap and work engagement. Theoretical and practical implications of these findings are drawn in the context of organizational socialization and human resources development.

KEYWORDS

conservation of resources (COR), socialization resources theory (SRT), orientation training, work engagement, psychological capital (PsyCap), leader-member exchange (LMX)

1. Introduction

Work engagement is a positive work state characterized by energy, focus, and dedication (Bakker and Sanz-vergel, 2014). It plays a critical role in both enhancing sustainable competitiveness and profitability in businesses (Saks, 2017) and achieving successful outcomes of newcomers' organizational socialization (Saks and Gruman, 2018). In the hospitality industry, employee engagement is particularly important (Hassanein and Özgit, 2022; Liu et al., 2023) for one notable reason. That is, hotel organizations are labor-intensive and service-oriented, and they must cultivate high levels of work engagement among staff to meet customers' needs (Asghar et al., 2021). Saks (2017) reports that, however, there is an overall declining trend in employee engagement globally. For example, only 24% of workers in Southeast Asia, as per a

report[1], are seen to be engaged at work. Evidence shows that poor engagement is linked to low job satisfaction and can even lead to employees' turnover (Asghar et al., 2021; Ozturk et al., 2021). As such, it is necessary for managers to fully understand and intervene in the proximal and distal factors that lead to the levels of work engagement.

According to Boswell et al. (2005), newcomers' engagement levels often decline to varying degrees after entering an organization in organizational socialization. This phenomenon is known as the "hangover effects" (Saks and Gruman, 2018). Most newcomers experience the hangover effects unless organizational managers proactively adopt effective socialization practices to develop and maintain newcomers' higher levels of work engagement during the socialization process (Saks and Gruman, 2018; Liu et al., 2023). In other words, the socialization practices largely determine whether newcomers' level of work engagement decreases, stabilizes, or increases (Saks and Gruman, 2018). Moreover, maintaining and developing newcomers' work engagement is considered as an effective management approach to achieving success-related outcomes of organizational socialization (Saks and Gruman, 2018; Liu et al., 2023). According to Ashforth et al. (2007), organizational socialization could be referred to as the process by which a newcomer transforms from a rank outsider into an effective insider. It significantly affects newcomers' careers (Saks and Gruman, 2011) and spurs the company's profit growth (Strack et al., 2012). As a result, for more than three decades, both partitioners and scholars have interests in issues relevant to newcomers' organizational socialization (Peltokorpi et al., 2022).

Saks and Gruman (2018) have theoretically developed a model of socialization resources theory, focusing on the work engagement pathway to newcomers' organizational socialization. Their model includes both proximal (e.g., PsyCap, Saks and Gruman, 2011, 2018) and distal (e.g., supervisor support, Saks and Gruman, 2018) factors that lead to newcomers' work engagement. SRT theory argues that newcomers should be provided with the resources they need to integrate into their employment organization effectively. In fact, the engagement path way to socialization is a new paradigm for both socialization research and practice. As a new approach, SRT is seen to have its limitations. Existing SRT models have, for example, neglected potential moderating variables such as mentoring (Cai et al., 2021) and income (Liu et al., 2023). Furthermore, there has been a lack of empirical research on resource caravans and resource passageways. Resource caravans refer to the interconnection and influence of organizational and individual resources as a moving "caravan," while resource passageways are specific environments in which resources are nourished or hindered by the width or narrowness of the "passageway" (Hobfoll, 2011; Hobfoll et al., 2018). In this regard, although SRT theory points out the important role of resource caravans and resource passageways in the process of organizational socialization, most of the current empirical studies based on SRT theory focus on individual socialization resources rather than socialization resource caravans, albeit a few studies (e.g., Liu et al., 2023) have explored the role of resource passageways (e.g., leader member-exchange, LMX) as well as their influences on newcomer socialization outcomes.

Orientation training refers to institutionalized training program tailored to newcomers right after their entry into the employment organization (Saks and Gruman, 2011). The effectiveness of orientation training is vital for both newcomers and their organizations (Zheng, 2018). It is regarded as an indispensable component in achieving success-related socialization outcomes in organizational context (Saks and Gruman, 2018; Raub et al., 2021). Klein and Weaver (2000) note that, for example, newcomers with orientation experiences assimilate better into the organization than their counterparts without orientation experiences do. A valid orientation training program enables new hires to become familiar quickly with the job's numerous facets, including organizational practices, culture, and task duties, among others (Song and Chathoth, 2010). In turn, the familiarity enables newcomers to quickly adjust to their job positions (Tabvuma et al., 2015). In addition, effective orientation training acts as a "rope" to ease newcomers' transition from "outsider" to "insider" and help them deal with a variety of stressors (Saks and Gruman, 2011). Although previous studies have explored the relationship between training and work engagement, scholars have not yet come to a consistent and clear conclusion. For instance, Shantz et al. (2016) note that work engagement in the sample of health care can be predicted by training, while Almotawa and Shaari (2020) report that the same causality is not statistically significant. This would suggest that effect of orientation training on work engagement could be indirect, but not direct, albeit in SRT model (Saks and Gruman, 2018) socialization resources (e.g., orientation training, Saks and Gruman, 2011) are proposed to have both direct and indirect effects on work engagement. This would suggest that more empirical evidence should be provided to tell how and why orientation training affects work engagement.

According to SRT, organizational job resources often influence work engagement in two ways (Saks and Gruman, 2018). The first is that socialization resources have direct influences on work engagement (Liu et al., 2023). The second is that socialization resources indirectly affect work engagement through PsyCap. According to Luthans and Youssef-Morgan (2017) and Luthans et al. (2007), PsyCap is an individual's positive development state, which could be understood as a cluster/caravan formed by four HERO (Hope, Efficacy, Resilience, and Optimism) resources: (1) perseverance toward goals and, when necessary, making certain adjustments to achieve success (Hope), (2) the confidence to undertake and exert the necessary effort to complete challenging tasks (Efficacy), (3) when plagued by problems and adversity, the ability to stay motivated and even rise above oneself to succeed (Resilience), and (4) positive attributions about present and future success. Prior research demonstrates that people's PsyCap is effective in reducing job stress (Patnaik et al., 2022), and it mediates the relationship between stress and job satisfaction (Xie et al., 2021). In addition, PsyCap mediates the effect of organizational trust on job performance (Zhang et al., 2021). To our knowledge, there has been no documented report on PsyCap's mediating role in the relationship between orientation training and newcomers' work engagement. As per COR theory, organizational and individual resources may cross over in the resource corridor and produce an impact known as the crossover effect (Hobfoll et al., 2018). Therefore, it is likely that PsyCap is influenced by orientation training and further impacts work engagement. It should be noted that PsyCap in our study is considered

1 State of the Global Workplace Report. 2021. Available online: https://www.gallup.com/workplace/349484/state-of-theglobal-workplace.aspx? (accessed on May 6, 2023).

a factor consisting of the forgoing four specific dimensions. This is different from some previous empirical studies (e.g., Prayag et al., 2020) that the first-order four dimensions of PsyCap are investigated only. In other words, our study shifts the focus on PsyCap from the individual resource perspective to the cluster of resource perspective. Our doing is in line with COR theory, and thus it is likely to better capture the true dynamic of newcomers' PsyCap (Vilariño del Castillo and Lopez-zafra, 2022).

Additionally, in response to the lack of existing moderating variables in organizational socialization (Cai et al., 2021), our study explores the moderating effects of leader-member exchange (LMX) and education. LMX represents the quality of the relationship between leaders and subordinates (Graen and Uhl-Bien, 1995) and is also critical in influencing the attitudes and behaviors of both parties (Xu and Li, 2019). Due to the differentiated nature of the leader-subordinate relationship, previous research has shown that LMX can impact employees' work engagement. For example, Ke and Ding (2020) found that LMX moderated the effect of entrepreneurial leaders on work engagement. In addition, LMX can be viewed as a resource caravan passageway and may influence the flow of resources within the gallery. Therefore, newcomers in a high-quality LMX context will more effectively use orientation training as a resource to maintain work engagement. Besides, education refers to the level of education received by an individual. It meets the criteria for categorizing resources under the COR theory, and the information it provides can assist people in acquiring other resources they may need (Hobfoll, 1989). In short, our study is based on COR theory, and it proposes an integrative model of organizational socialization by which PsyCap mediates the relationship between orientation training and work engagement. Meanwhile, some direct effects in our model are likely to be moderated by LMX and newcomers' education levels. Specifically, our research is focused on the following three research questions:

(1) Does orientation training impact newcomers' work engagement through PsyCap?
(2) Does LMX moderate the relationship between orientation training and work engagement?
(3) Does a newcomer's education moderate the relationship between orientation training and PsyCap?

The present study will substantially contribute to the literature in two ways. First, exploring the mediating role of PsyCap in the relationships between orientation training and work engagement enables the present study to tell how and why organizational resources affect newcomers' work engagement. Second, exploring the potential moderation roles of LMX and education enables the present study to understand under what conditions orientation training affects work engagement and PsyCap, respectively.

2. Literature review and research hypothesis

2.1. The COR theory and research framework

Initially, COR theory seeks to provide a new research perspective in understanding "what stress is" (Hobfoll, 1989, 2011). It contends that individuals tend to conserve, protect, and acquire resources, and on this basis, both potential and actual resource losses can cause stress at the individual level (Hobfoll, 1989; Hobfoll et al., 2018). In comparison to veteran employees, newcomers usually have few opportunities to gain resources because of their relatively short tenure in the new organization. Moreover, new employee groups have limited resource reserves, and integration into the new company requires a large amount of personal and organizational resources. More often than not, newcomers are frequently seen to suffer from resource loss and a relative resource imbalance. The resource gain paradox states that in the face of resource loss, timely resource replenishment is more crucial and valuable to individuals (Hobfoll et al., 2018). At this point, replenishing those already low on resources with fresh ones can help them promptly and do more to stop the ongoing loss of resources (Hobfoll et al., 2018). For individuals with scarce resources, the replenishment and supply of resources are helpful for relieving stress and tension.

First, from the perspective of COR (Hobfoll et al., 2018), job resources influence work engagement in a motivating way. A valid orientation program is an important form of job resources, and it enables newcomers to accumulate needful resources following their entry into the employment organization. This initial gain is favorable to developing resource gain spirals (Hobfoll et al., 2018), which means that a person's initial resource accumulation enhances later resource gain (Hobfoll et al., 2018). In other words, employees with more initial individual resources will have an advantage of greater resource gain.

Second, according to the crossover effect of resources (Hobfoll et al., 2018), the impact of orientation training on work engagement is likely to be realized through personal resources (PsyCap). In this respect, SRT theory (Saks and Gruman, 2018) also notes that socialization resources affect personal resources, which in turn have an influence on newcomers' distal socialization outcomes including work engagement organizational commitment, and turnover intention, among others. As a result, this work incorporates newcomers' PsyCap as a particular mediator in the model, which will aid in elucidating the principles governing resource cluster operation.

Last but not least, it is also clear how LMX and education level fit into the job engagement paradigm. The leader-member exchange theory (Graen and Uhl-Bien, 1995) postulates that "in-groups" have a greater quality of leadership member exchange than "out-groups"; and that, as a result, employees may receive more support in the form of psychological or material resources. While low-quality LMX is likely to obstruct the access to the flow of resources and negatively impact engagement, high-quality LMX acts as wide resource caravan routes to facilitate the smooth passage of resource caravans (Hobfoll et al., 2018; Liu et al., 2023). Furthermore, education can be seen as an energy resource that serves to help newcomers acquire more resources (Hobfoll, 1989) and preserve and enhance personal resource pools, so it is likely to be a vital moderator at the individual level.

2.2. Orientation training and PsyCap

According to Luthans et al. (2007), PsyCap is highly malleable and inclusive and, therefore, can be consciously cultivated through certain specific measures. On this basis, orientation training is one of the essential methods for developing PsyCap (Saks and Gruman, 2011). In contrast, from the existing literature, there still needs to be more evidence on the relationship between orientation training and PsyCap.

However, the causal relationship between orientation training and the lower-level components of PsyCap has made some progress. For example, Ashforth et al. (2012) argue that orientation training keeps newcomers optimistic and hopeful by enhancing their job competencies. Moreover, a recent investigation by Huang and Hung (2022) in high-tech companies notes that orientation training provided by organizations has a positive impact on developing employees' motivation and self-efficacy and helps to improve their cognitive level and job performance. This is because newcomers can quickly grow accustomed to the workplace and become competent in their job duties through orientation training. Such positive experiences, in turn, give newcomers courage to face and overcome difficulties in career development. Based on the foregoing, it is reasonable to predict that orientation training is likely to positively impact PsyCap as well. This is because PsyCap is the caravan resource of the four dimensions including self-efficacy, resilience, hope, and optimism (Luthans et al., 2008). Based on the foregoing, the first hypothesis of our study is developed:

> *Hypothesis 1.* Orientation training significantly and positively affects newcomers' PsyCap.

2.3. PsyCap and work engagement

The COR theory states that individuals who possess sufficient resources can better manage stress and have a greater desire for work productivity (Hobfoll, 1989). Individuals will also attempt to nurture resource gain spirals to enhance their resource reserves (Wang et al., 2019). As one's positive psychological resources, PsyCap may provide employees the inner strength and security required to work (Li et al., 2015). For instance, employees with high PsyCap have greater confidence in their talents and abilities (Zhou et al., 2019). They also maintain optimism about the present and the future and are less likely to become trapped in challenging circumstances, demonstrating higher work engagement (Zhou et al., 2019). In addition to the objective benefits that psychological capital brings to employees mentioned above, employees with high PsyCap are more willing to devote themselves to work that brings resource returns to accelerate the resource gain spiral, thus showing high dedication. Therefore, it is reasonable to speculate in our study that the higher the PsyCap of newcomers, the more engaged they will be at work. Accordingly, our study proposes the second hypothesis:

> *Hypothesis 2.* PsyCap has a positive effect on newcomers' work engagement.

2.4. The mediating role of PsyCap

In the literature, PsyCap is often considered as a mediator between resources and outcomes in the organizational context. Ngo et al. (2023), for example, investigate the mediating role of PsyCap in the relationship between employees' development policies and their reported well-being. In the context of organizational socialization, newcomers might use orientation training to foster their PsyCap (noted earlier) on the one hand; and on the other hand, individuals with high PsyCap may invest in resources and show high engagement at work to increase the possibility of obtaining potential future resources (e.g., organizational recognition, income, and job promotions). Jointly, these would suggest the mediating role of PsyCap in the process of developing and maintaining newcomers' work engagement. This concurs with Luthans et al.'s (2007) theoretical notion that PsyCap is often treated as a mediator in the relationships between job resources and outcomes. This also concurs with Saks and Gruman's (2018) argument that socialization resources nourish newcomers' PsyCap and further maintain and develop work engagement. A review of the literature indicates that there has been a lack of empirical evidence on the mediating role of PsyCap in the foregoing relationships. We, therefore, propose the third hypothesis:

> *Hypothesis 3.* PsyCap plays a substantial mediating role between orientation training and work engagement.

2.5. The moderating role of LMX and education

According to COR theory, resources are constantly present in the environment, climate, and leadership that are unique to the organization. These factors can either support and nurture the resources in the "passageway" or obstruct and restrict them (Hobfoll et al., 2018). Among them, LMX is considered a resource caravan passageway (Hobfoll et al., 2018). Specifically, employees who maintain high levels of exchange with their leaders are frequently perceived as "insiders," with interactions characterized by higher levels of support, trust, and respect. In contrast, employees who exhibit low exchange relationships tend to be viewed as "outsiders," and their interactions are only within the formal work context (Ke and Ding, 2020).

Therefore, our study hypothesizes that newcomers with high quality LMX are more likely to access and utilize orientation training resources and thus exhibit higher levels of work engagement than those with low-quality LMX. In a high-quality LMX, leaders provide tangible and intangible job support to their subordinates, making employees feel more trusting and secure (Ke and Ding, 2020). It is crucial for organizations to enable their new associates to feel comfortable with the orientation training, which in turn promotes higher level of work engagement. Besides helping newcomers grasp the training material, high-quality LMX can give the employees more positive feedback on their work. This in turn helps motivate newcomers to exhibit high level of work engagement. In the literature, LMX is usually considered as a moderator. Xu et al. (2022), for instance, document that LMX moderates the relationship between social undermining and employee silence. In socialization literature, there has been a lack of empirical evidence regarding the moderating role of LMX in the relationship between orientation training and work engagement. Based on the foregoing discussion, the fourth hypothesis of this study is therefore developed:

> *Hypothesis 4.* LMX moderates the relationship between orientation training and work engagement in that this relationship is stronger when LMX is high than when it is low.

Education is an indicator of individual competence (Wang and Wang, 2016). In general, employees with higher education degrees typically possess more advanced cognitive, learning, information-seeking, and analytical decision-making skills than those with lower levels of education. For example, education is highly correlated with employees' innovative behavior; and employees with higher education can better facilitate and engage in creative activities in the company (Kong, 2017). In the present study sample, hotel newcomers' education level is likely to moderate the relationship between orientation training and PsyCap, meaning that those with higher education are more likely to make better use of organizational resources (e.g., effective orientation training) to foster their personal resources (e.g., PsyCap). In particular, higher education level frequently denotes more vital personal abilities (e.g., learning, cognition, etc.), which aids in enabling new hotel employees to learn and comprehend the pertinent training materials more quickly, effectively converting the resource advantage into a psychological advantage and having higher PsyCap. In this respect, most early studies (e.g., Kong, 2017) concentrate on the impact of education on corporate performance. In the domain of organizational socialization research, Liu et al. (2023) report that income moderates the relationship between task mastery and work engagement. An argument could be extended to expect that income moderates the relationship between orientation training and work engagement. Cai et al. (2021) and Harris et al. (2022) also call for more empirical investigations on the moderating effect in newcomers' organizational socialization research. Therefore, the fifth hypothesis of this study is developed:

> *Hypothesis 5*. The relationship between orientation training and PsyCap is moderated by newcomer education in that this relationship is stronger when education is high than when it is low.

3. Methodology

3.1. Measurement scales

The questionnaire contains four core constructs (orientation training, PsyCap, LMX, and work engagement) whose measurement items are detailed in Appendix A. The four constructs each are measured by using a well-established Likert scale. Orientation training was measured by using Zheng's (2018) scale ranging from 1 (very poor) to five (very good). Respondents were requested to indicate the levels of training effectiveness on, for example, orientation to organizational culture and history. PsyCap was measured using a 6-point Likert scale (1 = strongly disagree, 6 = strongly agree) developed by Luthans et al. (2007). An example is, "I always feel confident when presenting in front of many colleagues," etc. LMX was measured by Graen and Uhl-Bien (1995) using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), such as "I am clear about whether my leader is satisfied with my performance," etc. Work engagement was measured by Schaufeli et al. (2006) using a 7-point Likert scale (0 = never, 6 = always), such as "I feel motivated at work," etc. Finally, the study collected newcomers' demographic information.

It should be mentioned that we took Greenbaum et al.'s (2018) suggestion by measuring LMX from employees' perspectives for two main reasons. One is that our study focuses on exploring the behaviors and attitudes of a newcomer, and therefore his or her perceptions of LMX are critical. The other is that previous scholars (e.g., Minsky, 2002) measured LMX for leaders and subordinates but they found perceptual differences between leaders and associates. The differences are mainly due to communication problems.

3.2. Data collection and participants

Prior to formal data collection, we conducted a pilot test and collected 20 copies of questionnaires from hotel newcomers. The Cronbach alpha value of each latent constructs in the questionnaires was greater than 0.90. In the main study, respondents must meet the following two preconditions: (a) non-managerial employees from 3- to 5-star hotels and (b) work tenures between 1 to 12 months following entry into the employment organization. We used snowball sampling technique to collect the empirical data. The formal data were collected between December 2021 and April 2022. We adopted the strategy of online data collection by using the "Wenjuanxing" platform[2] for two notable reasons. One is that this platform is widely used in China (Wang et al., 2021). The other is that offline data collection was impossible due to the COVID-19 problem. We motivated respondents' engagement to fill out the questionnaires by using a random bonus package ranging from 1–10 RMB yuan. As a result, 674 questionnaires were returned, among which 77 invalid questionnaires (e.g., responding time being less than 90 s) were removed, and 567 valid questionnaires were retained. The socio-demographic characteristics are presented in Table 1.

3.3. Common method variance/bias

To minimize the effect of common method variance/bias (CMV/B), Podsakoff et al. (2003) suggest the use of different scales for different constructs. Therefore, the points of the Likert scales among the four constructs in the present study differ from each other. Moreover, respondents' anonymity was assured, and their engagement in filling out the questionnaire was motivated (noted earlier). All these strategies are effective and helpful in minimizing the effect of CMV/B. Apart from the foregoing, two more methods were adopted to detect the potential problem.

Specifically, one post-hoc test (i.e., one-factor method) was conducted to detect the CMV/B problem. All the measurement items for the four latent constructs were entered in SPSS 26.0, and principal component factor analysis was analyzed. The principal component factors turned out to be not a single common factor but multiple factors. The first factor explains 18.80% of the total variance, which is far below the threshold level of 50% (Harman, 1976).

The other post-ho test involves the unmeasured latent method construct (ULMC, Richardson et al., 2009) method. In particular, we have built four different models using AMOS 24.0: (a) model A (the trait-only model, $\chi^2/df = 4.155$), (b) model B (the method-only model, $\chi^2/df = 9.853$), (c) model C (the trait/method model, $\chi^2/df =$ $=3.655$), and (d) model D (the trait/method -R model, $\chi^2/df = 3.077$). The results show that the trait-only model (i.e., model A) fits better ($\Delta\chi^2 = 4373.231$, $p = 0.000$) than the method-only model (i.e., model B), suggesting that observed variance in the independent and dependent constructs is not because of method alone. The trait/

2 https://www.wjx.cn

TABLE 1 Demographic characteristic.

Respondents characteristics	Frequency	Percentage (%)
Gender		
Male	197	34.7
Female	370	65.3
Age		
≤ 20	73	12.9
21–25	267	47.1
26–30	101	17.8
31–35	63	11.1
36–40	29	5.1
≥ 41	34	6.0
Education		
High school/junior college and below	183	32.3
University/College or above	384	67.7
Organizational tenures		
1–3 months	158	27.9
4–6 months	137	24.1
7–9 months	109	19.3
10–12 months	163	28.7
Income		
$315 and below	113	19.9
$316–630	302	53.3
$631–945	90	15.9
$946 and above	62	10.9
Position		
General Employees	453	79.8
Foreman / Supervisor 3-star hotel	114	20.1
Hotel Star 4-star hotel 5-star hotel		
3-star hotel	73	12.9
4-star hotel	234	41.3
5-star hotel	260	45.8

method model (i.e., model C) fits better than ($\Delta\chi^2 = 227.700$, $p = 0.000$) the trait-only model (i.e., model A), which shows that trait-based and method variance is presented in the data. Finally, the revised trait/method model (i.e., model D) fit better ($\Delta\chi^2 = 700.438$, $p = 0.000$) than the trait/method model (i.e., model C), providing no substantial evidence of bias because of CMV.

4. Results

4.1. Reliability, validity and model Fit

The data were analyzed using SmartPLS 3.0. This method is suitable for complex models such as the one (with both moderation and mediation) in the present study. In addition, most of the causal paths in the present study are exploratory, and PLS-SEM is, as per Hair et al. (2017), a suitable method. Generally, the reliability and validity of the theoretical constructs have been guaranteed.

First, the factor loading of each construct's specific items was tested, and their values were between 0.732 and 0.864 (see Table 2), higher than the threshold level of 0.7 (Hair et al., 2017). Second, the composite reliability (CR) ranges from 0.936–0.955 (see Table 2), which is greater than the criterion of 0.7, indicating that each latent construct exhibits a high level of internal consistency (Hair et al., 2017).

In terms of convergent validity, Hair et al. (2017) suggest that the AVE value of a construct should be greater than 0.50. The present study's AVE values range from 0.635 to 0.675 (see Table 2), all greater than the foregoing threshold level. With regard to discriminant validity, we used the following two approaches to assess it. The first one concerns the square root of each AVE value. Table 3 indicates that the square root of each AVE value on the diagonal is greater than the correlation coefficients between the two corresponding constructs. This would suggest that all four variables in our study have good discriminant validity according to the criteria suggested by Ab Hamid et al. (2017) and Hair et al. (2017). The second discriminant validity assessment involves, as per Henseler et al. (2015), the HTMT (Heterotrait-Monotrait) Ratio test. In particular, when HTMT value is less than 0.85, the corresponding construct can be considered to have good discriminant validity (Henseler et al., 2015). In the present study, HTMT values in Table 4 show that all the four latent constructs exhibit acceptable level of discriminant validity.

Turning to the model fit, Hair et al. (2017) suggest that the SRMR (Standardized Root Mean Residual) value should be less than 0.08. In the present study, SRMR values in the Saturated and Estimated models are 0.029 and 0.032, respectively. These results suggest that the model fits the data well in the present study. Finally, Hair et al. (2017) suggest that VIF values of measurement items should be less than 5.00. In the present study, VIF values range from 1.889 to 3.700. This would suggest that VIF problem is not an issue in our study.

4.2. Hypothesis testing results

We tested all hypotheses in this study using 567 parent samples with 5,000 complete bootstraps enabled in SmartPLS 3.0. Specifically, we chose bias-corrected complete bootstrapping to test research hypotheses at the significance level of 0.05 (2-tailed). One advantage of this method, as per Hair et al. (2019), lies in its ability in working around the potential estimation bias caused by multivariate nonnormal data. As a result, our hypothesis testing results are less likely to be biased as per Hair et al. (2019) and the results are summarized in Table 5. In particular, H1 concerns the effect of orientation training on PsyCap, and it gains empirical support ($\beta = 0.608$, $p = 0.000$) in this study. H2 involves the effect of PsyCap on newcomers' work engagement, and it has also been supported ($\beta = 0.432$, $p = 0.000$) in the present empirical data. H3 relates to the mediating role of PsyCap, which has proven it to be a substantial ($\beta = 0.257$, $p = 0.000$) mediator between orientation training and work engagement. Moreover, PsyCap's mediating role has been further confirmed by the following situations. As shown in Table 5, when controlling for PsyCap as a mediator, path C was not significant ($\beta = -0.020$, $p = 0.638$); but when

10.3389/fpsyg.2023.1263658

TABLE 2 Assessment results of the overall measurement model.

Constructs	Items	Loadings	*T* Statistics	Cronbachα's α	CR	AVE
Orientation training	OT1	0.770	35.229	0.936	0.945	0.635
	OT2	0.734	30.004			
	OT3	0.732	31.093			
	OT4	0.805	44.284			
	OT5	0.799	39.974			
	OT6	0.832	53.694			
	OT7	0.829	52.529			
	OT8	0.825	47.717			
	OT9	0.767	33.110			
	OT10	0.864	69.789			
PsyCap	PC1	0.788	39.410	0.948	0.955	0.639
	PC2	0.814	50.360			
	PC3	0.794	47.660			
	PC4	0.833	54.552			
	PC5	0.754	34.680			
	PC6	0.837	48.322			
	PC7	0.835	47.762			
	PC8	0.774	37.172			
	PC9	0.783	26.532			
	PC10	0.750	23.030			
	PC11	0.843	60.103			
	PC12	0.775	27.222			
Work engagement	WE1	0.827	44.312	0.945	0.953	0.671
	WE2	0.858	56.503			
	WE3	0.832	46.535			
	WE4	0.788	33.333			
	WE5	0.809	32.541			
	WE6	0.788	38.562			
	WE7	0.855	60.274			
	WE8	0.840	50.051			
	WE9	0.798	32.540			
	WE10	0.791	34.337			
LMX	LMX1	0.799	43.131	0.919	0.936	0.675
	LMX2	0.844	55.527			
	LMX3	0.841	48.224			
	LMX4	0.816	45.303			
	LMX5	0.825	51.814			
	LMX6	0.786	38.913			
	LMX7	0.838	55.998			

(1) 567 parent samples with 5,000 bootstraps. (2) SmartPLS 3.0 software was used to analyze the data. (3) Factor loading values are all statistically significant at 0.001 level. (4) SRMR: Saturate model = 0.029, Estimate model = 0.032. (5) Control variables include age, gender, income, education, and position, among which education is moderator as well. (6)VIF values range from 1.899 to 3.700.

PsyCap is not being controlled in the model with only one antecedent (i.e., orientation training) and one outcome (work engagement), path C′ was, however, significant ($\beta = 0.432$, $p = 0.000$).

H4 and H5 are moderation hypotheses. Specifically, H4 hypothesizes that LMX moderates the relationship between orientation training (independent variable) and work engagement (dependent variable). Results in Table 5 indicate that the interaction variable (i.e., LMX*orientation training) significantly ($\beta = 0.065$, $p = 0.025$) influences work engagement. The moderation plot is shown in Figure 1. A post-hoc group regression analysis was conducted using

TABLE 3 Constructs' correlations and squared root values of AVE.

Constructs	LMX	OT	WE	PsyCap
LMX	**0.822**			
Orientation training(OT)	0.593	**0.797**		
Work engagement(WE)	0.643	0.456	**0.819**	
PsyCap	0.718	0.629	0.682	**0.799**

(1) $N = 567$. (2) Square root values of AVE are shown on the diagonal. (3) Correlation values are below the diagonal and statistically significant at 0.001 level. (4) Values were obtained by using SmartPLS 3.0 software.

TABLE 4 HTMT discriminant validity of the constructs.

Constructs	LMX	OT	WE	PsyCap
LMX	NA			
Orientation training(OT)	0.637	NA		
Work engagement(WE)	0.687	0.480	NA	
PsyCap	0.766	0.662	0.717	NA

HTMT, heterotrait–monotrait Ratio. NA, not applicable. HTMT ratios are below the diagonal.

PLS-SEM3.0, and the results show that in terms of the positive effect of orientation training on engagement, new employees with high LMX have been more affected by engagement ($\beta = 0.236$, $p = 0.000$) than those with low LMX ($\beta = 0.219$, $p = 0.000$). In other words, results reveal that newcomers with high LMX were more effective in using social resources such as organizational orientation training to increase their engagement than their counterparts with low LMX. Jointly, the foregoing results would suggest that H4 gains empirical support in this study.

Likewise, H5 hypothesizes that education plays a moderating role between orientation training (independent variable) and PsyCap (dependent variable). Table 5 shows that the variable (i.e., education*orientation training) significantly ($\beta = 0.096$, $p = 0.027$) affects PsyCap. The moderation plot is shown in Figure 2. Furthermore, a post-hoc group regression analysis was conducted using PLS-SEM3.0. The results show that in terms of the positive effect of orientation training on PsyCap, new employees with education at college and above were more affected by PsyCap ($\beta = 0.674$, $p = 0.000$) than those with education at high school and below ($\beta = 0.560$, $p = 0.000$). In other words, newcomers with higher education (college and above) are more likely to make good use of socialization resources (i.e., orientation training) to maintain and develop their PsyCap levels than their counterpart group of lower education (high school and below). Taken together with the foregoing results, H5 is empirically supported in the present data.

5. Discussion

5.1. Originalities and contributions

In the domain of organizational socialization, the research framework in this study is one of the few studies (e.g., Liu et al., 2023) that are theoretically and jointly built on COR theory and SRT theory. In general, our research framework as well as its study findings helps managers and the academic community understand how, why, and under what conditions orientation training affects newcomers' work engagement. Our empirical findings add to the body of knowledge on organizational socialization and broaden and deepen the explanatory capacity of COR theory and SRT theory on the phenomena of newcomers' organizational integration in several ways.

First, there has been a lack of documented report on the direct and positive effect of orientation training on newcomers' PsyCap; and our study provides the empirical evidence on this research hypothesis (H1). This would suggest that Saks and Gruman's (2018) theoretical notion of this particular causal linkage gains empirical support successfully. This also lends empirical support for the argument of COR: organizational resources have spillover effect on personal resources (Hobfoll et al., 2018). The finding regarding the direct linkage between orientation training and PsyCap is empirically exploratory and thus contributes to the literature substantially. Apart from orientation training, future studies should both empirically investigate more organizational and job resources as listed in Saks and Gruman's (2011) work and examine their impact on newcomers' PsyCap. Future studies are particularly warranted to examine other types of orientations—e.g., Wen et al.'s (2023) cultural orientation—as well as their influences on socialization process and outcomes.

Second, COR theory proposes that resources do not exist individually and separately, but usually present themselves in a cluster (Hobfoll et al., 2018). In line with this proposition, the four newcomers' four HERO resources should be considered and examined as a cluster of PsyCap. However, more often than not, most previous socialization research examines HERO as four independent resources only (e.g., Self-efficacy, Bauer et al., 2007), with a neglect of treating HERO as a cluster of PsyCap with only a few exceptions (e.g., Ngo et al., 2023). The empirical findings regarding PsyCap as well as its relationship with work engagement, have been accordingly very rare. For instance, Karatepe and Karadas (2015) investigate only self-efficacy as well as its effect on work engagement. The present study differs from most previous socialization research. That is, we theoretically consider PsyCap, as per Luthans and Youssef-Morgan (2017), as a theoretical construct which is organically built on its four HERO components. In this study, PsyCap has proven itself to be a theoretical construct with both convergent and discriminant validity. As such, we lend empirical support for both COR (Hobfoll et al., 2018) and PsyCap (Luthans and Youssef-Morgan, 2017) theories in that PsyCap is a resource caravan rather than four independent HERO resources. This drops an important theoretical implication that future research should continue to consider PsyCap as a distinct and legitimate core construct and take a step further to examine more nomological network of PsyCap (e.g., employee development policies, Ngo et al., 2023) for one main reason. That is, SRT theory emphasizes that the four individual HERO resources "operate synergistically, and their overall PsyCap may demonstrate the most vital relationship with socialization outcomes (Saks and Gruman, 2011, p. 6)."

Third, in their SRT model of engagement pathway to organizational socialization, Saks and Gruman (2018) propose that socialization resources (e.g., orientation training) have both direct and indirect effects on work engagement. This proposition has only been partially supported in the present study. Specifically, Table 5 indicates that orientation training predicts work engagement directly without controlling for the mediator of PsyCap ($\beta = 0.432$, $p = 0.000$). After

TABLE 5 Summary of direct and indirect effects.

Path	Coefficients	BC-CIs [2.5%; 97.5%]	*T* Statistics	*p*-values
Direct effects				
OT → PsyCap(H1)	0.608	[0.518; 0.673]	15.877	0.000**
PsyCap → WE(H2)	0.432	[0.337; 0.522]	9.054	0.000**
OT → WE(C)	−0.020	[−0.101; 0.064]	0.471	0.638
OT → WE(C′)	0.432	[0.352; 0.510]	10.725	0.000**
Mediation effects				
OT → PsyCap → WE(H3)	0.263	[0.201; 0.331]	7.886	0.000**
Moderation effects				
OT*LMX → WE(H4)	0.065	[0.011; 0.124]	2.238	0.025*
OT*Education → PsyCap(H5)	0.096	[0.006 0.173]	2.241	0.027*

The 567 samples were Bootstrapped 5,000 times by SmartPLS 3.0, and the test type was a two-tailed test with significance level $p = 0.05$; * indicates $p < 0.05$, ** indicates $p < 0.01$ (two-tailed).

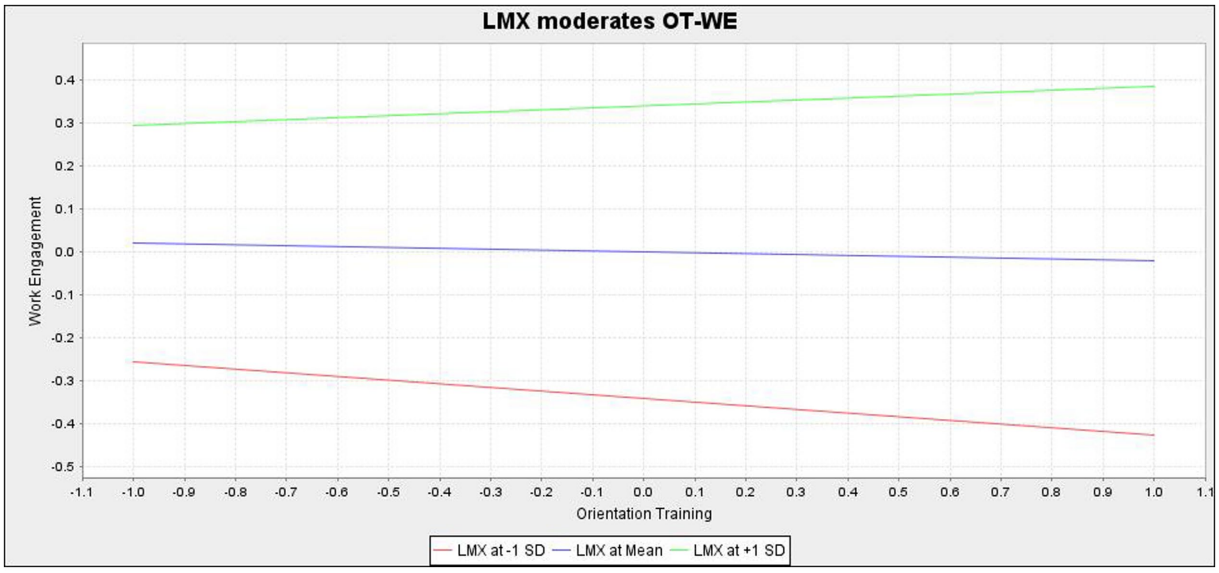

FIGURE 1
LMX moderates the relationship between orientation training and work engagement.

controlling for the mediator, the direct effect of orientation training on work engagement disappears ($\beta = -0.020$, $p = 0.683$). This reveals that PsyCap is a full, rather than partial, mediator in the relationship between orientation training and work engagement. This suggests that SRT model of engagement pathway to socialization (Saks and Gruman, 2018) needs to be refined when socialization resources and personal resources are narrowed down to the specific resources of orientation training and PsyCap. The refinement concerns the foregoing direct versus indirect effect of orientation training on work engagement. It is particularly felt considering that SRT approach to socialization research is a new paradigm, and SRT is still in its infancy (Ashforth et al., 2012; Cai et al., 2021).

Finally, in response to the relative lack of moderating effects in organizational socialization (Cai et al., 2021), we have examined the moderating roles of LMX and educational level in the research framework (Figure 3). In particular, we consider LMX as a resource caravan passageway in the process of organizational socialization, and its quality is likely to regulate the speed of various resource fleets on the "socialization path" and its impact on work engagement. Our empirical result indicates that the effect of orientation training on work engagement is stronger when LMX is high than when it is low. This finding is exploratory and thus significantly contributes to the body of literature. This provides empirical support for one notion of COR (Hobfoll et al., 2018): "LMX is a resource passageway, and it plays an important role in follower engagement" (p. 9).

In terms of the positive effect of orientation training on PsyCap, our empirical result reveals that this effect is stronger when education is high than when it is low. Education is a type of energy resource, as opposed to LMX, which makes up the general environment of resource passageway (Hobfoll et al., 2018). The finding regarding the moderation role of education in the present study is essentially exploratory. Therefore, it is suggested that energy resources, as well as

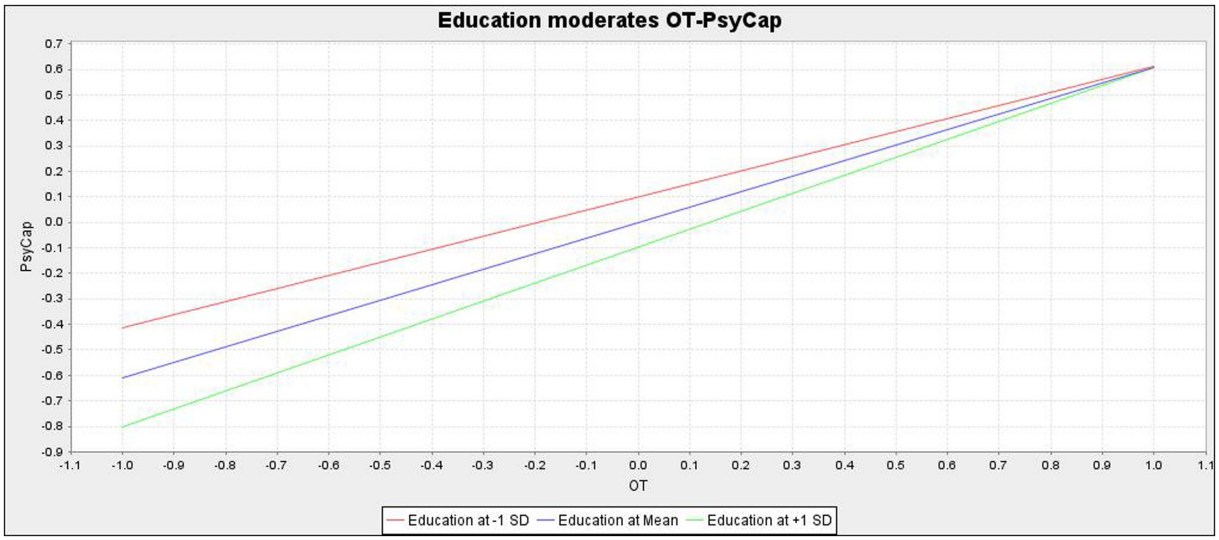

FIGURE 2
Education moderates the relationship between orientation training on PsyCap.

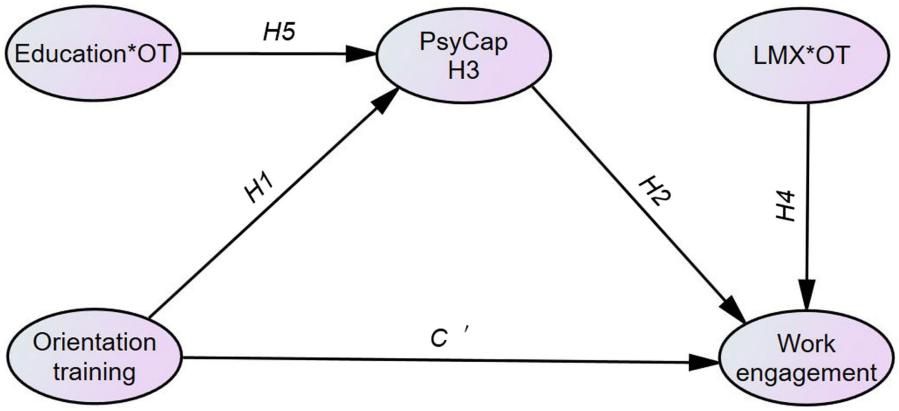

FIGURE 3
Conceptual framework of this study. 1. OT=Orientation training, WE=Work engagement, LMX=Leader-member exchange. 2. Path C concerns the direct effect of OT on WE without controlling for the PsyCap mediators; after controlling for the mediators, path C is accordingly changed into path C'. 3. Control variables include gender, age, position, and income. 4. * indicates that LMX and Education are moderators.

their roles in the socialization process, should be examined and included in future SRT models.

5.2. Practical implications

In the present study, the effect of orientation training on work engagement is fully mediated by PsyCap. In other words, organizational resources (e.g., orientation training) affect personal resources (e.g., PsyCap), which in turn affect work engagement. This would suggest that orientation training must be ensured to be positive and effective. Otherwise, ineffective training leads to lower level of PsyCap, which in turn results in disengagement. As such, orientation training programs should be well designed, implemented, and evaluated from time to time so that both trainers and trainees are well engaged in achieving the effectiveness of orientation training.

In practice, hotel training is oriented, more often than not, to newcomers' skills and abilities but not to their psychological state, such as PsyCap. In the present study, PsyCap has proven itself as a resource caravan and it influences work engagement positively. One practical implication is that following their entry into the organization, newcomers should be tested for their PsyCap levels from time to time. This is due to PsyCap's nature of plasticity, malleability, and openness to change (Luthans and Youssef-Morgan, 2017). In case of new hires with low PsyCap levels, managers should diagnose and intervene in such problems. The major objective of PsyCap development programs would not necessarily be building new knowledge and skills, but intervening and enhancing, for instance, newcomers HERO in that they can do well by means of using existing and potential resources. Special programs like positive experiences, performance feedback, and effective coaching/modeling could be developed and tailored to augment newcomers' PsyCap levels. In short, PsyCap is subject to change, and once higher levels of newcomers' PsyCap have been

developed and maintained, higher levels of work engagement will be accordingly developed.

The present study has examined two moderators including LMX and education. In particular, newcomers with college and above education make better use of training resources than their counterparts with senior middle school and below education to cultivate PsyCap. This leads to the following implication—It is important to recruit employees, particularly the front-line staff, with an education background of college or above. The other moderator is LMX, a resource caravan passageway (Liu et al., 2023). LMX is a way for managers and subordinates to achieve resource flow. High-quality LMX can provide newcomers with various explicit resources (e.g., information bias) and implicit resources (e.g., supervisor support). Low-quality LMX means managers and subordinates are often filled with dissatisfaction, suspicion, and even resistance (Graen and Uhl-Bien, 1995). The results of our study suggest that LMX moderates the relationship between orientation training and newcomer engagement. This finding is exploratory in organizational socialization research domain. But it also echoes Xu et al. (2022) finding regarding the moderating role of LMX. Namely, in organizational context the interactive effect between LMX and social undermining affects employee silence significantly. As such, we extend the literature substantially. In the present study, the relationship between orientation training and PsyCap is specifically stronger when education is high than when it is low. Therefore, it is necessary for organizations to promote resource exchanges between managers and newcomers. The hotel can also set up a comparable prevention and intervention system so that when newcomers report low levels of LMX, hoteliers should diagnose the problem by conducting in-depth interviews, for example, to identify the root causes and quickly implement corresponding remedies.

5.3. Limitations and future studies

Our empirical data are self-reported and cross-sectional, which may lead to common method variance (CMV/B). These data collection methods have their limitations but are reasonable for two main reasons. First, Podsakoff et al. (2003) argue considerably on decreased or increased causal relationships. However, Lance et al. (2010) document that the common method's inflationary bias is mitigated mainly by attenuation from measurement inaccuracy. Bauer et al. (2007) consider cross-sectional data a reasonable alternative strategy to capture the dynamics of newcomers' organizational socialization phenomenon. To address CMV/B issue, we, therefore, conduct post-hoc statistical analysis to diagnose the potential CMV/B problem. As noted earlier (Section 3.3 Common Method Variance/Bias), the statistical results indicate no substantial evidence of bias because of CMV. Furthermore, to lessen method bias, techniques such as ensuring respondent anonymity, as advised by Podsakoff et al. (2003), were utilized at the response reporting stage. Second, all the latent constructs in our overall models are generated from psychological and subjective impressions that are intangible but perceptible. As a result, the self-reporting approach is suitable, as per Song and Chathoth (2011), in that people's true perceptions and intents can typically be reported by no one else but themselves.

Because most of our study findings are exploratory, the generalizability of our study findings is unknown. Given this limitation, it is necessary to verify our study findings in future studies with longitudinal data and in other service industries, national cultures, and geographical areas. Future studies should investigate the roles of more socialization resources (e.g., organizational support) as listed in SRT (Saks and Gruman, 2018) and personal resources (e.g., core self-evaluations) in the development of newcomers' work engagement. Finally, more moderators (e.g., emotional intelligence) should be investigated in future SRT models.

6. Concluding remarks

Built on COR and SRT theories, this study has developed and validated an integrative model of work engagement. The empirical results reveal that PsyCap fully mediates the relationships between orientation training and work engagement. They also show that education and LMX each moderates the effects of orientation training on PsyCap and work engagement, respectively. These findings are empirically exploratory, insightful, and valuable, contributing to the literature substantially. These originalities have particularly felt in consideration of the following two facts: (a) the engagement pathway of SRT to studying newcomer socialization has been a new paradigm and trend, and (b) there has been only a small number of empirical evidence on SRT theoretical propositions. Future work engagement pathway to studying newcomer organizational socialization should include more constructs of socialization resources, personal resource caravan, and resource passageways. Future studies are also warranted to conduct a comparative study in a Western context, other service industries, and other countries/regions. Finally, in terms of why and under what conditions orientation training affects newcomers' work engagement, this research provides, nevertheless, both practical and theoretical contributions for future research scholars to build on.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the [patients/ participants OR patients/participants legal guardian/next of kin] was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

ZS: Formal analysis, Resources, Writing – original draft, Conceptualization, Funding acquisition, Investigation, Methodology, Software, Supervision, Writing – review & editing. HZ: Formal analysis, Resources, Writing – original draft, Data curation, Project administration. JL: Data curation, Resources, Supervision, Validation, Visualization, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1263658/full#supplementary-material

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Resources of emotional resilience and its mediating role in teachers' well-being and intention to leave

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The continuing attention of scholars and practitioners to the teaching profession, teachers and teaching is based above all on the fact that societal progress is impossible without an effective education system. Teachers are the "soft" dynamic, and at the same time, a driving force in this constantly changing system, and research into the prerequisites for their effective performance requires constant attention. In this study, the main phenomenon under analysis is the emotional resilience of teachers–the internal capacity to adapt, manage or cope with emotionally demanding situations. The purpose was to investigate work-related and personal resources that contribute to teachers' emotional resilience and its role in the links between resources, teacher well-being, and the intention to leave. Data were collected using convenience sampling and included 522 teachers working in Lithuanian primary and secondary schools. An online self-administered questionnaire consisted of scales that assessed teachers' job resources, self-efficacy, well-being, and intention to leave. The research revealed that perceived workplace characteristics – performance feedback, autonomy, social support, and opportunities for professional growth–along with self-efficacy were positively related and predicted teacher emotional resilience. Emotional resilience was found to be a direct positive predictor of teacher well-being along with job resources and self-efficacy and have a mediating effect on the relationships between work-related resources and self-efficacy as independent variables and teacher wellbeing as a dependent variable. Contrary to well-being is teachers' intention to leave a school, which is usually an undesirable outcome for an organization. The study revealed that this intention is negatively affected by job resources and self-efficacy, however emotional resilience did not impact teachers' intention to quit. Based on the results, the article outlines avenues for further research and provides implications for strengthening teachers' emotional resilience.

KEYWORDS

teacher, emotional resilience, job resources, self-efficacy, well-being, intention to leave

1 Introduction

Numerous studies report that teaching is emotionally demanding, and that emotional resilience was particularly important during the COVID-19 pandemic, when education systems were confronted with the challenges of distance learning and other pressures necessitating the search for optimum solutions. After the pandemic, the world did not return to the *status quo ante*.

The world of work has changed rapidly and significantly, and constant change has become characteristic of the work of teachers. As with many other professions, teachers have had to adapt to new demands and conditions while striving for high quality teaching. There are also the everyday challenges of pupil behavior, learning difficulties, organizational concerns, or stressful communication situations (Cordingley and Crisp, 2020). In Lithuania recent developments include curriculum renewal in 2023, changes in the composition of the student body, and the full inclusion of pupils with disabilities or linguistic multiplicity to be implemented in 2024. This situation has not only affected teachers' well-being, but also led to a significant number of teachers leaving their jobs, as in many other countries (See et al., 2020; Alves et al., 2021). Limited research reveals that teachers' emotional resilience is one of the factors impacting their well-being and intention to leave, so it is appropriate to examine work and personal factors that enhance emotional resilience, as well as the implications for positive organizational and personal outcomes.

Positive emotions and the ability to maintain emotional balance help people cope with situations of extreme stress (Diener et al., 2020) and effectively manage day-to-day routine teaching processes when deciding what and how to teach (Sheppard and Levy, 2019). Emotional resilience contributes to positive teacher-student relationships (Hagenauer et al., 2015), cooperative classroom environments (Wang et al., 2020), positively impacts teachers' emotional well-being (Näring et al., 2012), and professional lives in general (Chen, 2020). At the organizational level positive emotions can be significant in maintaining a stable staff, enhancing teachers' commitment to the organization, and reducing instances of teachers intending to leave school (Lee et al., 2021). Emotional resilience can therefore be considered a psychological factor that can strengthen teachers' well-being and their relationship with the organization. Another aspect of emotional resilience and its link to well-being and intention to leave is its role as a mediating psychological factor in the relationship between job and personal resources with well-being and intention to leave. To our knowledge, the role of emotional resilience as a mediator in the context of the problem under investigation has not been explored in detail.

We investigated the issue of teacher emotional resilience from several perspectives: firstly, we investigated work related and personal resources as antecedents of teacher emotional resilience, secondly, we examined the relationship between emotional resilience and teacher well-being and intention to leave, and, thirdly, we examined the role of emotional resilience as a mediating variable in the relationship between job and personal resources with teacher well-being, and intention to leave.

2 Theoretical framework and literature review

2.1 Teacher emotional resilience

According to Luthans (2002), resilience is a basic phenomenon in positive psychology and in employee behavior studies. In general resilience could be defined as "the positive psychological capacity to rebound, to 'bounce back' from adversity, uncertainty, conflict, failure or even positive change, progress and increased responsibility" (p. 702). Meta-analyses of resilience research (Britt et al., 2016; Hartmann et al., 2020) provide a wide variety of definitions of resilience, which tend to emphasize three aspects of this phenomenon: as mentioned, the first reflects the capacity of the individual to "bounce back" from a stressful situation (Luthans, 2002), the second is associated with the ability to utilize resources, to adapt to changes and to demonstrate positive behavioral transformation when resolving challenging situations (Luthar et al., 2000), and the third aspect highlights dynamic rather than static personal strength, which can be nurtured and developed (Baker et al., 2021).

In recent years research on teacher resilience has gained increased attention because, as Day (2017) states, "teaching is emotional work and that moral purpose, efficacy and agency are key parts of teachers' positive professional identities, important to their lives, well-being and effectiveness" (p. 44). The phenomenon of teacher resilience has been analyzed extensively (Beltman, 2021), but research on their emotional resilience–the capacity to regain and maintain emotional equilibrium and a positive attitude in difficult emotional situations– has not been fully examined (Day and Hong, 2016).

Employees with high emotional resilience quickly regain their emotional balance in the face of stressful and complex situations at work and in their personal lives, and redirect their cognitive, emotional, and physical energies to cope with difficulties and adapt to change (Lloyd et al., 2016). Murden et al. (2018) define emotional resilience as the ability to successfully adapt to disruptions, to smooth out occupational stress and to "switch" from a state of resistance and coping to a state of growth and development. Grant and Kinman (2014) refer to this phenomenon as the ability to motivate oneself, to control impulses and regulate one's mood.

According to a four-dimensional framework developed by Mansfield et al. (2012) emotional resilience is one of four teacher resilience types along with professional, motivational, and social resilience. This framework is based on the authors' research with graduating pre-service and early career teachers. The emotional dimension of teacher resilience is defined as "emotional responses to teaching experiences, emotional management and coping with stress" (Mansfield et al., 2012, p. 362). It refers to the emotional responses to daily teaching experiences, emotion management and coping with stress; it includes the personal attributes, characteristics and/or strategies teachers employ in front of adversities, such as the ability to manage their emotions, to maintain emotional stability, not take things personally, having a sense of humor (Mansfield et al., 2012), being emotionally intelligent (Chan et al., 2008), enjoying teaching and having a feeling of personal fulfillment (Howard and Johnson, 2004; Mansfield et al., 2012).

It is appropriate to look at this phenomenon from two perspectives. The first relates to individual and organizational outcomes which emotional resilience impacts. Studies of employees in various occupations confirm that emotional resilience can enhance positive outcomes for employees and organizations, including well-being, job satisfaction, work engagement, performance, and retention (Grant and Kinman, 2014; Hartmann et al., 2020). But what is the importance of emotional resilience specifically for teachers, their well-being and their turnover intention?

Another perspective relates to emotional resilience resources. According to Fletcher and Sarkar (2013) it is important to analyze a person's immediate environment, and "to develop the protective and promotive factors that individuals can proactively utilize to build resilience" (p. 18). Gu and Day (2007, 2013) point out that teacher

resilience is a dynamic phenomenon influenced by many personal and environmental factors. Hartmann et al. (2020) also confirm that resilience-promoting factors are important elements of the resilience process. It is therefore pertinent to explore the impact of the work environment and personal characteristics on teachers' emotional resilience.

2.2 Job resources and teacher emotional resilience

The concept of job resources was introduced and elaborated by Bakker and his colleagues (Bakker and Demerouti, 2007; Bakker et al., 2010; Bakker and de Vries, 2021) and refers to the physical, psychological, social, or organizational aspects of the job that help employees achieve work goals and encourage personal growth and development (Hakanen et al., 2008; Collie et al., 2020; Granziera et al., 2021; Chen and Lee, 2022). The Job Demands-Resources Theory (Bakker and Demerouti, 2017) examines the interplay between job demands and available resources that workers can use to fulfill demands and achieve professional goals. Positive employee and organizational outcomes are possible if employees have sufficient job-related (performance feedback, autonomy, social support, opportunities for professional growth) and personal (adaptability, optimism, self-efficacy) resources. Adequate provision of both types of resources strengthens employee work motivation and engagement (Xanthopoulou et al., 2007; Christensen et al., 2020), and can also enhance work-related resilience (Boldrini et al., 2019; Chen and Lee, 2022). However, the implications of these factors specifically for teacher emotional resilience have not been sufficiently investigated (Day and Hong, 2016).

Xanthopoulou et al. (2007), building on Hobfoll's (1989) Conservation of Resources Theory, were among the first to incorporate personal resources into the Job Demands-Resources model. Personal resources build a person's motivational potential, enhance work engagement and help to achieve positive outcomes for the individual and organization. One of the personal resources is self-efficacy. The construct's author Bandura (1977, 2012) defined self-efficacy as people's beliefs in their capabilities to produce given attainments (2012), "a generative capability in which cognitive, social, emotional, and behavioral subskills must be organized and effectively orchestrated" (1997, p. 37) in various contexts. Pahwa and Khan (2022) state that "Self-efficacy means that a person has confidence in his abilities to perform a task in a particular situation" (p. 221) and describe it as a key personal antecedents of emotional resilience in adults along with purposefulness and meaning, self-awareness, problem solving, learning attitude and other personal factors.

Both self-efficacy and resilience are important for personal adaptation, and both are related yet autonomous constructs. The former is more rational, conditioned by past experiences, while the latter expresses emotional readiness to withstand present difficulties. The differences between these phenomena can be seen from two perspectives: the situations in which they occur and their role in regulating behavior. Tait (2008) emphasizes that the difference between resilience and self-efficacy is that resilient individuals are able to respond and manage stressful situations, whereas efficacious individuals are proactive in a variety of circumstances. Resilience refers to the inner capacity to adapt and maintain emotional equilibrium, while personal efficacy beliefs have strong motivational potential, encouraging people to show initiative, to engage in new activities, and to pursue more complex goals. As Schwarzer and Warner (2012), resilience is involved in regulating behavior when a person is exposed to stressors or adverse circumstances, while self-efficacy operates in a wide range of circumstances, even when a person is not experiencing challenges or trauma. Beliefs about personal efficacy, together with other intrinsic and extrinsic motivators of behavior help to answer the question of whether a person will engage in an activity, while emotional resilience determines how, with what emotional reactions a person will cope with challenging situations, and to what extent they will be able to maintain emotional equilibrium and move on to finding rational solutions.

Numerous studies have found that self-efficacy served as a predictor for teacher resilience (Ee and Chang, 2010; Raath et al., 2016; Ngui and Lay, 2020; Yada et al., 2021), However, to our knowledge, only a handful of studies have explored links specifically to their emotional resilience. One of these is a study by Daniilidou et al. (2020) in which the authors applied the Multidimensional Teacher Resilience Scale (Mansfield and Wosnitza, 2015) in a survey of 636 Greek primary school teachers and revealed that teacher self-efficacy predicted their emotional resilience. Significant positive relations between teacher self-efficacy and emotional resilience were found in yet another study conducted with pre-service teachers from Germany, Ireland, Malta, and Portugal (Peixoto et al., 2018).

In our study we followed the Job Demands-Resources approach (Bakker and Demerouti, 2017) and analyzed feedback, autonomy, social support, and opportunities for development as a set of workplace-related resources, and self-efficacy as a potential personal resource for teachers' emotional resilience.

2.3 Emotional resilience and well-being

Research on teacher well-being is well established, yet it remains relevant and researcher attention to teacher well-being has not decreased. From a psychological point of view, well-being is not a stable, unchanging phenomenon. It is a generalized, positive internal state that can shift with changes in the person or external conditions (Yin et al., 2016). Due to fundamental changes in the teaching process and in working conditions, teacher well-being received considerable research attention during the COVID-19 pandemic and the post-pandemic period (Sacré et al., 2023). There was a need to understand and accept changes in teachers' work and to adapt to the changed circumstances. This included examination of "disrupted" former rhythms, requirements to develop new skills (e.g., the use of information technologies; Sá et al., 2021) which impacted a teacher's sense of themselves, their mental health, and more broadly–their well-being (Gutentag and Asterhan, 2022). A systematic review of studies on teacher well-being revealed that it can have a positive effect on teachers' performance results, job satisfaction, teaching behavior, relationships with colleagues and students (Dreer, 2023), and can decrease teacher stress and burnout (Burić et al., 2019). Well-being can even be identified as one of the key indicators or criteria for assessing the effectiveness of changes in schools and in the work of teachers.

Work-related well-being is often referred to with various synonyms: workforce well-being, workplace well-being, occupational well-being, employee well-being. It can also be examined in the

context of a specific professional domain, such as teacher well-being. Van Horn et al. (2004) were among the first to create a model of occupational well-being which refers to an individual's "positive evaluation of various aspects of one's job, including affective, motivational, behavioral, cognitive and psychosomatic dimensions" (p. 366). Viac and Fraser (2020) presented a basic definition of teacher well-being, that includes "teachers' responses to the cognitive, emotional, health and social conditions pertaining to their work and their profession" (p. 18). Granziera et al. (2023) conceptualized well-being as "teachers' evaluations of and functioning in their work environment" (p. 280). In summary, it can be said that teacher well-being is based on and reflects healthy functioning and effective work performance. From a wider perspective, workplace well-being is inextricably linked to employees' psychological well-being and, more broadly, life well-being. In our study, we applied the approach to well-being developed by Zheng et al. (2015). The authors provided theoretical and empirical support for the employee well-being model, which combines workplace, psychological and life well-being types, and developed an empirically validated multidimensional well-being assessment instrument.

A considerable amount of research data has been accumulated on the multifaceted interrelationships between teacher resilience and well-being. Hascher et al. (2021) recently reviewed 46 publications from 2010 to 2020 and identified four strands of research describing the links between teacher resilience and well-being. The first strand includes publications that analyze resilience and well-being as similar constructs; the second analyses these constructs as a component of each other, with resilience subsumed into well-being or vice versa; the third strand analyses well-being as a predictor of teacher resilience; and the fourth highlights the role of resilience in the development of teacher well-being. For example, Burić et al. (2019) found that teacher resilience predicts lower levels of negative emotions, burnout and psychopathological symptoms and summarized that resilience acts as a protective factor for their well-being. On the other hand, it is important to underline that there is not enough research examining the links between teacher emotional resilience and well-being. Studies confirm that job resources help employees to maintain work engagement, motivation and stimulate teacher well-being (Skaalvik and Skaalvik, 2018; Benevene et al., 2020; Han et al., 2020; Granziera et al., 2023). These links can be more complex than the direct links between well-being and the work and personal aspects that strengthen it. One of the few available studies is one by Chen and Lee (2022), which was conducted with a sample of 407 teachers from Hong Kong, SAR and mainland China. It was found that teacher emotional resilience affected well-being directly and indirectly as a mediator in the relationships between school support and well-being.

2.4 Emotional resilience and intention to leave

Teachers tend to change schools or even leave the profession because of unappealing working conditions, insufficient funding, heavy workloads, lack of autonomy at work, and little support from management (Mansfield et al., 2016; Cordingley and Crisp, 2020; Howson, 2020; See et al., 2020; Worth and Van den Brande, 2020; Sabina et al., 2023). The first 5 years of teaching are particularly challenging for early-career teachers and, according to Gallant and Riley (2014), in many countries 40–50% of teachers leave the profession within that time. Therefore, research on individuals' intention to leave and organizational strategies to increase teacher retention have become important tasks of the education system and of each educational institution.

The worldwide teacher shortage has encouraged researchers to examine what causes teachers to stay or leave (Kurtz and Maurice, 2018; Li and Yao, 2022; Tikkanen et al., 2022). In Lithuania, as in other countries, the COVID-19 pandemic and the turbulent geopolitical situation have led to an increase in the number of teachers leaving their jobs and a shortage of teachers in particular subject areas.

There are two subcategories of research in this field. Some focus on a teacher's intention to leave the profession. We found this to be too broad an interpretation of intention to leave because the reasons for leaving the profession can be related to the person's attitude to the profession and not to a specific school. Studies on teachers' intentions to leave a school situation are more in line with current thinking that individual workplaces and organizations create specific conditions that enhance or restrain teacher resilience (Ungar et al., 2013; Wang et al., 2022). A teacher may find conditions in one school to be unacceptable, but moving to a new workplace may alleviate the reasons for leaving the profession. Recent research has also looked at a phenomenon called *teacher churn* when teachers change grade levels, subject areas, or schools (Dhaliwal et al., 2023) to find a better "fit." While this may be an apt partitioning of intention to leave for a future study, we focus on the primary workplace with which our study participants identified themselves. Vekeman et al. (2017) compare the two types of intention to leave studies, focusing on person-organization (P-O) fit. Their analysis revealed that P-O fit is directly related to the intention to move to another school, but there was no direct relation between P-O fit and intention to leave the profession.

Studies show that intention to leave is negatively predicted by perceived organizational support and continuance commitment (Esop and Timms, 2019), which is based on costs related with leaving the organization (Hackett et al., 1994); work engagement (da Silva et al., 2021; Tvedt et al., 2021), job satisfaction (Räsänen et al., 2020). Other studies point to meaningful work, and valuation of teacher dignity, which diminish turnover intentions (Janik and Rothmann, 2015; Heleno et al., 2018).

Intention to leave studies are related to much more exhaustive research on teacher burnout, in which emotional exhaustion and the loss of emotional resources are exhibited (de Vera et al., 2019; Annamalai, 2022). Madigan and Kim (2021) conducted a meta-analysis of the effects of teacher burnout and job satisfaction on intentions to quit and concluded, that both phenomena are related with turnover intention, however, the negative effect of burnout on intention to leave is stronger compared to job satisfaction.

A broader meta-analysis of teachers' intention to leave assumptions was provided by Li and Yao (2022), who examined 94 studies over the last 30 years. The authors found that teachers' commitment, job satisfaction, work engagement, intrinsic motivation, and burnout were the strongest predictors of turnover intention. While all of the mentioned research foci are tangentially related to our research, we are looking for a more direct link between teacher emotional resilience and intention to leave. De Neve and Devos (2017) investigated how numerous factors, one of which was affective commitment, influence turnover intentions. Their path analysis revealed that teacher self-efficacy and affective commitment to a

school directly reduced 272 Flemish teachers' intention to leave the job. This is in line with the work of Meyer et al. (2002), who named three forms of organizational commitment, noting that affective commitment had the strongest negative correlation to intention to leave. Arnup and Bowles (2016) surveyed 160 Australian teachers with less than 10 years of experience and found that lower job satisfaction and a lower level of general resilience predicted intention to leave the teaching profession.

Our review of research reveals that teacher resilience, along with job and personal resources, can strengthen their well-being, relationships with school, and reduce turnover intentions. Unsatisfactory working conditions, high demands, limited opportunities to achieve professional goals, create a context that negatively affects the meaningfulness of teaching. If a person lacks emotional resilience, the internal capacity to adapt, manage or cope with emotionally demanding situations, this can be an obstacle to achieving goals, and can lead to feelings of dissatisfaction or mistrust. This confirms the need for research on teachers' emotional resilience and the resources that strengthen it.

3 The current study

In this study we aimed to analyze the relationships between teachers' emotional resilience, job and personal resources, well-being and intention to leave school. More specifically, resources were studied as antecedents to emotional resilience. Furthermore, emotional resilience was analyzed as a potential antecedent to teachers' well-being and intention to leave, and also as an intervening variable (mediator) in the relationships between job and personal resources and two outcomes–well-being and intention to leave school.

Research objectives:

1. To examine job resources and self-efficacy as predictors of teacher emotional resilience.
2. To analyze job resources, teacher self-efficacy and emotional resilience as predictors of teacher well-being and intention to leave.
3. To investigate the mediating effect of teacher emotional resilience on the relationship between work-related resources and self-efficacy as independent variables and teacher well-being as a dependent variable.
4. To investigate the mediating effect of teacher emotional resilience on the relationship between work-related resources and self-efficacy as independent variables and intention to leave as a dependent variable.

4 Materials and methods

4.1 Data collection procedure and participants

Data were collected using convenience sampling and included 522 teachers working in Lithuanian primary and secondary schools located in cities, towns and villages of Lithuania. The main criteria for inclusion in the sample was a degree or certification in education and at least 1 year of experience in a teaching position. 91.6% of the sample were women, 5.4% were men, 3.1% did not indicate gender. The average age was 50.5 years (from 20 to 73 years, SD = 9.6), the average number of years of teaching experience was 26.4 years (SD = 10.8). 99.6% of the participants indicated that they have a higher education degree and 80.4% said that they work in schools located in cities.

An online self-administered questionnaire was used to collect data. The questionnaire was not publicly available–only teachers who received information about the study and an invitation to respond could participate. Information and the invitation were distributed by direct professional contacts via e-mails and social networks. We also asked school principals to disseminate information directly to school personnel. In the cover letter we presented the purpose of the study and provided instructions for completing the questionnaire. Participants were informed that the study was conducted in accordance with research ethics requirements, that participants' responses were analyzed in aggregate for scientific purposes only, and that confidentiality of responses was guaranteed. We indicated that participation in the study is voluntary and that respondents could withdraw from the study at any time. Since none of the participants withdrew, the responses of all teachers in the sample were included in the final data set.

4.2 Research instruments

The questionnaire consisted of demographic questions on respondents' age, gender, education, years of teaching experience, school location, and assessment scales for research variables.

Emotional resilience was measured using the Emotional Resilience scale from the Teacher Resilience Questionnaire, Version 1.5 (Mansfield and Wosnitza, 2015). The scale consists of four items, for example, "When I feel upset or angry at school, I can manage to stay calm." Responses are scored on a five-point Likert scale, with 1 representing "Strongly disagree" and 5 – "Strongly agree."

Job resources were measured using a composite indicator, consisting of four types of work-related resources (autonomy, feedback, social support, and opportunities for development) taken from the Job Demands–Resources Questionnaire (Bakker, 2014). Autonomy was measured using three items ("Can you participate in decision-making regarding your work?"). Feedback was assessed using three items ("My job offers me opportunities to find out how well I do my work."). Social support was measured using three items ("If necessary, can you ask your colleagues for help?") and opportunities for development were assessed using three items ("In my work, I have the opportunity to develop my strong points."). Answers for autonomy, feedback and social support scales ranged from 1 point – "never" to 5 – "very often," and for opportunities for development from 1 point – "strongly disagree" to 5 – "strongly agree." We calculated the scores for every job resource scale, and the construct validity of the modeled composite job resources measure was evaluated by applying Principal component factoring with Varimax rotation when indicators of four job resource types were included as separate variables. One factor was obtained to explain 57.33% of data

variance (KMO = 0,773; Bartlett's Test of Sphericity Chi-Square = 452,477, $p < 0{,}001$).

Self–efficacy was assessed using the short version of the Occupational Self-Efficacy Scale (Schyns and Von Collani, 2002; Rigotti et al., 2008). A variety of self-efficacy scales related to specific activities and tasks have been used in research, and for this study we chose a scale related to the occupational domain. The scale consists of six items ("When I am confronted with a problem in my job, I can usually find several solutions."). Responses were indicated on a five-point Likert scale ranging from 1 point – "strongly disagree" to 5 points – "strongly agree."

Well-being was measured by applying the Employee Well-Being scale (Zheng et al., 2015) consisting of 18 items. The statements in the scale cover three areas of employee well-being–workplace well-being ("Work is a meaningful experience for me."), psychological well-being ("I feel I have grown as a person."), and life well-being ("I am close to my dream in most aspects of my life."). Answers ranged from 1 point – "strongly disagree" to 5 points – "strongly agree."

Intention to leave the school was measured using the Chiu and Francesco (2003) three-item scale ("In the last few months, I have seriously thought about looking for a new job."). The respondents indicated their responses on a five-point Likert scale ranging from 1 point – "strongly disagree" to 5 points –"strongly agree."

The questionnaire was administered in Lithuanian, translation of the items from English to Lithuanian was prepared by professional translators. The Lithuanian version of the Occupational Efficacy Scale was taken from a study presented by Žukauskaitė et al. (2019).

4.3 Statistical analyses

Data were analyzed using the IBM SPSS 27: descriptive statistics and reliability of the study measures were estimated; multiple regression models were tested to reveal the effect of job resources and self-efficacy in predicting teachers' emotional resilience and to analyze predictors of two dependent variables–teacher well-being and intention to leave school. The PROCESS Macro tool – Model 4 (Hayes, 2013) was applied to test four mediation models with job resources and self-efficacy as independent variables, emotional resilience as a mediator, and both well-being, and intention to leave as dependent variables. 95% confidence intervals were estimated by using the bootstrapping technique with 5,000 bootstrap samples. The indirect effect through the mediating variable was confirmed if the effect's 95% confidence interval did not include 0.

5 Results

Presentation of the research results corresponds to the stated objectives. Descriptive statistics of the study variables are presented in Table 1, followed by the results of three multiple regression models which tested: firstly, the influence of job resources and self-efficacy on teacher emotional resilience as a dependent variable; secondly, the role of both resources and emotional resilience in predicting teacher well-being and intention to leave as dependent variables (Table 2). Finally, aligned with the third and fourth study objectives, the results of four mediation models are presented that highlight the mediating role of emotional resilience in the links between work-related and personal resources (independent variables) and teacher well-being and intention to leave (Table 3) as dependent variables.

The results revealed that the intercorrelations between the study variables are statistically significant: positive correlations were received for the relationships among emotional resilience, self-efficacy and well-being, and negative correlations for the relationships of all three variables with intention to leave. Emotional resilience most strongly correlated with self-efficacy and well-being ($r = 0.503$, $p < 0.001$ and $r = 0.490$, $p < 0.001$, respectively). Job resources had the strongest negative correlation with intention to leave ($r = -0.452$, $p < 0.001$).

The associations of emotional resilience, work resources, self-efficacy, well-being, and intention to leave with the demographic characteristics of the sample were tested using correlation analysis for age and teaching experience; the Student's t-test was used for the comparison of means between gender groups, and the ANOVA test for groups of respondents divided according to education level and school location. Age and years of teaching experience were found to correlate only with job resources ($r = 0.095$, $p < 0.05$ for age; $r = 0.130$, $p < 0.01$ for teaching experience) and intention to leave ($r = -0.115$, $p < 0.05$ for age; $r = -0.100$, $p < 0.05$ for teaching experience). The means of groups divided by gender, education and school location fluctuate around the mean value obtained for the whole sample, the differences are marginal and statistically non-significant. In view of these results, demographics were not included in further analysis of the data.

To examine job resources and self-efficacy as predictors of teacher emotional resilience we tested a multiple regression model, in which job resources and self-efficacy were included as independent variables and emotional resilience as a dependent variable. The results are presented in Table 2. In the other two regression models well-being and intention to leave were included as dependent variables, and job resources, self-efficacy, emotional resilience as independent factors. Results are presented in Table 2.

TABLE 1 Means, standard deviations, intercorrelations between variables and scales' reliability indicators ($n = 522$).

	Variables	1	2	3	4	5
1	Emotional resilience	(0.733)				
2	Job resources	0.449**	(0.747)			
3	Self-efficacy	0.503**	0.517**	(0.861)		
4	Well-being	0.490**	0.555**	0.661**	(0.913)	
5	Intention to leave	−0.231**	−0.452**	−0.247**	−0.356**	(0.882)
M		3,429	3,976	3,873	3,980	2,094
SD		0.654	0.562	0.499	0.476	0.968

**$p < 0.001$. M, mean; SD, standard deviation; Cronbach's alpha coefficients are presented in the diagonal.

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TABLE 2 Multiple regression models testing predictors of teacher emotional resilience, well-being and intention to leave.

Independent variables	Dependent variables											
	Emotional resilience Model 1				Well-being Model 2				Intention to leave Model 3			
	β	*t*	*p*	VIF	β	*t*	*p*	VIF	β	*t*	*p*	VIF
Job resources	0.258	6.023	0.000	1.365	0.252	6.815	0.000	1.561	−0.434	−9.171	0.000	1.461
Self-efficacy	0.370	8.625	0.000	1.365	0.457	11.946	0.000	1.461	−0.005	−0.112	0.911	1.561
Emotional resilience					0.147	4.016	0.000	1.432	−0.033	−0.714	0.476	1.432
	$R^2 = 0.302$ *Adj* $R^2 = 0.299$; F (2,521) = 112.232, $p = 0.000$				$R^2 = 0.514$ *Adj* $R^2 = 0.512$; F (3,521) = 182.889, $p = 0.000$				$R^2 = 0.205$ *Adj* $R^2 = 0.201$; F (3,521) = 44.613, $p = 0.000$			

TR, teacher resilience; VIF coefficients for all independent variables in every model did not exceed statistical level of 2.0.

TABLE 3 Mediation analysis results for dependent variables – well-being and intention to leave.

Part 1. Job resources, emotional resilience and well-being						Part 2. Job resources, emotional resilience and intention to leave					
Independent variables/ Effects	*b*	*SE*	*p*	*95% CI*		Independent variables/ Effects	*b*	*SE*	*p*	*95% CI*	
				LLCI	*ULCI*					*LLCI*	*ULCI*
JR → WB	0.354	0.033	< 0.001	0.290	0.418	JR → ITL	−0.751	0.075	< 0.001	−0.899	−0.603
JR → ER	0.523	0.046	< 0.001	0.433	0.612	JR → ER	0.523	0.046	< 0.001	0.433	0.612
$R^2 = 0.202$, $F(1,520) = 131.508$, $p < 0.001$						$R^2 = 0.202$, $F(1,520) = 131.508$, $p < 0.001$					
JR → ER → WB	0.220	0.028	< 0.001	0.164	0.275	JR → ER → ITL	−0.052	0.065	0.420	−0.180	0.075
$R^2 = 0.381$, $F(2,519) = 159.442$, $p < 0.001$						$R^2 = 0.205$, $F(2,519) = 67.041$, $p < 0.001$					
Total effect	0.469	0.031	< 0.001	0.408	0.529	Total effect	−0.778	0.067	< 0.001	−0.910	−0.646
$R^2 = 0.308$, $F(1,520) = 231.117$, $p < 0.001$						$R^2 = 0.204$, $F(1,520) = 133.520$, $p < 0.001$					
Direct effect	0.354	0.033	< 0.001	0.290	0.418	Direct effect	−0.751	0.075	< 0.001	−0.899	−0.603
Indirect*effect	0.115	0.018		0.081	0.153	Indirect*effect	−0.027	0.036		−0.101	0.044
Part 3. Self-efficacy, emotional resilience and well-being						Part 4. Self-efficacy, emotional resilience and intention to leave					
SE → WB	0.529	0.035	< 0.001	0.460	0.598	SE → ITL	−0.339	0.095	< 0.001	−0.525	−0.153
SE → ER	0.659	0.049	< 0.001	0.562	0.757	SE → ER	0.659	0.049	< 0.001	0.562	0.757
$R^2 = 0.253$, $F(1,520) = 176.231$, $p < 0.001$						$R^2 = 0.253$, $F(1,520) = 176.231$, $p < 0.001$					
SE → ER → WB	0.153	0.027	< 0.001	0.101	0.206	SE → ER → ITL	−0.212	0.072	0.004	−0.354	−0.070
$R^2 = 0.471$, $F(2,519) = 230.889$, $p < 0.001$						$R^2 = 0.076$, $F(2,519) = 21.435$, $p < 0.001$					
Total effect	0.630	0.031	< 0.001	0.568	0.691	Total effect	−0.479	0.082	< 0.001	−0.640	−0.317
$R^2 = 0.438$, $F(1,520) = 404.560$, $p < 0.001$						$R^2 = 0.061$, $F(1,520) = 33.751$, $p < 0.001$					
Direct effect	0.529	0.035	< 0.001	0.460	0.598	Direct effect	−0.339	0.095	< 0.001	−0.525	−0.153
Indirect*effect	0.101	0.020		0.065	0.143	Indirect*effect	−0.140	0.050		−0.250	−0.048

*Based on 5,000 bootstrap samples; JR, job resources; WB, Well-being; ER, emotional resilience; ITL, intention to leave; SE, self-efficacy; b, unstandardized regression coefficients; SE, standard errors; CI, confidence interval for b.

Thus, job resources and a personal resource–self-efficacy positively predicted teacher emotional resilience. As shown in Model 1, two predictors explained 30.2% of the variance of the dependent variable, standardized beta coefficients were positive and significant both for job resources and self-efficacy ($\beta = 0.258$, $p < 0.001$ and $\beta = 0.370$, $p < 0.001$, respectively). Emotional resilience as a third independent variable was added in Models 2 and 3 to test predictors of well-being and intention to leave. The results revealed that Model 2 explains 51.4% of the well-being variance, all three predictors were significant, however, their effects were different. Self-efficacy was the strongest predictor of well-being, followed by job resources and emotional resilience ($\beta = 0.457$, $p < 0.001$, $\beta = 0.252$, $p < 0.001$ and $\beta = 0.147$, $p < 0.001$, respectively). The independent variables explained 20.5% of the intention to leave variance (Model 3), however, only job resources were a significant predictor, while self-efficacy and emotional resilience showed nonsignificant results.

Through the third and fourth objectives of the study, we sought to determine whether emotional resilience acts as an intermediate variable (mediator) in the links of work-related resources and self-efficacy with teacher well-being and intention to leave. Four mediation models were calculated using the Hayes (2013) Process Macro tool v. 4.0, Model 4. The independent variables are job resources and self-efficacy, the dependent variables are well-being and intention to leave, and emotional resilience is introduced as a mediating variable. The results are presented in Table 3.

In this part of the analysis, we explored the role of emotional resilience as a mediating variable for job resources and self-efficacy in predicting teacher well-being and intention to leave the school. The results show the significant indirect effect of emotional resilience on the positive relationships between job resources and well-being (Table 3, Part 1) and for self-efficacy and well-being (Table 3, Part 3). Job resources together with emotional resilience predicted 30.8% of well-being variation. Both direct and indirect effects of job resources were significant ($b = 0.354$, $p < 0.001$ and $b = 0.115$, *CI* [0.081; 0.153], respectively). We obtained similar results when the independent variable was self-efficacy. The total effect of the positive impact of self-efficacy together with emotional resilience on well-being was high ($b = 0.630$, $p < 0.001$) and both variables explained up to 43.8% of well-being variation. As in the case when the independent variable was job resources, the direct and indirect effects of self-efficacy on well-being were significant ($b = 0.529$, $p < 0.001$ and $b = 0.101$ *CI* [0.065; 0.143], respectively). To conclude, teacher emotional resilience mediated the positive relationships between job resources and teacher well-being and also between self-efficacy and well-being. Job resources and self-efficacy strengthen teacher well-being not only directly, but also via emotional resilience as a mediating variable.

The results of the indirect effect of emotional resilience on the relations between job resources and intention to leave (Table 3, Part 2) revealed that job resources negatively impact the intention to leave the school directly, whereas the mediating effect of emotional resilience in this relationship was insignificant ($b = -0.751$, $p < 0.001$ and $b = -0.027$, *CI* [−0.101; 0.044], respectively). Meanwhile the mediating effect of emotional resilience for the relations between self-efficacy and intention to leave were confirmed: the negative direct impact of self-efficacy on the intention to leave school is complemented by the indirect negative effect of emotional resilience ($b = -0.339$, $p < 0.001$ and $b = -0.140$, *CI* [−0.250; −0.048], respectively). Self-efficacy reduces the level of teachers' intention to leave directly and via emotional resilience as the mediating factor in this relationship.

6 Discussion

Job resources and self-efficacy were shown to be significant predictors for teachers' emotional resilience, as teachers who assigned higher values to these factors had higher emotional resilience scores. This means that job resources – which in our study combine autonomy, performance feedback, social support and opportunities for development – along with occupational self-efficacy can be identified as emotional resilience resources. Such confirmation, in our opinion, is important both empirically and practically. Seeing the regulatory role of labor resources and personal self-efficacy, we have confirmed their dynamic capacity to nurture emotional resilience. The latter, in its essence and content, is the central personal force that guarantees a teacher's ability to withstand challenges, to guard against burnout (Tait, 2008; Evans-Palmer, 2010; Mansfield et al., 2012; Gu and Day, 2013). This is important in everyday practice as demanding context prevails in teachers' work. Beutel et al. (2019) called teaching a "take home" job, since the intense workload is felt by teachers not only during the working day, but also during their free time.

The added value of our research was to confirm prognostic links of both external and internal resources to emotional resilience. This filled a gap in the research field. The concurrent connections between teachers' self-efficacy, resilience, and an active personal stance toward the teachers' job were underexplored. To date, most of the accumulated evidence has been on the isolated impact of inadequate job resources alone on teacher burnout (Hakanen et al., 2006; Manuti et al., 2022), when other soft power resources, such as self-efficacy were excluded. Similarly, when examining the relationship of the latter construct with resilience decoupled from job resources, it was found that self-efficacy served as a predictor for teacher resilience (Raath et al., 2016; Ngui and Lay, 2020; Yada et al., 2021). Self-efficacy and resilience were found to be collaterally important for teachers' behavior (Wilcox and Lawson, 2017) or for teacher burnout (Fathi and Saeedian, 2020). Studies in the last decade have highlighted other possible relationships, for example it was found that resilience was a predictor of early teachers' self-efficacy (Johnson et al., 2014; Gratacos et al., 2021). Most studies on self-efficacy as a predictor of resilience focused on a sample different from ours, e.g., Lightsey (2006) looked at the youth population. Finally, educational research has not answered questions about in-service teachers' self-efficacy as a prerequisite for resilience, although a number of studies have confirmed these links. Ee and Chang (2010) found that self-efficacy is an antecedent of resilience in a study of pre-service teachers. Ngui and Lay (2020) also studied pre-service teachers. We have complemented the research on the relationship between job and personal resources and individual and organizational outcomes by revealing how they operate in specific teaching contexts, a point made by Sokal et al. (2020).

We examined the implications of teachers' emotional resilience for their well-being from two perspectives: firstly, we evaluated the potential of emotional resilience for the prediction of well-being along with job resources and self-efficacy, and secondly, we examined the importance of emotional resilience as an intermediate variable (mediator) in the links of job and personal resources and well-being. Emotional resilience was found to be a direct positive predictor of teacher well-being; however, its impact is lower ($\beta = 0.147$, $p < 0.001$) compared to job resources and self-efficacy ($\beta = 0.457$, $p < 0.001$ and $\beta = 0.252$, $p < 0.001$, respectively). Testing the mediating effect of teacher emotional resilience on the relationships between work-related resources and self-efficacy as independent variables and teacher wellbeing as a dependent variable revealed that emotional resilience acts as a partial mediator in these relationships: job resources and self-efficacy reinforces teachers' well-being directly and via emotional resilience as well. The indirect effect of independent variables on well-being through emotional resilience is significant both for job resources ($b = 0.115$, [0.081, 0.153]) and self-efficacy ($b = 0.101$, [0.065, 0.143]; see Table 3, Part 1 and Part 3). An analysis of research literature revealed that research on the links between the phenomenon of general teacher resilience and teacher well-being is sufficiently established (Gibbs and Miller, 2014; Mansfield et al., 2016; Gray et al., 2017; Burić et al., 2019). However, we emphasize that emotional resilience has not yet received enough attention from researchers. The implications of emotional resilience for teacher well-being are just beginning to be explored. One of the few such studies is that of Chen and Lee (2022), who revealed that teachers' emotional resilience predicts well-being not only directly, but also acts as a mediator in the relationships between school support and teacher well-being. The links between teachers' emotional resilience and well-being revealed in our study support these results.

Unlike teacher well-being, teachers' intentions to leave school are not desirable organizational outcomes. This intention can lead to actual behavioral decisions and the termination of working relationships with the school. However, even before quitting, the

intention to leave can negatively affect work motivation, work engagement, colleagues, and the overall psychological climate. Our study shows that job resources, self-efficacy and emotional resilience have significant negative direct relations with teachers' intention to leave (see Table 1). However, multiple regression analysis with all three variables as predictors for the intention to leave showed that job resources alone were significant in predicting this intention ($\beta = -0.434$, $p < 0.001$; see Table 2, Model 3). Teachers who value the school's job resources more highly (possibility to receive results-based performance feedback, work autonomy, social support, and opportunities for professional development) are less likely to leave school and look for another job. The aforementioned research variables are directly negatively correlated with intention to leave, however the effects of self-efficacy and emotional resilience in predicting intention to leave were insignificant. Only perceived job resources directly and negatively predicted teachers' turnover intentions. The mediating effect of emotional resilience on the relationship between work and personal resources and intention to leave was also not confirmed (see Table 3). Thus, emotional resilience is negatively associated with intention to leave but does not predict it and does not have a mediating effect in the links between job and personal resources with intention to leave. This study found that teacher turnover depends more on external factors of the school and work environment than on their individual characteristics. The importance of the working environment and conditions for teachers' intention to leave is also revealed in meta-analytical reviews (Li and Yao, 2022). Some studies suggest that not only direct but also more complex connections may exist between teachers' emotional resilience and the intention to leave. For example, Lee et al. (2021) in a sample of secondary physical educators found that teacher resilience was related with turnover intention through a negative association with the mediator of emotional exhaustion.

The results of our study are aligned with Theory of Planned Behavior, which states that attitudinal orientations have the greatest influence on a person's behavioral intentions: various external and internal factors first prompt certain dispositions, which then impact the behavioral intentions. We studied direct relations between workplace and personal variables with the intention to leave school without taking into account teachers' attitudes toward the school at which they are employed. According to the Theory of Planned Behavior, affective aspects are one of the factors that shape behavioral attitudes and intentions (Ajzen, 2020; Bosnjak et al., 2020), therefore, in future studies it would be appropriate to analyze in more detail the significance of emotional resilience in teachers' turnover intentions, taking into account their attitudes toward the school.

7 Limitations and guidelines for future studies

Evidence for our results came from a rather homogenous sample of Lithuanian teachers, predominantly urban women with considerable work experience. Therefore, the narrow distribution limits the external validity of our findings. Further research is needed to explore to what extent our findings are applicable for teachers with more diverse characteristics. The other shortcoming of our study is related to a single source of information, namely teachers' self-reporting. The content of items addressed *ex post facto* opinion regarding one's own ability to maintain a positive stance, to make use of personal resources and agency. Reports on a teacher's daily experience might provide a more explicit picture of emotional resilience-in-act. Moreover, all these constructs are not stable and fixed. Periodic or follow-up assessments at other times could maximize the ecological validity of our findings and predict behavior of teachers in real-life settings.

Future research should focus on a wider range of personal and work environment variables and their interaction with teacher resilience. For instance, professional commitment or the understudied phenomenon of professional calling deserve a more detailed investigation. Meaning-making findings among working teachers could supplement this field of research. Beyond surveys, qualitative data documenting teachers as creators of meanings would increase understanding about forces that sustain inner equilibrium and commitment to a professional pathway. Recent findings of teaching during lockdown (Narayanan and Ordynans, 2022) once more reminded us that a proper study of man is incomplete without self-reflection about the purpose of one's own activities in current life situation. Beyond surveys, qualitative data documenting teachers as creators of meanings would increase understanding about forces that sustain inner equilibrium and commitment to a professional pathway.

We focused on teachers' perception of their work setting. However, it might be relevant to analyze the work environment, school type as well as the culture and climate of a specific school, since generalized, non-evidence-based recommendations do not always correspond to the real situation at particular schools.

Many studies examine teacher burnout and retention for specific subject areas. Special education appeared to be an area that is particularly challenging (Kerr and Brown, 2015; Bettini et al., 2020). There were variabilities when comparing work experience with beginning teachers intending to leave in greater numbers than their experienced counterparts (De Neve and Devos, 2017; Chambers et al., 2019). In our opinion, this particular vector of research should be extended. More complex studies are also needed, covering assumptions regarding teachers' long-term relations not only with the school but also with the profession in association with individual, organizational and family relations.

8 Implications

Who should be held responsible for developing emotional resilience and providing the resources that will strengthen teachers' capacities to cope? Clearly, there is no single solution, but a variety of interventions throughout a teacher's tenure are necessary. Developing individual emotional resilience is important, but we also need to consider the organizational and system-wide conditions in which a teacher works to consider whether those conditions hinder or promote emotional resilience.

Firstly, we might consider who should enter the teaching profession. According to Aguilar (2018a), before considering how to cultivate emotional intelligence we need to identify emotional intelligence and resilience in prospective teachers. She states that building emotional intelligence and resilience can take longer and be more complex than building pedagogical knowledge and skill. This is in line with claims by earlier researchers that prospective teachers cannot develop attitudes and dispositions within the time frame of a teacher education program unless they bring certain dispositions with them into the programs (Jacobowitz, 1994; Denner et al., 2001). Chambers et al. (2019) also assert that some of the factors associated

with intention to leave are not easily modifiable, but certain interventions can reduce teacher attrition.

Increasingly, non-academic attributes have been named essential for success and professionalism in teaching. Once teachers have entered a teacher education program, it is crucial that pre-service teachers receive instruction, mentoring and coaching on how to recognize, appreciate, and respond to emotions (Aguilar, 2018a, b). Studies conducted around the world confirm that teacher education can play a crucial role in the resilience developing process (Hammond, 2004; Day and Gu, 2014).

Once teachers have entered the workforce, leaders of organizations and educational systems need to be mindful of their responsibility to provide both external and internal resources for emotional resilience, not leaving teachers to cope on their own (Hamid and Ghazali, 2018). Providing job resources and eliminating sources of stress is not enough. Leaders also need to provide professional development programs that will strengthen various personal characteristics. Our study revealed several personal and organizational resources of emotional resilience: occupational self-efficacy, possibilities to receive feedback, autonomy at work, social support, opportunities for professional development. The Conservation of Resources Theory argues that resilience, like other stress coping resources, is not only depleted but also needs to be replenished and sustained (Hobfoll, 1989; Hobfoll et al., 2018).

Clearly, there are many players that should provide professional development, support, and resources for building emotional resilience. The process begins in teacher education programs and continues in schools that create a workplace environment conducive to optimal teacher performance and low turnover. On the other hand, teachers are not just passive consumers of resources provided by the school or educational system. Teachers' self-leadership, mindfulness, active capacity building for emotional resilience through experiential and professional skill-building programs, and proactivity in helping the school to focus its resources can also contribute to increasing the "basket" of emotional resilience resources.

9 Conclusion

The focus of this study was the emotional resilience of teachers – the internal capacity to adapt, manage or cope with emotionally demanding situations. We examined resilience resources and its implications for teacher well-being and intention to leave school. Our investigation revealed that perceived workplace characteristics – performance feedback, autonomy, social support, and opportunities for professional growth – along with self-efficacy were positively related with and predicted teacher emotional resilience. These can be listed as job and personal resources, which strengthen teachers' capability to maintain emotional balance and effectively manage emotional reactions in challenging circumstances.

This study reveals, that teachers' emotional resilience, job resources and teacher self-efficacy have a direct positive impact on teacher well-being. It also found that teacher emotional resilience mediated the positive relationships between job resources and teacher well-being and also between self-efficacy and well-being. Job resources and self-efficacy strengthen well-being directly and via emotional resilience as a mediating variable.

Emotional resilience, job resources and self-efficacy negatively correlated with teachers' intention to leave school. However, only perceived job resources and self-efficacy were significant predictors of the intention to leave. Teachers who value the resources provided by the school, who have confidence in themselves and believe in their abilities to effectively perform in the profession. Are less likely to leave school. The role of emotional resilience as a mediator in the relationships between job and personal resources and intention to leave has not been established.

In summary, our study has revealed some of the resources of teachers' emotional resilience and its links to teacher well-being and intention to leave, opening up possibilities for improving teachers' working lives.

Data availability statement

The datasets presented in this article are not readily available because the data set includes identifying data and cannot be released. Requests to access the datasets should be directed to dalia.bagdziuniene@fsf.vu.lt.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

DB: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. AK: Conceptualization, Investigation, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. DN: Conceptualization, Formal analysis, Resources, Supervision, Writing – original draft, Writing – review & editing. ES: Conceptualization, Formal analysis, Investigation, Resources, Supervision, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Self-regulatory employability attributes and competency: the strengthening role of grit

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Introduction: This study examines grit as psychological mindsets that explain the link between self-regulatory employability attributes and perceived employability competency expectations in a sample of South African adults ($N = 308$).

Methods: A quantitative, cross-sectional research design approach was used to collect primary data.

Results: Results of a mediation analysis through structural equation modelling revealed grit as an important mechanism to strengthen the association between employability attributes (career agility, cultural ingenuity, proactive career resilience) and employability competency expectations (autonomy/leadership skills and personal employability qualities).

Discussion: This study makes an important contribution to the role of learning and training through understanding the role of grit in enhancing prospects of employability. This study further adds to the grit literature, highlighting the role that grit plays in the contemporary employment context. Practical implications include supportive practices that strengthen individual workers' grit when confronted with the turbulent changes of today's work world.

KEYWORDS

autonomy, career agility, consistency of interest, cultural ingenuity, self-regulation, perseverance of effort, proactive career resilience

1 Introduction

Today's work world demands continuous upskilling and reskilling resulting from the rapid pace of technological changes which necessitates further education and training for sustained employability (Whysall et al., 2019; Suarta and Suwintana, 2021; Business Tech, 2022; Li, 2022; O'Donnell, 2022; Tran et al., 2024). Employers expect employees to be well-rounded individuals that possess competencies and broader transferable skills and attributes (employability qualities) in addition to their discipline-specific knowledge (graduateness), which will allow them to be competent, energetic and informed citizens who play a crucial role in technological advancements for value-added products and services and general business success (Tomlinson, 2012; Coetzee, 2017; Ismail, 2017; Clarke, 2018). Employability and self-development now take precedence over job security and loyalty to the organisation (Costa, 2021; Raeder, 2021).

Being aware of the competency expectations of employers may enhance individuals' employability and may also significantly narrow the gap between the supply and demand within the labour market (Steurer et al., 2022). Individuals thus need to display career self-management behaviours such as career agility, cultural ingenuity and proactive career resilience in taking responsibility for the planning of their own careers. These three self-regulatory employability

attributes inform perceptions of meeting the employability competency expectations of employers (Pham, 2021). Stated differently, when individuals' self-regulatory employability attributes are high, they perceive that they are better able to meet employer's employability competency expectations. Agentic (self-regulated) behaviours are exhibited in attributes and competencies, including motivational mindsets such as grit to achieve employability (Baluku et al., 2021; Del Castillo and Lopez-Zafra, 2022).

Research into grit and self-regulation has revealed that grittier individuals participate in proactive behaviours to pre-emptively cultivate a constructive path of action for realising their goals, particularly when pursuing very ambitious long-term goals (Aspinwall and Taylor, 1997; Strauss et al., 2012; Sturman and Zappala-Piemme, 2017; Jordan et al., 2019a). Grit entails having a central superior goal and determinedly working towards it in the face of obstacles and setbacks, often for years or decades (Duckworth and Gross, 2014). As an agentic characteristic, grit is likely to facilitate one's ability to adapt successfully to constantly changing work circumstances (Gregor et al., 2021). Grit also governs and regulates human behaviour (Hu et al., 2017; Min, 2018).

As a mediator, grit has been researched in relation to growth mindset, goal commitment and achievement outcomes (Tang et al., 2019) and personality, hardiness, resilience and subjective career success (Cunningham, 2018) among others. However, there is a dearth of research that focuses on grit in the career and employability context, particularly where grit is studied as the mediating variable. There are fewer studies that have been conducted within the South African workspace.

Han (2021) called for more experimental data to understand the mediating role of grit in individuals' wellbeing. Tang et al. (2021) called for more studies to understand the resilience model of grit in other countries. Cunningham (2018) called for a more in-depth assessment of grit within the South African environment. This study responds to these calls for further research by addressing the following research question:

Does grit mediate the link between self-regulatory employability attributes and employability competency expectations?

The objective of the study was to explore grit as strengthening mechanism of the link between self-regulatory employability attributes (career agility, cultural ingenuity, proactive career resilience) and employer employability competency expectations (autonomy and leadership skills, and personal employability qualities). This association between the variables is likely to provide career counsellors and trainers with avenues to explore interventions to develop self-regulatory employability attributes that enhance grit which in turn may strengthen individuals' employability competency.

This article is structured as follows: The variables of the study will first be explained, thereafter the method, measuring instruments, data analyses, results, discussion, practical implications, limitations and recommendation for future research are presented. Finally, a conclusion to the article is provided with the references utilised for this study.

2 Theoretical constructs

It is important to note that there are two conceptualisations of employability in this study. A self-regulatory conceptualisation that is reflected in the employability attributes (as antecedents), and a contextual conceptualisation that is reflected in self-perceived employability competency expectations as outcomes.

2.1 Self-regulatory employability attributes

Self-regulatory employability attributes is a psychosocial construct which refers to those career-related qualities that enable an individual to operate within a given (un) employment context (now and in the future) as an agentic, effective, efficient and healthy stakeholder (Van der Heijde, 2014; Coetzee, 2017).

The basic premise of self-regulatory employability attributes is that individuals who possess these attributes are agentic and internally motivated to self-develop, flourish and produce their own opportunities in their employment (Coetzee, 2019). Through self-directed behaviours, these individuals pivot their goal-directed activities and personal resources to achieving sustained employability over time and across changing circumstances (Sokol and Müller, 2007; Coetzee and Beukes, 2010; Van der Heijde, 2014; Nielsen, 2017; Coetzee, 2019).

This study is interested in examining the link between three self-regulatory employability attributes (career agility, cultural ingenuity and proactive career resilience), grit and perceptions of employer competency expectations. Research has indicated positive links between these three self-regulatory employability attributes and perceptions of employability (Coetzee, 2019) which may be explained by the psychological needs of self-regulated autonomy and competence from self-determination theory (SDT; Deci and Ryan, 2000). However, the link with grit is still unknown.

2.2 Self-regulated autonomy: career agility

When viewed from the employability context, self-regulated autonomy is the display of personal agency (autonomy) of an individual in overseeing their career and setting and executing goals that enhances one's achievement of better person-environment consistency (Coetzee and Engelbrecht, 2020). Career agility alludes to self-regulated autonomy whereby individuals show agentic readiness to manage career goals, seek out new career development opportunities because of an openmindedness towards changing employment conditions (Coetzee, 2019, 2022). Research indicates the psychosocial mindset denoted by career agility as an important attribute for perceived employability competency (Potgieter et al., 2023).

2.3 Self-regulated competence: cultural ingenuity and proactive career resilience

Self-regulated competence is the tendency to influence the environment and achieve valuable outcomes within it (Deci and Ryan, 2000). Individuals perceive that they are capable and confident in their actions and behaviours that assist them in attaining specific career outcomes like employability and understanding the conditions that influence one's career success and employability (Coetzee and Engelbrecht, 2020).

Cultural ingenuity reflects individuals' skills and ingenuity in interacting with various groups of people within the culturally diverse employment and career context (Coetzee, 2019). Cultural ingenuity presupposes a sense of self-efficacy in initiating and nurturing relationships with individuals hailing from diverse cultural backgrounds, facilitating seamless intercultural communication, comprehending the customs, values and beliefs intrinsic to other cultures and astutely adapting to disparate social milieus (Abbe et al., 2007; Coetzee, 2019).

Proactive career resilience denotes the ability to confidently adapt to changes in the career environment, take advantage of opportunities to progress in the career and successfully action career plans despite challenges (Coetzee, 2019). Combined, career agility (the agentic readiness to embrace career self-management) and proactive career resilience (confidence in proactive career-related adaptation despite challenges) facilitate positive outlooks relating to the future, dealing with changes proactively as well as exhibiting self-initiative in seeking and recognising opportunities that advance the career-life (Chiaburu et al., 2006; van der Heijde and van der Heijden, 2006; Fugate and Kinicki, 2008; Coetzee, 2019).

2.4 Employability competency expectations

Employability competency expectations refer to those skills and qualities that employers expect current or prospective employees to have to be successful (Coetzee et al., 2019). This study focuses on autonomy and leadership skills and personal employability qualities as two employability competency expectations regarded important by employers and individuals' confidence in gaining employment (Coetzee et al., 2019). Autonomy and leadership skills relate to the ability to function autonomously and exhibiting confidence in building networks, influence and persuade others and empower self and others. Personal employability qualities are important human capital resources such as the ability to manage and use time efficiently and productively, adapt to changing conditions, follow through and deliver on results and keeping knowledge and skills updated (Potgieter et al., 2023).

2.5 Grit

Grit denotes a non-cognitive, purpose-driven, context-specific goal-setting mindset that (1) influences individuals' ability to establish and engage in purpose-driven long-term (higher order) goals by actively displaying perseverance and passion for such goals, while also (2) reflecting on the application of strategies for lower-order goals and adapting these strategies in the face of challenges or negative feedback (Duckworth, 2017; Datu et al., 2018; Jordan et al., 2019b; Datu et al., 2021; Schwepker and Good, 2022). Perseverance of effort and consistency of interest as compound state-like traits of grit have been found to be predictors of success, optimal functioning, performance and goal achievement (Duckworth et al., 2007; Duckworth and Quinn, 2009; Duckworth et al., 2011; West et al., 2016; Duckworth, 2017; Polirstok, 2017; Park et al., 2018). When faced with adversity the gritty individual responds by actively searching for alternative actions to pursue (Duckworth et al., 2007; Duckworth, 2017).

Grit has displayed significant positive impact across various settings, particularly higher goal achievement (Sheldon et al., 2015); academic achievement (Bowman et al., 2015); persistence in challenging tasks (Lucas et al., 2015) and remaining employed (Robertson-Kraft and Duckworth, 2014). Gritty individuals tend to display better adaptive psychosocial functions, such as psychological wellbeing (Disabato et al., 2016; Vainio and Daukantaitė, 2016; Datu et al., 2017); prosocial behaviour (Lan and Moscardino, 2019); healthy personal relationships (Lan, 2020), and less mental distress (Zhang et al., 2018). Furthermore, grit predicts the ability of a person, irrespective of internal facets such as genes and IQ, to devote to the required perseverance for both academic and professional success (Duckworth et al., 2010).

2.6 Integration: grit as mediating mechanism

Jin and Kim (2017) found that grit is strongly related to both the self-regulatory autonomy and competence needs of employability. The employability attribute of career agility involves putting in the effort to engage in lifelong learning, persevering in keeping up to date with new job or career requirements, ensuring that one remains interested through setting stimulating goals and arriving at creative solutions all the while persevering despite challenges of change (Coetzee, 2019).

The employability attribute of cultural ingenuity is related to persevering to learn more about different cultures and how to communicate and work with people from diverse backgrounds. Being culturally ingenious involves the ability of people to initiate and maintain relationships with people from multicultural backgrounds and to enjoy the process (that is, being interested in it; Coetzee, 2019). Once again, cultural ingenuity relates to both aspects of grit (perseverance of effort and consistency of interest).

Proactive career resilience denotes an inherent perseverance of effort attribute of grit. The self-regulatory confidence in proactively adapting to and capitalising on new career development opportunities because of changing employment conditions may foster the intrinsic motivation to persevere and remain consistent in one's interest for employability (Duckworth et al., 2007; Perkins-Gough, 2013; Duckworth, 2017; Stoffel and Cain, 2018).

Research on the mediating role of grit in the employability context seems non-existent, especially regarding the link between self-regulatory employability attributes and employability competency. Grit as mediating mechanism may potentially deepen understanding of the psychological processes that link self-regulated attributes of employability and confidence in employability competency. Grit describes the unrelenting commitment towards completion of a particular task, for example achieving employability competency, despite failures, setbacks, and adversity (Duckworth et al., 2007). Grit is malleable and can be developed and improved, based on the amount of interest invested as people age, understand their life purpose and even as they develop passion and perseverance (Vela et al., 2015; Hill et al., 2016; Datu, 2017; Duckworth, 2017). In essence, when employability is viewed as the long-term career goal, gritty individuals will strive to upskill or reskill their employability attributes in the hopes of meeting employer employability competency expectations. According to Salisu et al. (2020), those with high levels of grit are more likely to capably employ their competencies better since they are less

concerned with short-term goals and less affected by the shocks, obstacles or disappointments in their surrounding environments because of efforts to meet the long-term goal.

In relation to this study then, it can be assumed that individuals who seek to enhance their career agility, cultural ingenuity and proactive career resilience (self-regulatory employability attributes) would also be more likely to meet the employability competency expectations of autonomy/leadership and personal employability qualities through their grit. When individuals engage in setting career and employability goals, they direct their attention and energies into meeting those goals (Locke and Latham, 2002). The more challenging the goals, the more individuals will persevere and stick to their goals (Locke and Latham, 2002). It is possible then that when meeting employers' employability competency expectations is viewed as the goal, the self-regulatory development of employability attributes (career agility, cultural ingenuity, proactive career resilience) will enhance individuals' perseverance of effort and consistency of interest (grit) to meet the goal of employability competency. This will be empirically tested as follows:

> *H*1: High levels of employability attributes are positively associated with employability competency expectations through individuals' grit.

3 Methods

3.1 Sample

Primary data was obtained from a sample ($N = 308$) of South African adults (18 years and older) from various sectors. The sample was represented by predominantly employed (85%) females (59%). Indians (64%) made up the majority of the sample, followed by African participants (16%), White persons (16%) and mixed-race (s) participants (4%).

3.2 Procedure

The data were electronically collected through an online survey platform after obtaining ethical clearance from the University of South Africa Research Ethics Committee. Informed consent was also obtained from the participants. Respondents' rights to confidentiality, voluntary participation and anonymity were upheld throughout the process.

3.3 Measuring instruments

Respondents completed the Employability Attributes Scale (EAS 4.0, Coetzee, 2019); the Employability Competency Inventory (ECI; Coetzee et al., 2019) and the Short Grit Scale (SGS; Duckworth and Quinn, 2009). They also provided data on their demographics.

3.3.1 Employability attributes scale

Career agility (13 items), cultural ingenuity (7 items) and proactive career resilience (8 items) were measured using the employability attributes scale (EAS 4.0; Coetzee, 2019). Examples of items include, "I am generally willing to consider new ideas" (career agility), "I understand the values and beliefs of other cultures" (cultural ingenuity), "I anticipate and take advantage of changes in my career environment (proactive career resilience)." Responses were measured on a 7-point Likert scale: 1 = definitely disagree; 7 = strongly agree. The Cronbach's alpha coefficient for the three sub-scales was 0.94. The overall scale obtained a Cronbach's alpha of 0.98. Ismail (2023) provided evidence of construct validity of the scale.

3.3.2 Employability competency inventory

Autonomy/leadership skills (6 items) and personal employability qualities (8 items) were measured using the employability competency inventory (ECI; Coetzee et al., 2019). Examples of items include, "Ability to empower self and others" (autonomy), and "Ability to work under pressure" (personal employability qualities). Responses were measured on a 5-point Likert scale: 1 = I do not feel confident at all; 5 = I feel highly confident. The Cronbach's alpha coefficient for the two sub-scales was 0.95 (autonomy) and 0.94 (personal employability qualities). The overall scale obtained a Cronbach's alpha of 0.98. Ismail (2023) provided evidence of the construct validity of the scale.

3.3.3 Short grit scale

Consistency of interest (4 items) and perseverance of effort (4 items) were measured using the 8-item short grit scale (SGS; Duckworth and Quinn, 2009). Examples of items include, "I often set a goal but later choose to pursue a different one" (Consistency of Interest), and "I finish whatever I begin" (Perseverance of Effort). Responses were measured on a 5-point Likert scale: 1 = not like me at all; 5 = very much like me. The Cronbach's alpha coefficient for the two-subscale was 0.84 (consistency of interest) and 0.72 (perseverance of effort). The overall scale obtained a Cronbach's alpha of 0.79. Ismail (2023) provided evidence of the construct validity of the scale.

4 Data analyses

Simple mediation analysis was conducted in order to investigate whether the mediating effect of individuals' grit between employability attributes (independent variables) and employability competency expectations (dependent variables) is significant.

The JASP (2022) computer software package was used to perform the mediation analysis with Delta method standard errors and maximum likelihood estimator. Following the guidelines of Hayes (2013), significance mediation (indirect) effects were established at the more stringent 95% bias-corrected bootstrapped lower and upper-level confidence intervals. Significant mediating effects were evident when the lower-level confidence interval (LLCI) and upper-level confidence interval range did not contain zero (that is, the interval values fall either above or below zero). Research indicates bias-corrected confidence intervals to have the highest statistical power when analysing mediation effects (Hayes and Scharkow, 2013).

Following the guidelines of MacKinnon (2008), simple mediation modelling was applied to first test whether the exogenous or independent variables (employability attributes) had a direct effect on the endogenous (or dependent) variable (employability competency expectations). Second, the respective pathways from the two

exogenous variables via the mediator variable (grit) to the endogenous variable and its sub facets were tested for significant indirect (mediating) effects.

The next step was to examine indirect (mediating) effects of sub facets of these constructs. Structural equation modelling was employed to test various combinations of indirect effects via parallel mediation. This approach helped to control for other potential mediators in the model and to obtain a deeper understanding of the psycho-social process through which the employability attributes through the grit variables relate to employer employability competency expectations (Hayes and Scharkow, 2013; Kane and Ashbaugh, 2017).

The JASP (2022) computer software package and SAS (CALIS Procedure) software version 9.4 (SAS, 2013) with maximum likelihood estimator were used to perform mediation analyses via structural equation modelling. In the parallel mediation models, the mediators were allowed to correlate but not to influence each other. Parallel mediation can test indirect effects of each proposed mediator while accounting for the shared variance between them (Kane and Ashbaugh, 2017).

5 Results

5.1 Descriptive statistics and bi-variate correlations

In Table 1, the internal consistency reliability (Cronbach α), composite reliability (CR), means, standard deviations and correlations between the constructs are provided. Table 1 shows that the construct scales had acceptable (0.69) to high (0.94) internal consistency reliability. Employability attributes correlated positively with all the employability competency expectations ($0.60 \leq r \leq 0.72$; $p \leq 0.001$; large practical effect). Employability competency expectations correlated positively with all the grit variables ($0.26 \leq r \leq 0.60$; $p \leq 0.001$; moderate to large practical effect). Employability attributes correlated positively with all the grit variables ($0.14 \leq r \leq 0.63$; $p \leq 0.05$; small to large practical effect). These results indicated significant positive associations between the employability attributes, employability competency expectations and the grit variables. The highest correlations were observed between overall EAS and overall ECI ($r = 0.78$, $p \leq 0.05$; large practical effect). All correlations between the scales were below <0.80 thereby minimising potential multicollinearity concerns.

5.2 Simple mediation analysis

Table 2 displays the standardised total, direct and indirect effects of the SEM model. Table 2 shows that employability attributes ($\beta = 0.36$; LLCI = 0.28; ULCI = 0.43) had significant and positive direct effects on employability competency expectations. In terms of indirect effects, Table 2 further shows that employability attributes through grit had a significant and positive indirect effect ($\beta = 0.03$; LLCI = 0.01; ULCI = 0.05) on employability competency expectations. The total effect of employability attributes ($\beta = 0.39$; LLCI = 0.31; ULCI = 0.47) on employer employability competency expectations was also significant, suggesting only a partial mediation effect. The total

TABLE 1 Means, standard deviations, reliabilities, and correlations among study variables.

Variables	Composite Reliability (CR)	Cronbach Alphas	Mean	Standard Deviation	Personal employability qualities	Autonomy/ leadership	Overall ECI	Career agility	Cultural ingenuity	Proactive career resilience	Overall EAS	Consistency of Interest	Perseverance of Effort	Overall SGS
Personal employability qualities	0.93	0.94	3.92	0.89	-									
Autonomy/ Leadership	0.92	0.95	3.81	0.97	0.83 ***	-								
Overall ECI	0.97	0.98	3.87	0.81	0.93 ***	0.90 ***	-							
Career agility	0.96	0.94	5.70	1.12	0.71 ***	0.70 ***	0.74 ***	-						
Cultural ingenuity	0.93	0.94	5.52	1.18	0.60 ***	0.62 ***	0.64 ***	0.68 ***	-					
Proactive career resilience	0.94	0.94	5.42	1.14	0.72 ***	0.72 ***	0.75 ***	0.81 ***	0.74 ***	-				
Overall EAS	0.98	0.98	5.47	1.03	0.75 ***	0.75 ***	0.78 ***	0.90 ***	0.84 ***	0.93 ***	-			
Consistency of Interest	0.81	0.84	3.20	0.90	0.28 ***	0.26 ***	0.26 ***	0.20 ***	0.14 *	0.22 ***	0.22 ***	-		
Perseverance of Effort	0.69	0.72	4.03	0.65	0.60 ***	0.55 ***	0.57 ***	0.58 ***	0.44 ***	0.63 ***	0.63 ***	0.32 ***	-	
Overall SGS	0.88	0.79	3.62	0.63	0.49 ***	0.45 ***	0.46 ***	0.42 ***	0.31 ***	0.46 ***	0.45 ***	0.88 ***	0.70 ***	-

$N = 308$; *** $p \leq 0.0001$; * $p \leq 0.05$.

TABLE 2 Results of mediation analysis: employability competency expectations as overall dependent variable.

Direct effects on employer employability competency expectations						
Variable	β	SE	z	*p*	LCI	UCI
Employability attributes	0.36	0.04	8.79	0.00	0.28	0.43
Indirect effects on employer employability competency expectations						
Variable	β	SE	z	*p*	LCI	UCI
Employability attributes through grit	0.03	0.01	2.12	0.02	0.01	0.05
Total effects on employer employability competency expectations						
Variable	β	SE	z	*p*	LCI	UCI
Employability attributes	0.39	0.04	9.76	0.00	0.31	0.47
Total indirect effects on employer employability competency expectations						
Variable	β	SE	z	*p*	LCI	UCI
Employability attributes	0.04	0.01	2.78	0.01	0.01	0.06

$N = 308$.

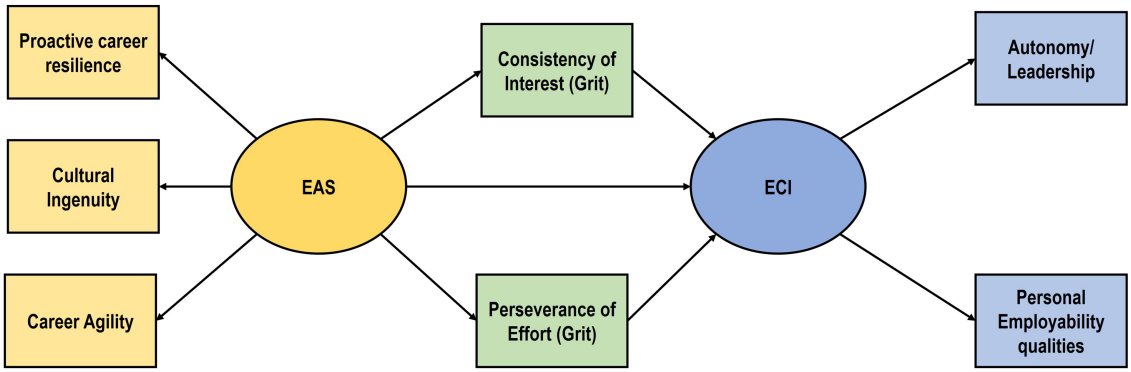

FIGURE 1
Parallel mediation model. Source: Ismail, 2023.

indirect effects for employability attributes ($\beta = 0.04$; LLCI = 0.01; ULCI = 0.06) were also significant.

5.3 Structural equation modelling

Proactive career resilience, cultural ingenuity and career agility were loaded as subfactors onto the overall employability attributes factor (exogenous variable). Autonomy/leadership and personal employability qualities were loaded as two subfactors onto the overall construct of employability competency expectations as endogenous variable. The two sub facets of grit (consistency of interest and perseverance of effort) acted as parallel mediators. This is illustrated in Figure 1.

Table 3 provides the model fit statistics of the mediation model. The following rules of thumb (threshold values) were applied for good model fit (Hair et al., 2019): chi-square/df ≤ 3; RMSEA ≤0.06 or ≤ 0.08; SRMR ≤0.05; CFI ≥ 0.90. The model had a good fit with the data: chi-square/df = 3.99; CFI = 0.98; RMSEA = 0.06, SRMR = 0.04. The path regressions for the model are provided in Table 4. The structural model of the mediation model is provided in Figure 2. Overall, the empirical results provided support for the research hypothesis (H1).

6 Discussion

This purpose of this study was to explore whether grit mediates the relationship between self-regulatory employability attributes and employability competency expectations. Although self-regulatory employability attributes were positively associated with employability competency expectations, this link was further (although not strongly) strengthened through grit.

The present findings suggest that the self-regulatory qualities of career agility (agency in managing career goals, seeking out new career development opportunities and being openminded towards changing conditions; Coetzee et al., 2019; Coetzee, 2022), cultural ingenuity (insight into own and others' values and beliefs, and confidence in communicating and engaging with other cultures: Coetzee, 2019) and proactive career resilience (self-efficacious adaptation while capitalising on change for career advancement despite challenges (Han et al., 2021; Peeters et al., 2022) strengthen grit. In turn, grit seems to heighten confidence in one's ability to function autonomously and exhibiting leadership skills (i.e., take leadership in building networks, influence and persuade others, and empower self and others (Coetzee et al., 2019). Grit also appears to strengthen confidence in one's personal employability qualities (i.e.,

TABLE 3 Path regression coefficients: mediation model.

Latent variables	Path	Manifest variables	Estimate	Standard error	*t* value
EAS	→	Cultural Ingenuity	0.78	0.03	31.20***
EAS	→	Career agility	0.84	0.02	40.71***
EAS	→	Proactive Career Resilience	0.94	0.01	71.07***
ECI	→	Autonomy	0.92	0.02	60.56***
ECI	→	Personal Employability qualities	0.93	0.01	64.52***
ECI	←	Consistency of Interest	0.08	0.04	2.10*
ECI	←	Perseverance of Effort	0.14	0.05	2.78*
ECI	←	EAS	0.73	0.05	16.20***
Consistency of Interest	←	EAS	0.20	0.06	3.58***
Perseverance of Effort	←	EAS	0.63	0.04	16.83***

$N = 308$; ***$p \leq 0.0001$; *$p \leq 0.05$.

TABLE 4 Structural equation modelling: direct and indirect effects (SAS calis procedure).

Direct effects				
Path		Estimate (β)	Std error	*t* value
Autonomy/leadership	← ECI	0.98	0.02	42.83***
Personal employability qualities	← ECI	0.92	0.02	41.11***
Career agility	← EAS	1.04	0.04	25.96***
Cultural ingenuity	← EAS	1.02	0.05	22.44***
Proactive career resilience	← EAS	1.20	0.03	35.59***
Consistency of Interest	← EAS	0.21	0.06	3.52***
Perseverance of Effort	← EAS	0.45	0.03	13.47***
ECI	← Consistency of Interest	0.08	0.04	2.10*
ECI	← Perseverance of Effort	0.19	0.07	2.76**
ECI	← EAS	0.73	0.04	16.87***
Indirect effects				
Autonomy/leadership	← Consistency of Interest	0.08	0.04	2.11*
Autonomy/leadership	← Perseverance of Effort	0.19	0.07	2.78**
Autonomy/leadership	← EAS	0.82	0.04	19.59***
Personal Employability qualities	← Consistency of Interest	0.07	0.04	2.11*
Personal Employability qualities	← Perseverance of Effort	0.18	0.06	2.78**
Personal Employability qualities	← EAS	0.77	0.04	20.21***
ECI	← EAS	0.10	0.03	3.11**

$N = 308$; ***$p \leq 0.0001$; **$p \leq 0.01$; *$p \leq 0.05$.

ability to stay relevant by updating one's knowledge and skills, adapting to changing work conditions and pressure while also following through and delivering results; Coetzee et al., 2019).

The strong and positive direct association between the three self-regulatory employability attributes and individuals' confidence in their employability competency (autonomy and leadership, and personal employability qualities) could be attributed to the agentic and internally motivated drive to self-develop, flourish and produce personal employment opportunities that underpin self-regulatory employability attributes (Sokol and Müller, 2007; Van der Heijde, 2014; Nielsen, 2017; Coetzee, 2019). In this regard, the self-regulated employability attributes seem to denote key psychosocial mindsets that activate especially perseverance of effort (heightened motivation to actively persevere in behavioural effort: Datu (2021), and to a lesser degree consistency of effort persistent interest in goal achievement: Datu (2021), which in turn, help strengthen confidence in employability competency.

The finding corroborates empirical evidence that grit as a malleable compound state-like trait, is linked to agentic, behavioural, cognitive and emotional engagement, autonomous motivation, and mastery- and performance-approach goals (Chen et al., 2018; Datu et al., 2018). The stronger mediating role of perseverance of effort in relation to consistency of effort is in agreement with arguments that a lower level of consistency of effort points to individuals' capacity for

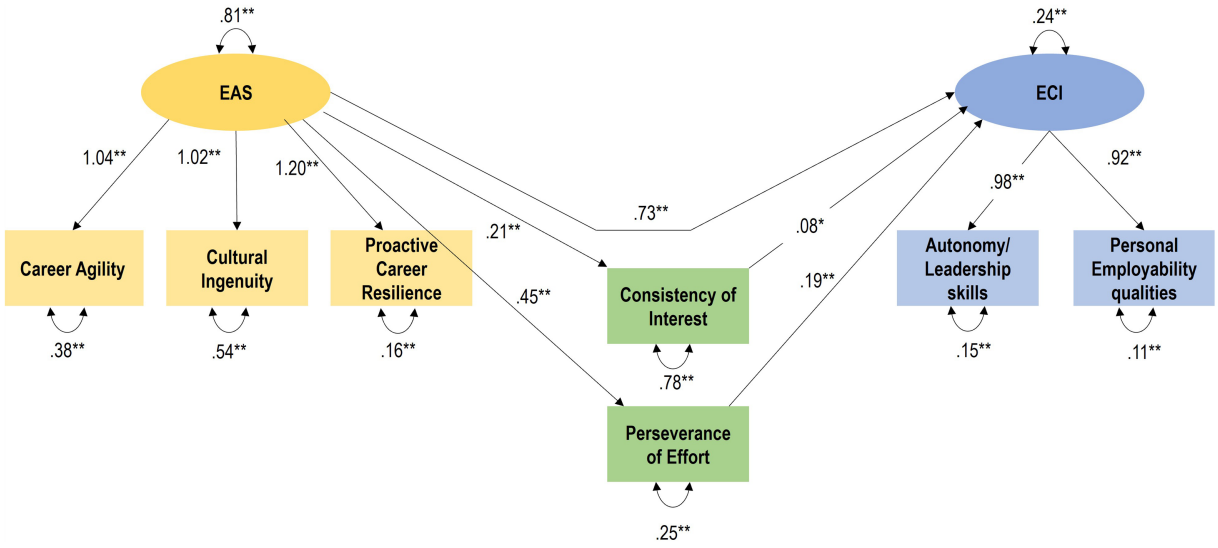

FIGURE 2
Structural model of mediation model.

self-variability, that is, a tendency to calibrate one's goals, interests and behaviour based on situational demands or cues in achieving long-term aspirations (Datu, 2021). Individuals with high perseverance of effort and low consistency of effort generally exhibit significantly higher levels of hope and lower anxiety (Datu and Fong, 2018).

Overall, the findings support the view that grit as a protective resilience factor help individuals to persevere and stay appropriately consistent in their interest to meet employer employability competency expectations to enable them to realise employability goals. Previous research corroborates the role of grit in remaining employed (Robertson-Kraft and Duckworth, 2014) and staying focused on realising long-term goals of employability despite adversity or obstacles (Salisu et al., 2020). In this study, the self-regulated autonomy and competence attributes of career agility, cultural ingenuity and proactive resilience (employability attributes) gave impetus to participants' drive to persevere and stay relatively consistent in their efforts (grit) to meet the employability competencies of autonomy and leadership, and the personal employability qualities required by employers. Tang et al. (2021) explain grit as a compensatory and protective resilience factor in realising goals of employability. When facing challenges in their goal pursuit, less gritty individuals were more likely to give up on their goal (Yu et al., 2021). This occurs when individuals have fewer skills (employability attributes) and perceive themselves as being unable to meet their goal (meeting employability competency expectations; Hembree, 1990; Ashcraft and Kirk, 2001; Yu et al., 2021).

7 Practical implications

This study revealed important preliminary insights that extended research on grit. The findings suggest that self-regulatory employability attributes (cultural ingenuity, proactive career resilience and career agility) and grit (perseverance of effort and consistency of interest) should be developed and strengthened to enhance the employability competency expectations of autonomy/leadership skills and personal employability qualities. This can be done through educational learning as well as through training in the workspace. The link between employability attributes and grit is undeniably lifelong learning and adapting to the changes one is faced with in changing employment environments (Chen and Hong, 2020a,b; Nilforooshan, 2020; Öztemel and Akyol, 2021). If individuals continue to persevere in enhancing their employability attributes, they provide themselves with an added advantage of meeting employability competency expectations of current and prospective employers. Through adapting to changing conditions, they position themselves as the talent that employers seek.

Not only is adapting to the changes and challenges a means to secure employment, but within the digital era work world, adapting, positions individuals in a positive and strategic mind space wherein they view change and challenge as a way to learn and grow. This means that they will eagerly seek out new ways to engage with technology and their careers, thereby making them productive assets to any organisation and within any workspace they find themselves in.

It is important to understand that the role of the surrounding environment in supporting this process should not be excluded. The social environment of the organisation is generally considered instrumental to meaningful career goal achievement (Xie et al., 2017). Employers, families, friends, colleagues, educational systems and governments should provide the resources and support to individuals to assist them in meeting these objectives (Tang et al., 2019; Tewell, 2020). Positive associations between individuals' career agility, for example, and the organisation's appraisal as fulfilling its obligation in providing supportive conditions enable adaptation learning and upskilling in today's work world (Coetzee, 2022).

This study further raises awareness among employers and organisations on the areas of training and development that need to be addressed. Career counsellors and human resource development practitioners should utilise the findings of this study to design interventions that will develop individuals' employability attributes and grit. Individuals can also make use of these results, to proactively

engage in exercises and programmes to build their self-regulatory employability and grit by enrolling in online courses or researching ways in which they can upskill. This will in turn assist individuals in meeting employer employability competency expectations thereby enhancing their employability.

8 Limitations and recommendations for future research

The current study was conducted in South Africa and due to contextual differences, the small sample size and the fact that the sample comprised mainly Indian South Africans, mean that the findings cannot be generalised. Few studies have focused on the role of grit in enhancing employability, particularly within the South African context. Future studies can replicate this study in different countries and setting and with a more representative sample.

The cross-sectional design of this study limits any causal inferences. It is recommended that longitudinal studies are conducted to examine the true causal change in employer employability competency expectations as a result of grit as intervening mechanism. Longitudinal research can further assess the malleability of grit and grit profiles of individuals (e.g., high or low perseverance of effort versus high or low consistency of effort) over time in relation to their self-regulatory employability attributes and employability competency.

Theoretically, grit is not a self-perception, nor is it directly observable (Duckworth and Yeager, 2015). To adequately measure one's passion and perseverance would require both first-person and third-person (Usher et al., 2019). Here, we simply measured individuals' self-perceived grit. Future research can include the third-person perspective as well.

9 Conclusion

The results of this study revealed the influence of grit in strengthening the link between employability attributes (particularly career agility, cultural ingenuity and proactive career resilience) and employability competency expectations (particularly autonomy/leadership skills and personal employability qualities). The findings underscore the need for continuous skill development, resilience, and holistic career approaches to meet the evolving demands of the contemporary world of work. Career interventions, educational learning and training should consider structuring meeting employability competency expectations as a goal that needs to be achieved through fostering grit. Through building career agility, cultural ingenuity and proactive career resilience while also strengthening grit, individuals should be successful in meeting their goal in enhancing their employability in the contemporary world of work.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by UNISA College of Economic and Management Sciences Research Ethics Review Committee. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

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The dual influence path of decent work perception on employee innovative behavior

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Background: The goal of decent work (DW) is a win-win situation for both employees and employers. It promotes an individual's employability and enhances the competitiveness of the organization.

Design: Based on the conservation of resources theory (COR), this paper conducted survey on knowledge workers and analyzed the data by hierarchical linear model (HLM).

Research purposes: This paper aims to examine how decent work perception (DWP) influences employee innovation behavior through the mediating effect of job engagement and burnout and the moderating effect of authoritarian leadership.

Findings: Based on the results of statistical analyses conducted on 489 valid knowledge workers, it was demonstrated that DWP positively influence employee innovative behavior. Job engagement has a full mediating effect on the relationship between DWP and employee innovative behavior. The study did not support the mediating effect of job burnout, however. There is a positive moderating effect of authoritarian leadership on the relationship between DWP and job engagement and a negative moderating effect on the relationship between DWP and job burnout.

Implications: In addition to contributing to theoretical studies on DW and work behavior, this paper also contributes to practice on employee motivation and leadership.

KEYWORDS

decent work perception, employee innovative behavior, job engagement, job burnout, authoritarian leadership

1 Introduction

In 1999, the International Labor Organization (ILO) proposed the concept of decent work (DW), which aimed to promote opportunities for women and men to obtain decent and productive employment under conditions of freedom, equity, security, and dignity. An organization committed to DW must ensure employees' interests and develop their employability, actively promote competitive advantages for the organization (Elshater et al., 2022), and promote social sustainability (Geng and Maimaituerxun, 2022). As the organization's most valuable asset, employees' innovation behavior is a key source of

innovation and competitive advantage. Thus, motivating knowledge workers' innovative behavior has become increasingly crucial for individual employability, organizational innovation, and social advancement.

The existing research on DW can be divided into two research priorities. First, the macro-level of DW. The concept of DW originated in the field of economics and industrial relations. Researchers developed DW indexes at a macro level based on the ILO definition. Researchers evaluated and compared the status quo of DW in different countries and regions, including India, China, Nepal, Spain, and Brazil (Gil et al., 2008; Saha, 2009; Adhikari et al., 2012). Second is DW's micro-level, also called decent work perception (DWP). The concept of DWP was derived from vocational psychology, organizational behavior, and human resource management. Using grounded theory and psychology of working theory from the individual perception perspective, researchers developed the dimensions and scales of DWP (Blustein et al., 2016; Douglass et al., 2017; Duffy et al., 2017; Ferraro et al., 2018; Seubert et al., 2021). Research has focused on the status quo of DW in various groups (Cruz et al., 2017), as well as the relationship between DW, work attitudes, and work behavior (Ferraro et al., 2020; McIlveen et al., 2021; Aybas et al., 2022; Xu et al., 2022). While studies on DW have been developing for more than 20 years, there are still some limitations. There is still room for improvement in the study of DW at the micro level. Despite a few DWP scales for employees, they lack validation in different contexts to ensure their universality. It is necessary to develop a scale of DWP for specific employees. The existing scale of DWP was developed for line workers. Knowledge workers differ from other workers regarding autonomy, motivation, and work behavior (El-Kassar et al., 2022; Hon et al., 2022). Thus, using current scales to measure knowledge workers' DWP is inappropriate. More attention should be paid to the outcomes of DWP. In existing studies, DWP is considered an outcome variable and focuses on the realization of DW but disregards the impact of DWP as an antecedent variable on employee behavior.

Innovative behavior can be described as a process in which employees generate, develop, and implement new ideas to improve role performance (Janssen, 2000). Three aspects of employee innovative behavior have been discussed in previous literature. Individual factors, such as psychological capital and a proactive personality, influence innovative behavior (Sun and Huang, 2019; Alikaj et al., 2021). Second, organizational factors affect employee behavior through job characteristics, environmental factors, and leadership (Dedahanov et al., 2019; Qi et al., 2019; Lee et al., 2021). Furthermore, social factors, such as government policies and social networks, can influence innovative behavior (Lenihan et al., 2019). Only some empirical studies have examined innovation behaviors from a resource perspective in existing research. Individual and organizational factors influencing employee innovative behavior require a high level of resource input, according to the conservation of resources theory (COR). To achieve DW, one must satisfy an intrinsic human need for respect and self-value, promoting workplace innovation. From a resource perspective, it is therefore necessary to investigate the relationship between DW and employee innovative behavior.

Based on COR, the following study was conducted. (1) We tested how DWP effectively predicts employee innovative behavior. (2) We conducted empirical research on how DWP promotes employee innovative behavior through the mediating effect of job engagement driven by the resource-gain spiral. (3) We examined how DWP hinders employee innovative behavior due to the mediating effect of job burnout resulting from the resource-loss spiral. (4) We tested the moderating role of authoritarian leadership (AL) in the relationship between DWP, job engagement, and burnout.

Developing the empirical study between DWP and employee innovative behavior showed this study's significance as follows. (1) The study makes an initial attempt to use DWP as the antecedent of employee innovation from the point of view of COR. (2) Research on the antecedents of employee innovative behavior thus shifts from an individual factor to an integration of contextual factors, raising social concern due to the deregulation of the labor market and its impact on workers' well-being. (3) The study promotes DW studies by connecting DWP with work attitudes and behaviors and extending the scope of DW research.

2 Theoretical background

2.1 DW:Concept and measurement

DW was first proposed by Juan Somavia, ILO director, in 1999. The original definition is based on a sociological concept to promote opportunities for women and men to obtain decent and productive work in conditions of human dignity, security, and freedom. DW macro studies focus on the status of DW in a nation, country, or area. Using in-depth research, scholars from psychology and management introduced DW to vocational psychology and organizational behavior (Cooke et al., 2019). Therefore, DW has evolved into an interdisciplinary concept combining sociology, psychology, and management from a micro-level focusing on individual perceptions (Yan et al., 2023). As a result, DW at the micro level is also referred to as DWP. DWP studies emphasize individual self-value, which emphasizes the meaning and value of work (Di Fabio and Blustein, 2016), emphasizing that individuals can realize their self-value and dignity through work challenges.

The measurement of DW at the macro-level and micro-level has been developed since 1999. First, Ferraro et al. (2018) proposed a decent work questionnaire (DWQ) comprising 31 indexes related to the four pillars of human rights, employment equity, social dialogue, and social protection. This measurement is based on a macro-level definition of DW. In addition, Duffy et al. (2017) have developed a decent work scale (DWS) based on the psychology of working theory at a micro level. DWS comprises five dimensions: safe working conditions, access to health care, adequate compensation, free time and rest, and organizational value. Lastly, Yan et al. (2023) developed a decent work perception scale (DWPS) for knowledge workers from a micro-level perspective. This scale is designed from grounded theory, containing 4 dimensions and 13 items. Job security, respect and support, self-value, and professional skills are four dimensions.

In addition to the above measurements, other scholars have developed DW measurement tools from both macro and micro perspectives in recent years. For instance, 9 indicators testing security, farming, and hospitality industries in South Africa (Webster et al., 2015), 8 factors for employees from the hospitality sector (Garcia-Rodriguez et al., 2021), and decent work index (DWI) testing in Gauteng City-Region (Mackett, 2017). The prevalence of these measurement tools suggests that research on DW is increasingly

focused on studies of perception at the micro-level. The research focus shifted from the macro-level to the micro-level because different countries and nations may have various social security and social protection systems. Scholars have difficulty standardizing statistical indexes for macro-level indicators across different countries. However, micro-level scales from individual perception are self-reported, which avoids this obstacle.

Even though DW research has been developed for more than 20 years, there are still some limitations in the current research. The first limitation is the lack of a consistent DWP scale. Scholars have conducted extensive research on the micro-level of DW, but there has yet to be a consensus on the definition of DWP at the micro-level. The lack of a consistent definition as a basis for DWP tools development at the micro level has resulted in the need for uniformity in the measurement tools for DWP. Second, the structural dimensions of DWP vary from group to group due to the differences in job demands among workers engaged in different types of work.

2.2 Conservation of resource theory

This study aims to fill the research gap by applying COR to DW research to investigate the relationship between DWP and individual behavior. DWP studies are theoretically based on self-determination theory, social exchange theory, broaden-and-build theory, and psychology of working theory (Huang and Yuan, 2022). Based on the existing theoretical foundations, scholars have studied DWP's antecedent and outcome variables, enriching the research results of DW. According to COR, an individual's attitude and behavior are affected by DWP dual influence paths from the perspective of a resource gain spiral and a resource loss spiral. Individuals tend to preserve, protect, and acquire their resources, leading to different behaviors based on resource gains and losses (Hobfoll et al., 2018). Therefore, it is necessary to introduce COR into the DWP study. One significant advantage of COR is that it can more clearly describe DWP's resource gain and loss dual paths on individual behavior. Further, COR can provide multiple potential factors that may influence the relationship between DWP and subsequent outcomes at the same time. To put it another way, COR can facilitate a deeper understanding of the mechanisms by which DWP affects work-related outcomes, including moderators and mediators.

According to COR, individuals who value a particular resource are more likely to reinvest that resource, acquire new resources, and engage in behaviors that benefit them and their organizations (Hobfoll et al., 2018). A critical resource for employees is job engagement. Job engagement means that "A person who is involved in his work takes his job and career seriously, has meaningful values and components of his identity, will be affected emotionally and significantly by work experience, and will be mentally preoccupied with work" (Jans, 1982, p. 57). Examining job engagement is critical. Job engagement, or a positive attitude in the workplace, is essential in improving employee behavior and a source of competitive advantage for the organization (Hu et al., 2023). We thus consider job engagement as the mediator in the relationship between DWP and employee innovative behavior.

COR suggests that individuals are prone to stress when faced with resource loss or the threat of resource loss. People who lack resources are more likely to lose existing resources and more likely to lose even more resources under stress pressure, thus creating a cycle of resource loss (Hobfoll et al., 2018). Another vital resource for employees is job burnout. Job burnout is "a prolonged response to chronic emotional and interpersonal stressors on the job and is defined here by the three dimensions of exhaustion, cynicism, and a sense of inefficacy" (Maslach, 2003, p189). The fatigue and burnout of employees inhibit their ability to be innovative due to stress and a lack of time, resources, and support (Kwon and Kim, 2020). As a result, this study examines the role of burnout as a mediator between DWP and employee innovative behavior.

In addition, it is crucial to identify the boundary conditions within which DWP can influence workplace outcomes. As organizations increasingly utilize workgroups (Ohana and Stinglhamber, 2019), team leaders (supervisors) have acquired unprecedented influence over work teams (Wei et al., 2022). However, it remains to be seen how leaders may influence the consequences of DWP. As a dimension of paternalistic leadership, AL is characterized by high control over subordinates (Chiang et al., 2021). Authoritarian leaders use their authority, which is enshrined in organizational hierarchies, to demand absolute obedience from their subordinates (Pizzolitto et al., 2023). It has been recognized as a universal phenomenon in the Chinese working environment (Zhang et al., 2021). Most studies have examined the direct effects of AL at the workplace rather than its potential moderating effects (Yang and Wei, 2018). AL has been found to hinder team members' ability to obtain job resources and result in the loss of personal resources (Asim et al., 2021). According to COR, employees may cope with losing resources through AL by reallocating other available resources, such as those derived from DWP. As a result, AL may reduce the influence of the DWP on employee innovative behavior by misappropriating job-related resources obtained from the DWP.

3 Hypothesis

3.1 Main effect between DWP and employee innovative behavior

We propose that DW has a direct impact on employee innovative behavior. DWP reflects an individual's perception of work based on personal needs and comparison with others (Qing et al., 2016). A qualitative research result, combined with exploratory factor analysis and confirmative factor analysis for knowledge workers, shows that DWP includes job security, respect and support, self-value, and professional skills (Yan et al., 2023). Job security is related to employees' perceptions of income, benefits, and work safety provided by the employer. An employee's perception of fairness at work and the respect and support they receive from their colleagues and leaders are included in respect and support. Self-value refers to employees' perceptions of freedom, autonomy, and values in the work process. Knowledge and skills applied to the challenges of the job are referred to as professional skills.

Using the COR model, we consider job security and professional skills to be direct resources, whereas respect & support, and self-value are indirect resources. Research has demonstrated that job insecurity contributes significantly to employee stress and resource loss. Therefore, securing income and ensuring the safety of employees is essential for preserving and acquiring resources. Another vital resource is employees' sense of control over their work due to their

professional skills and challenging jobs (Kakavand et al., 2019). Employees with greater direct access to resources typically report a strong sense of job security and high levels of expertise, which can reduce stress on the job by providing them with a sense of psychological security (Newman et al., 2019). Respect, support, and self-value are indirect resources that come from appreciating and recognizing an employee's commitment to work, which is a powerful psychological motivator for the employee. As a result, employees with more indirect resources are more likely to have their ideas recognized and realized at work, which can provide psychological incentives for employees to work in an innovative manner.

It has been shown that knowledge workers satisfy their job demands by applying their job resources (Schaufeli and Bakker, 2004). Employees' innovative behavior may be significantly influenced by their ability to meet job demands (Li and Hsu, 2016). Employees with higher DWP have access to more direct and indirect resources, enabling them to use resources to meet job demands. Fulfilling job demands through the efficient utilization of resources creates psychological incentives that motivate employees to acquire more resources, thus entering the value-gain spiral. By accumulating and gaining resources, employees will continue to develop new ideas and innovate their working methods. Consequently, their innovative behavior can be enhanced and promoted. So, we propose that:

> *H1*: DWP has a significant positive effect on employee innovation behavior.

3.2 Mediating role of job engagement

It is well known that burnout and engagement are polarized aspects of work well-being (Schaufeli et al., 2002). A negative state known as burnout occurs when an individual's dedication to a career does not yield the desired results (Bakker et al., 2014). In contrast to work burnout, job engagement describes a positive integration between self and work achieved through self-control (Kahn, 1990). Job engagement includes vigor, dedication, and absorption (Schaufeli et al., 2002). A vigorous individual is energetic, possesses a high level of mental resilience at work, and is willing to work hard and persist despite obstacles. Dedication is characterized by high involvement in one's work, a sense of passion, inspiration, pride, and challenge. Absorption is defined as total concentration and attention, feeling that time passes rapidly at work and not wanting to stop working.

Based on COR, we propose that job engagement mediates DWP and employee innovation behavior. It is common for knowledge workers to have a high education level, engage in innovative work rather than repetitive and monotonous tasks, and exercise a significant degree of autonomy at work. The characteristics of knowledge work suggest that innovation is required at work. Following COR, knowledge workers' perception of DW is determined by their capacity to meet the demands of their jobs (Huang and Yuan, 2022). Workers with high DWP are more likely to have access to resources, such as a secure job, strong professional skills, support and respect from their organizations, as well as a high sense of self-value. Previous findings on Brazilian physicians suggest a correlation between DW and job engagement (Ferraro et al., 2020). By using resources effectively, knowledge workers can rationally assess individual resources when there is a high demand for innovation. In the face of difficulties, knowledge workers are more engaged in their tasks and are more willing to share their knowledge with others to overcome those challenges (Wu and Lee, 2020). Positive emotions have been found to stimulate creative inspiration and innovative behavior in knowledge workers (Montani et al., 2020). An employee whose innovative behavior is appreciated by the organization receives more intrinsic and extrinsic rewards, accumulating personal resources. The knowledge worker with a high DWP may be able to accumulate resources through engagement, enter a gain-spiral of resources, and demonstrate innovative behavior as a result. We propose that:

> *H2*: Job engagement mediates DWP and employee innovation behavior.

3.3 Mediating role of job burnout

We propose that job burnout mediates the relationship between DWP and employee innovative behavior. As the opposing facet of work well-being, burnout encompasses emotional exhaustion, cynicism, and low professional efficacy (Greenglass et al., 2001). An emotionally exhausted individual is not impulsive toward work and feels frustrated, stressed, and even frightened of it. A cynical employee keeps a distance from his or her coworkers and does not show enthusiasm or commitment to the work he or she does. Low professional efficacy refers to individuals who have a negative view of themselves and believe they are ineffective in their jobs.

COR suggests that when knowledge workers are faced with innovative requirements, they should utilize the existing resources to accomplish the task. Knowledge workers with a low DWP have fewer resources, unsecured employment, fewer skills, less organizational respect, and lower self-value at work. Lack of resources can cause psychological stress when faced with high job demands. Constant stress and tension produce burnout (Yui et al., 2021). In other words, job burnout contributes to negative emotions among knowledge workers, hinders their personal development and goal attainment, and inhibits their creativity (Li et al., 2019). A loss spiral occurs when individuals lose the resources they already possess and fail to acquire new resources, leading to further loss. Knowledge workers with a low DWP may exhibit negative emotions due to high job demands, including anxiety due to a lack of resources. Burnout can be caused by negative emotions, preventing access to resources, and inhibiting the generation of new ideas. Therefore, we propose that:

> *H3*: Job burnout mediates DWP and employee innovation behavior.

3.4 Moderating effects of authoritarianism leadership

From a leadership perspective, AL emphasizes the absolute authority of the leader. A leader closely monitors and manages subordinates who exhibit behaviors of attachment and obedience (Pizzolitto et al., 2023). Based on COR, leadership styles may affect a

subordinate's access to resources at work (Mahmood et al., 2020). Through positive leadership styles, subordinates are led into a resource-gain spiral by receiving positive feedback, which in turn facilitates the acquisition of additional resources by the subordinate. On the other hand, an adverse leadership style can result in negative feedback for subordinates, leading them to diminish their resources and resulting in a spiral of resource loss. Authoritative leaders demand high standards of work results from their subordinates, tightly control the work process, and often criticize and nitpick their work. Undoubtedly, this leadership creates negative feedback to the subordinates, which may result in psychological stress. Research findings suggest that AL can have a negative impact on subordinates' job satisfaction and organizational embeddedness (Siddique et al., 2020).

Knowledge workers with a high DWP have more resources, such as more robust job security, professional skills, respect and recognition, and a higher sense of self-value. Abundant resources motivate employees to increase job engagement (Zhang et al., 2019). A leader who exhibits AL behaviors will monopolize power, undermine the autonomy of his or her subordinates, disregard their opinions and suggestions, and frequently criticize and reprimand them. Subordinate support is undermined by this leadership behavior, resulting in weaker job resources for the subordinate. Furthermore, AL may lead to negative feelings among subordinates, who may feel that their leaders are more demanding and have less autonomy in their work. Negative emotions can diminish an employee's commitment to work and result in resource loss. If resources are depleted, fewer resources are available to acquire new ones, leading to psychological stress and low employee motivation (Hobfoll et al., 2018). Previous research on Chinese workers in Taiwan has shown that subordinates experience declines in motivation and job engagement when their leaders exhibit AL behaviors (Shu, 2015). Thus, knowledge workers with high DWP may experience work resource loss when under AL, resulting in low work engagement. Therefore, we propose that:

> *H4*: AL has a significant negative moderating effect on the relationship between DWP and job engagement.

Knowledge workers with a low level of DWP have fewer resources available at work, lack adequate job security, possess fewer professional skills, and receive less recognition and respect at work, making it more difficult to realize their self-value in the workplace. Knowledge workers who have a low level of DWP cannot meet the high job demands due to a lack of job resources when faced with AL. As a result, they tend to exhibit negative emotions at work, like procrastinating, being negligent, and not completing errands efficiently. Anxiety and boredom may result from long-term negative emotions, leading to job burnout. Anxious employees will likely invest less time, energy, and emotion into the job. As a result of mis-utilizing the resources, knowledge workers may lose the resources they already possess. A lack of resource investment may accelerate the speed at which resources are lost, resulting in continuous resource depletion, and thus entering a spiral of resource losses. Therefore, under AL, subordinates with low DWP show more significant levels of burnout due to a lack of resources. Therefore, we propose that:

> *H5*: AL has a significant positive moderating effect on the relationship between DWP and job burnout.

The theoretical framework of DWP, job engagement, job burnout, AL and employee innovative behavior is shown below (see Figure 1).

4 Methods

4.1 Procedures and samples

This study focuses on knowledge workers. The distribution of knowledge workers is characterized by industry aggregation, regional aggregation, and differences in ownership of enterprises. Currently, Chinese enterprises are characterized by differentiated development across industries, unbalanced development across regions, and diversified ownership. We used a stratified convenience sampling method to meet the requirement of a diverse sample. First, we targeted industries that gather knowledge workers, such as banking, securities, investment, insurance, TIC (testing, inspection, and certification), colleges and universities, and research laboratories. Second, we selected economically developed regions for sampling, such as metropolitan areas such as Beijing, Shanghai, and Guangzhou, as well as provincial capitals of the second tier. Our final step was to choose samples from different types of organizations, including state-owned enterprises, private enterprises, foreign enterprises, public institutions, and governments. The paper questionnaire was distributed face-to-face to ensure a high rate of return.

This survey was approved by the Academic Ethics Committee of the School of Business in July 2022. Subjects will receive a written consent form, which they must read and sign before starting the survey. We promised that the study would be conducted anonymously, and all data would be used for academic research only and not for commercial purposes. The subjects were informed that their research data would be stored on an encrypted computer and not made available to the public. The survey was conducted over four months, from September 1st, 2022, to December 31st, 2022. We distributed 580 questionnaires and collected 489 valid questionnaires with a valid recovery rate of 84.31%. The descriptive statistics of the sample are shown in Table 1. Males accounted for 40.5% of the sample, while females accounted for 59.5%, slightly higher than males. The age distribution of the sample indicates that 7.6% are 25 years of age or younger, 55.8% are 26–34 years of age, 27.2% are 36–45 years of age, and 9.4% are 46 years of age or older. This is in line with the characteristics of the human capital curve. As for education level, 9.2% of respondents hold a junior college degree or lower, 65% hold an undergraduate degree, 18.6% hold a postgraduate degree, and 7.2% hold a doctoral degree. As for ownership, state-owned enterprises accounted for 59.1%, private enterprises accounted for 10%, foreign enterprises accounted for 3.7%, public institutions and government accounted for 24.7%, and others accounted for 2.5%. Banking accounted for 28% of the industry distribution; insurance accounted for 37%; securities and investment accounted for 4.9%; TIC accounted for 6.1%; and colleges, universities, and research institutions accounted for 22.5%, reflecting the clustering characteristics of knowledge workers within the industry. In terms of organization tenure, 6.1% of samples work for half a year or less, 5.7% work for 0.6–1 year, 22.5% work for 1.1–3 years, 19.2% work for 3.1–5 years, 19% work for 5.1–10 years, and 27.4% work for 10.1 years and above. Accordingly, knowledge workers prefer stable employment and will likely remain employed for a lifetime.

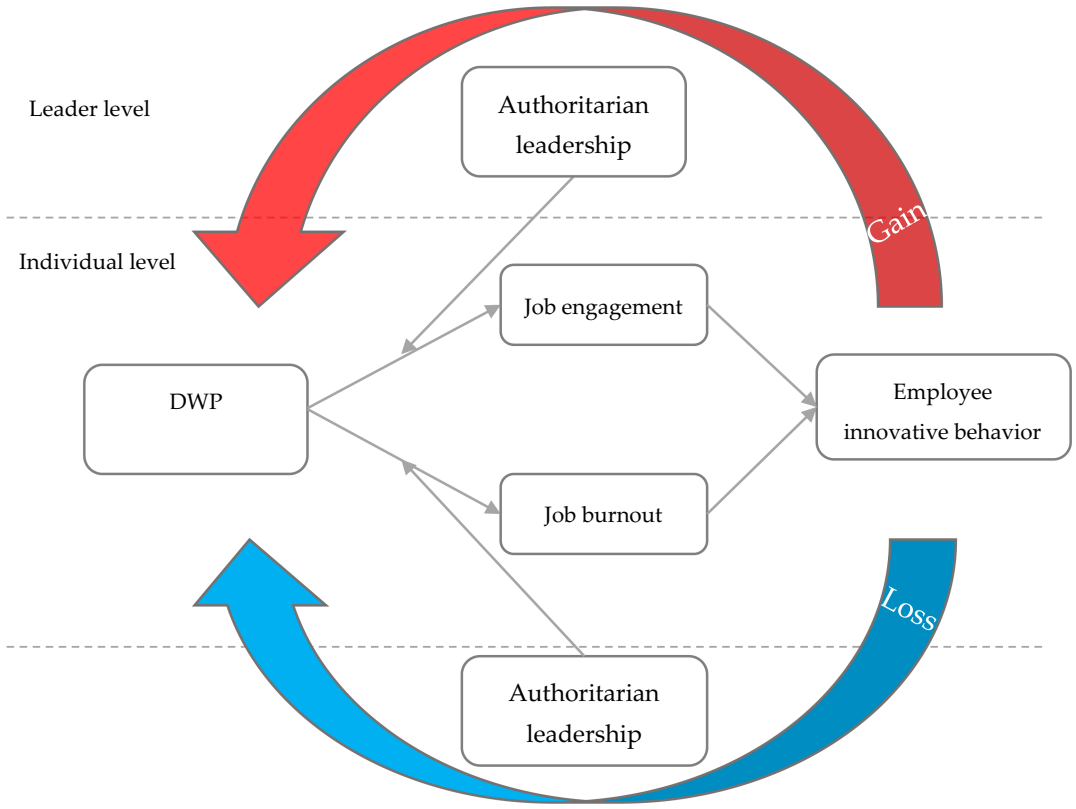

FIGURE 1
Theoretical framework.

4.2 Measures

In this study, we used the newly developed scale for knowledge workers, DWPS. It was found that the DWPS had good reliability and validity among Chinese knowledge workers. We utilized the Chinese version of scales for job engagement, job burnout, and AL and the original English scale for employee innovative behavior. We performed back-translation to ensure the validity of the employee innovative behavior scale. To begin with, a doctoral student in human resource management translated the English version of the employee innovative behavior scale into Chinese. The Chinese text was then translated into English by another human resource management PhD student. A professor of human resource management compared the two English versions of the scale and checked items in the Chinese version.

The questionnaire was divided into leaders' and subordinates' parts. Leaders and subordinates needed to be rigorously surveyed in one-to-one pairings to satisfy the moderating effect between leaders and subordinates designed for this study. The questionnaire was divided into three parts. Part one was guidance, including the study purpose and research content. Part two was the measurement items for each variable. All of them were on a 5-point Likert scale, with 1 indicating strongly disagree, 2 indicating disagree, 3 suggesting neutrality, 4 showing agree, and 5 indicating strongly agree. Part three was demographic variables.

We conducted a reliability test, validity test, and common method bias test for the formal survey. We used reliability and KMO tests to ensure the scale's reliability and validity (see Table 2). It is required to take a common method bias test since the survey was self-reported. The Harman single-factor test was used to test respondents' self-reports of DWP, AL, job engagement, and job burnout based on the criteria provided by Podsakoff et al. (2003). We did an exploratory factor analysis of all the variables and extracted seven unrotated factors with eigenvalues greater than 1 by principal component analysis. Results showed that the explained variance ratio of the first factor was 29.099%. Referring to Podsakoff et al. (2003), it was considered that there was no serious common method bias among the variables since the explained variance ratio of the first factor was lower than 40%.

4.2.1 DWP

We selected the DWPS developed by Yan et al. (2023) for knowledge workers as the measurement tool for DW. This scale contains 14 questions in four dimensions: job security, professional skills, respect & support, and self-value. As shown in Table 2, the Cronbach'α value of each dimension for DWPS is over 0.8, with 64.788% of the explained variance ratio, indicating high reliability and validity. We do not revise the questions since they were developed for knowledge workers, which is adequate for our research subjects. The complete scale of DWPS can be found in the Table A1 in the Appendix.

4.2.2 Job engagement

This study used the Utrecht Work Engagement Scale (UWES) developed by Schaufeli et al. (2019), which includes dimensions such as vigor, dedication, and absorption. The Cronbach'α value of UWES is 0.901, more significant than 0.7, demonstrating good reliability. The

TABLE 1 Descriptive statistical analysis of formal survey.

Variable	Item	Percentage (%)
Gender	Male	40.5
	Female	59.5
Age	25 years old and below	7.6
	26–35 years old	55.8
	36–45 years old	27.2
	46 years old and above	9.4
Education	Junior college and below	9.2
	Undergraduate college	65.0
	Postgraduate college	18.6
	PhD	7.2
Ownership	State-owned business	59.1
	Private business	10.0
	Foreign enterprise	3.7
	Public organizations and government	24.7
	Others	2.5
Industry	Banking	28.0
	Insurance	37.0
	Security	4.9
	TIC	6.1
	Public organizations and governments	22.5
	Others	1.4
Organization tenure	0.5 year and below	6.1
	0.6–1 year	5.7
	1.1–3 years	22.5
	3.1-5 years	19.2
	5.1–10 years	19.0
	over 10 years	27.4

KMO value is 0.747, and the variance explained is 83.714%, which suggests good validity.

4.2.3 Job burnout

We use the Burnout Inventory General Survey (MBI-GS) developed by Maslach et al. (2001) to measure job burnout. The MBI-GS contains 16 questions in three dimensions: emotional exhaustion, cynicism, and low professional efficacy. The Cronbach'α values for each dimension are 0.906, 0.899, and 0.855, respectively, indicating good reliability. The KMO value is 0.905, and the variance explained is 71.742%, suggesting good validity.

4.2.4 Authoritarian leadership

This study utilized the authoritarian leadership scale (ALS) developed by Wu and Zhao (2009) as the measurement tool. Conducting on the definition of AL by Cheng et al. (2000), Wu and Zhao (2009) developed ALS in the Chinese context. The ALS consists of nine questions using subordinates' ratings of their superiors' leadership style. The Cronbach'α of ALS is 0.934, which indicates that the scale has good reliability. The KMO value is 0.907 and the variance explained ratio is 65.778%, which demonstrates the questionnaire has good validity.

4.2.5 Employee innovative behavior

We adopt the innovative behavior scale developed by De Jong and Den Hartog (2010), which measures employee innovative behavior from a process perspective. This scale contains four dimensions: idea development, idea generation, idea dissemination, and idea implementation. Based on the leader's evaluation, this scale is shown to be an effective tool for measuring the innovative behavior of knowledge workers. The Cronbach'α value of the scale is 0.774, indicating good reliability. The KMO value is 0.775, and the variance explained is 59.903%, suggesting good validity.

4.2.6 Control variables

We choose gender (1 = male, 2 = female), age (1 = 25 years old and below, 2 = 26–35, 3 = 36–45, 4 = 46 years and above), education (1 = junior college and below, 2 = undergraduate college, 3 = postgraduate college, 4 = PhD), organization ownership (1 = state-owned business, 2 = private business, 3 = foreign enterprise, 4 = public organizations and governments, 5 = others), industry (1 = banking, 2 = insurance, 3 = security, 4 = TIC, 5 = public organizations and governments, 6 = others) and organization tenure (1 = 0.5 year and below, 2 = 0.6–1 year, 3 = 1.1–3 years, 4 = 3.1-5 years, 5 = 5.1–10 years, 6 = over 10 years) as control variables. Organization tenure is calculated as the years since the respondent works in this organization.

5 Results

5.1 Correlations and ANOVA

Correlation analysis, as the primary test for the relationship between variables, predicates the hypothesis. We conducted a correlation analysis on five variables, and the results are shown in Table 3. DWP is positively correlated with job engagement (r = 0.681), negatively correlated with job burnout ($r = -0.531$), and positively correlated with employee innovative behavior ($r = 0.221$). AL is negatively correlated with job engagement ($r = -0.134$) and positively correlated with job burnout (0.439). Job engagement is positively correlated with employee innovative behavior ($r = 0.233$). The correlation results indicate the relationship between the five variables in the hypothesis and their direction.

Group t-tests and ANOVA are conducted to test whether demographic factors affect the relationship between independent and dependent variables. We utilize the group t-test to examine gender differences. Results of the F-test on the two genders show that the *p*-values of all factors are more significant than 0.05 at the significance level of 5%, indicating no significance in all factors between the two genders. We conducted ANOVA on age, education, ownership, industry, and organization tenure. Education, ownership, industry, and organizational tenure significantly affect the relationship between independent and dependent variables, while age does not play a significant role. As a result, we need to control the effect of education, ownership, industry, and organization tenure on variables when testing the hypothesis.

5.2 Hypothesis test

We hierarchical linear modeling (HLM) to examine the moderating effect by using statistical software HLM6.08. HLM is suitable for empirical analysis of nested relationships, which means that the observed data belong to different levels. In this study, a team-level variable, AL refers to leaders' behavior to monitor and control their subordinates. Individual-level variables include DWP, job engagement, job burnout, and employee innovation behavior. We use the HLM to examine nested data at the team and individual levels to obtain accurate and reliable results.

5.2.1 Main effects

H1 proposes that DWP positively affects employee innovative behavior. Team leaders evaluate innovative behavior, and subordinates self-report DWP. The team data and individual data are nested. Therefore, it is necessary to conduct HLM to test the relationship between DWP and employee innovative behavior. Table 4 shows a positive correlation between DWP and employee innovative behavior (M3, $y = 0.088$, $p < 0.01$). Therefore, H1 is supported.

5.2.2 Mediating effects

H2 proposes that job engagement mediates the relationship between DWP and employee innovative behavior. H3 supposes job burnout mediates the relationship between DWP and employee innovative behavior. We utilize HLM to test the hypothesis since the employee innovative behavior from the team level and job engagement, job burnout, and DWP from the individual level are nested data. According to Baron and Kenny (1986), we analyze mediating effects in two steps. Step 1 is to test the positive effect of DWP on employee innovative behavior. Step 2 is to examine the effect of job engagement and job burnout on employee innovative behavior when controlling the effect of education, ownership, industry, and organization tenure.

Table 5 shows that job engagement has a significant effect on employee innovative behavior ($\gamma 60 = 0.048$, $p < 0.05$) in step 2, while job burnout does not have a significant effect on employee innovative behavior ($\gamma 70 = 0.031$, $p > 0.1$). The results indicate that job engagement mediates the relationship between DWP and employee innovative behavior. Therefore, H2 is supported. Job burnout does not mediate between variables, and H3 is not supported. As shown in Table 5, DWP does not significantly affect employee innovative behavior in step 2 ($\gamma 50 = 0.043$, $p > 0.1$), indicating that job engagement has full mediation between DWP and employee innovative behavior.

5.2.3 Moderating effects

H4 proposes that AL has a negative moderating effect on the relationship between DWP and job engagement. Since AL is a team-level variable while DWP and job engagement are individual-level variables, we need to construct the HLM to analyze the moderating effect of AL. The interaction of DWP and AL in Table 6 is shown as DWP*AL, which has a significant negative effect on job engagement ($\gamma 70 = -0.175$, $p < 0.01$, See Figure 2). Thus, H4 is supported.

H5 proposes that AL has a positive moderating effect on the relationship between DWP and job burnout. We used the same steps as H4, and the study results are shown in Table 7 and Figure 3. The interaction between DWP and AL has a significant positive effect on job burnout ($\gamma 70 = 0.165$, $p < 0.01$, See Figure 3). Therefore, H5 is supported.

TABLE 2 Reliability test results and validity test results of formal survey.

Variable	Dimension	Cronbach'α	KMO	Explained variance
DWP	Job security	0.842	0.931	64.788
	Professional skills	0.876		
	Respect & support	0.869		
	Self-value	0.857		
Job burnout	Emotional exhaustion	0.906	0.905	71.742
	Cynicism	0.899		
	Low professional efficacy	0.855		
Job engagement		0.901	0.747	83.714
AL		0.934	0.907	65.778
Employee innovative behavior		0.774	0.775	59.903

6 Discussion

6.1 Key conclusion

This study confirms that knowledge workers' DWP significantly positively affects employee innovative behavior (H1). Job engagement has a fully mediating effect on DWP and innovative behavior (H2). However, this study did not support the mediating effect of job burnout on DWP and innovative behavior (H3). AL negatively moderated the relationship between DWP and job engagement (H4) and positively moderated the relationship between DWP and job

TABLE 3 Correlation analysis results.

Variable	M	SD	1	2	3	4	5
1. DWP	3.881	0.562	1				
2. Job engagement	2.893	0.836	0.681**	1			
3. Job burnout	2.428	0.550	−0.531**	−0.491**	1		
4. AL	2.634	0.773	−0.172**	−0.134**	0.439**	1	
5. Employee innovative behavior	3.148	0.391	0.222**	0.233**	−0.038**	0.021	1

**$p < 0.01$; *$p < 0.05$.

TABLE 4 HLM results of H1.

Variable	Employee innovative behavior						
	M1	M2	M3	M4	M5	M6	M7
Constant	3.144	3.145	3.137	3.144	3.145	3.144	3.144
Education		0.005	0.008	0.004	0.008	0.005	0.008
Ownership		0.021	0.022	0.019	0.019	0.022	0.020
Industry		0.002	0.001	0.001	0.000	0.002	0.0002
Organization tenure		−0.010	−0.008	−0.009	−0.008	−0.006	−0.007
Team size		−0.008	0.015	0.011	0.008	0.012	0.012
DWP			0.088**				
Deviance	330.098	355.731	352.305	354.9	357.58	356.115	359.979

**$p < 0.01$; *$p < 0.05$.

TABLE 5 HLM results of H2 and H3.

Variable	Employee innovative behavior		
	Step 1	Step 2	
Constant (γ_{00})	3.137	3.136	3.144
Education (γ_{10})	0.008	0.011	0.007
Ownership (γ_{20})	0.021	0.02	0.021
Industry (γ_{30})	0.0006	0.004	0.0001
Organization tenure (γ_{40})	−0.008	−0.01	−0.01
DWP (γ_{50})	0.088**	0.043	0.102**
Job engagement (γ_{60})		0.048*	
Job burnout (γ_{70})			0.031
Team size (γ_{01})	0.015	0.0168	0.012
Deviance	352.305	352.185	356.438

**$p < 0.01$; *$p < 0.05$.

burnout (H5). Job engagement tends to decline under AL when knowledge workers have high DWP. Knowledge workers tend to show high levels of burnout with low DWP. Knowledge workers, however, tend to experience higher levels of burnout under the influence of AL.

6.2 Theoretical contributions

The main effect of H1, DWP has a positive effect on employee innovative behavior and expands the research on the impact of DWP on employee behavior. In recent years, with the development of individual DW scales, scholars have begun to explore the outcome variables of DWP. It was found that DW significantly positively affects employees' in-role performance, organizational citizenship behavior (Huang and Yuan, 2022), proactive behavior, and voice behavior (Sheng and Zhou, 2022). However, there needs to be more research into the relationship between DW and employee innovation behavior. This study expands the scope of the relationship between DWP and employee behavior. It contributes to the basis for the mechanism of DWP and employee innovative behavior.

H2 and H3 further explore the relationship between job engagement and job burnout. This study verified the fully mediating role of job engagement between knowledge workers' DWP and innovative behavior. However, it did not validate job burnout's mediating role. This may be because innovative behavior, as a positive behavioral outcome, is more likely to be influenced by positive attitudes (Kwon and Kim, 2020). The findings of this study again validate that job engagement, as a positive emotion, is the opposite of job burnout, which is a negative emotion. Previous research has found that job engagement can protect against job burnout (Maslach and Leiter, 2016). Employees who do not engage in their jobs do not necessarily mean they are burnout (Conway et al., 2016). Therefore, job engagement and burnout may have a non-linear or U-shaped relationship. There is a complex and diverse relationship between engagement and burnout, indicating the need for further research. Knowledge workers have fewer simple and repetitive tasks as a result of the nature of their work. Their work processes must be improved, more intellectual intelligence must be consumed, and more creative ideas must be generated. This job requires a high level of engagement and is less likely to lead to burnout. This may be one of the reasons burnout is not significant. Researchers can explore the relationship between engagement and burnout in other groups, such as industrial workers and informal employees, in future studies.

H4 and H5 contribute to DW boundary conditions. Leadership is the team-level variable, while DWP is the individual-level variable. This study introduces AL, a team-level variable, to the individual-level study of DWP using HLM. It provides new ideas for cross-level research on DW based on the results of this study. Previous studies have confirmed the impact of positive leadership on DW, such as entrepreneurial leadership (Shehri et al., 2022), and negative leadership styles, such as toxic leadership (Casqueira, 2019). However, leaders' leadership is diverse and complex. Exploring the impact of leadership on DW in different cultural contexts is conducive to boundary studies of DW. AL is a unique style of leadership within the Chinese cultural context. Therefore, this study not only helps scholars to understand the role of contextual factors in the relationship between leadership and individual attitudes and behaviors but also facilitates scholars to explore the boundaries of leadership on DW in various cultural contexts in the future.

6.3 Practical implications

This paper provides new insights into how to develop the innovative behavior of knowledge workers. On the one hand, we found that DWP had a significant positive effect on employee innovative behavior. Knowledge workers are vital in enhancing the organization's

TABLE 6 HLM result of H4.

Variable	Job engagement			
	M1	M2	M3	M4
Constant (γ_{00})	2.904	2.914	2.900	2.903
Education (γ_{10})		−0.052	−0.055	−0.061
Ownership (γ_{20})		0.052	0.040	0.041
Industry (γ_{30})		−0.035	−0.049	−0.052
Organization tenure (γ_{40})		−0.028	0.003	0.011
DWP (γ_{50})			0.983**	0.997
AL (γ_{60})			−0.033	−0.001
DWP*AL (γ_{70})				−0.175**
Team size (γ_{01})		−0.059	−0.023	−0.029
Deviance	1169.481	1185.67	931.682	927.361

**$p < 0.01$; *$p < 0.05$.

TABLE 7 HLM result of H5.

Variable	Job burnout			
	M1	M2	M3	M4
Constant (γ_{00})	2.425	2.423	2.424	2.423
Education (γ_{10})		0.006	0.017	0.023
Ownership (γ_{20})		−0.0153	−0.017	−0.017
Industry (γ_{30})		−0.028	0.006	0.009
Organization tenure (γ_{40})		0.054**	0.023	0.016
DWP (γ_{50})			−0.4535**	−0.467**
AL (γ_{60})			0.240**	0.213**
DWP*AL (γ_{70})				0.165**
Team size (γ_{01})		0.032	0.011	0.016
Deviance	766.468	781.288	581.259	569.926

**$p < 0.01$; *$p < 0.05$.

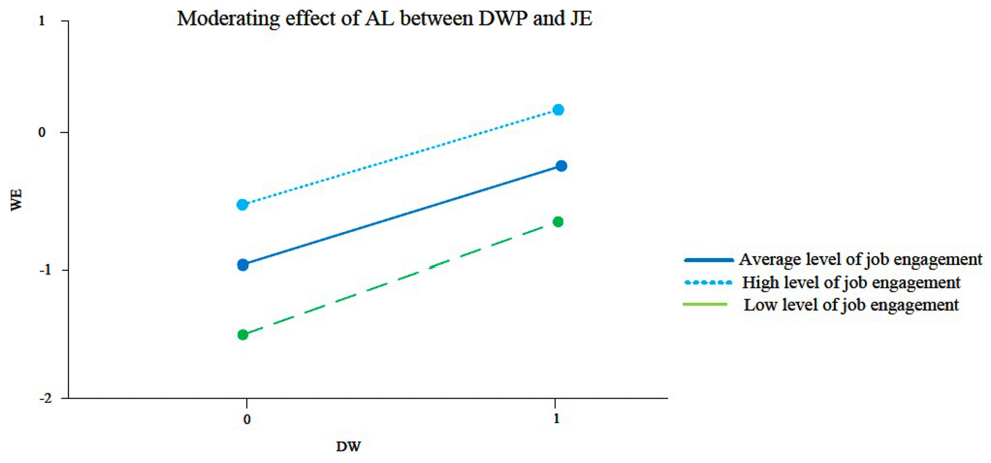

FIGURE 2
Moderating effect of AL between DWP and JE.

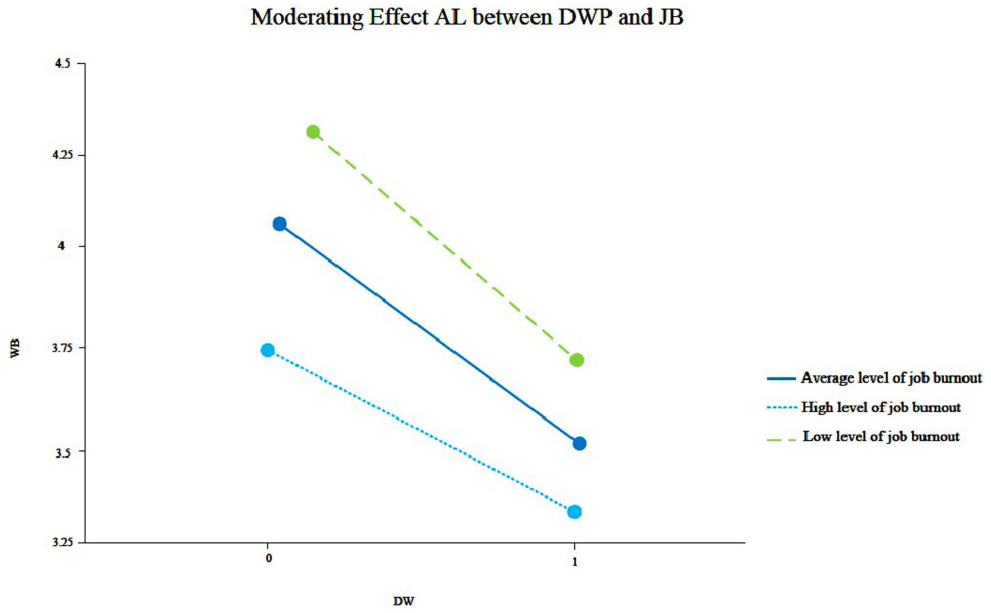

FIGURE 3
Moderating effect of AL between DWP and JB.

competitive advantage as vital capital. Knowledge workers' DW includes job security, respect and support, self-value, and professional skills. The research results can guide managers in developing innovative behavior within their employees by providing them with a secure job, respecting their efforts, recognizing their performance, and improving their professionalism. Additionally, we found that job engagement mediates the relationship between DWP and employee innovation. Monitoring employee engagement can assist managers in predicting innovative performance among employees.

The results of this study provide new insights into how leadership can be transformed. We found that AL negatively moderates the relationship between DWP and job engagement and positively moderates the relationship between DW and job burnout. As a result of their traditional Chinese cultural background, Chinese leaders tend to demonstrate AL behaviors. The growing group of new generation Y employees has increasingly become the main force of China's organizations. The majority of them are the only child in their family. Parents give excessive care and love. At work, they are eager to maintain equal communication with their supervisors. The AL style with large power distances is not preferred by new generations, inhibiting the development of innovative behavior. Leaders should change their AL style to manage the new generation of knowledge workers.

6.4 Limitations and future directions

Limitations are discussed from the sample, common variance bias, and cross-sectional data. (1) Sample limitations. We used convenience sampling to obtain instant and objective data paired with mutual ratings between leaders and subordinates. The randomness of the samples needs to be improved. Additionally, we selected samples from a variety of cities, industries, and positions in order to broaden the sample. The samples may, however, be homogenous due to the fact that they come from Chinese workplaces. (2) Common variance bias. There may be a social desirability bias effect of the scale completed by the subordinates. Moreover, there may have been some correlations between the different variables. The social desirability bias effect and correlation between variables may lead to common variance bias. (3) Cross-sectional data limitations. We use cross-sectional data rather than longitudinal data to test the theoretical model. DWP, job engagement, and burnout are ongoing psychological states. Thus, a longitudinal approach may contribute to improving the research results.

Future studies can be developed from sampling, data selection, and methods. (1) There is a need to broaden the scope of future studies by including more industries and nations and to expand the sample size worldwide. Various work groups from different countries can be compared in future studies. International scholars are encouraged to collect data from around the world. The models will also be tested for robustness through comparative studies across samples from different countries and regions. (2) Various data selections. Future research could also incorporate questionnaires with objective data, such as innovation performance, to avoid common variance bias. (3) Application to longitudinal studies. In the future, a two-stage moderating effect of AL could be conducted on longitudinal data to examine the in-depth influence of leaders on the relationship between subordinates' attitudes and behaviors. Furthermore, the mediating effect of job burnout was not supported in this study. Future research can be conducted on various sample groups, and improvement of the theoretical framework to explore the mechanism of job burnout and DWP.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by this survey was approved by the Academic Ethics Committee of the School of Business of Shanghai Dianji University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

YY: Writing – original draft, Conceptualization, Investigation, Software. DD: Funding acquisition, Visualization, Resources, Writing – review & editing. YG: Data curation, Methodology, Supervision, Writing – review & editing. JG: Formal analysis, Project administration, Validation, Writing – review & editing. EL: Data curation, Resources, Writing – review & editing.

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Conflict of interest

EL was employed by Chengdu Huizhixin Management Consulting Co., Ltd.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Appendix

TABLE A1 Complete scale of DWPS.

DWPS for Knowledge Workers
My income is secured
My organization can provide security for my work
The organization can provide me with good benefits
My work gives me respect and recognition.
I am fairly and equitably treated at work
I can be respected and am satisfied with my current job
I can get help and support in my work
My work allows me to be respected and recognized
I can work with autonomy and freedom
I can create value in my work
My work gives me a sense of achievement
My job requires high competence
My job requires professional knowledge and skills
My job is challenging

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The effect of cadet resilience on self-efficacy and professional achievement: verification of the moderated mediating effect of vocational calling

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Background: The primary objective of this study was to empirically examine the influence of cadets' resilience on their professional achievement within the unique context of a Military Academy. In doing so, the study sought to delineate the role of self-efficacy as a key mediator in the intricate relationship between the resilience of cadets and their professional achievements. The main focus of this study was to clarify the causal and effect relationships between the psychology and behavior mechanisms of the cadets. This was achieved through rigorous scrutiny of the moderated mediating effect of vocational calling within the multifaceted relationship involving cadets' resilience, self-efficacy, and professional achievement.

Methods: The study's participant pool consisted of 121 individuals, comprising cadets in their third and fourth years of study, all of whom aspired to attain the rank of officer within the Military Academy. To rigorously investigate the hypotheses presented, a series of causal relationships among the four core variables were evaluated using a robust regression analysis methodology. To facilitate this analysis, the PROCESS macro 3.5v, a Hayes-developed tool, was effectively used.

Results: The findings of this study revealed several critical insights. First, vocational calling emerged as a potent moderating factor in shaping the relationship between cadets' resilience and self-efficacy. Furthermore, it was demonstrated that vocational calling exerted a conditional influence on the impact of cadets' resilience on their professional achievement, with self-efficacy serving as a crucial mediating mechanism in this relationship. In particular, the study affirmed that self-efficacy functioned as a comprehensive mediator, elucidating the pathway through which the resilience of the cadets ultimately influenced their professional achievements.

Conclusion: The results of this research contribute significantly to enhancing our understanding of the intricate connection between the resilience levels exhibited by cadets and their corresponding professional achievements. Furthermore, these findings have valuable implications for the ongoing refinement of military education and training programs. They offer insights that could inform the development of more effective testing and selection protocols for military personnel, ultimately benefiting the armed forces in their pursuit of excellence.

KEYWORDS

cadets, self-efficacy, resilience, professional achievement, vocational calling, moderated mediating effect

1 Introduction

The selection and training of military personnel have assumed paramount significance in contemporary times, as underscored in recent scholarly literature (Haralambie, 2016; Rodden-Aubut and Tracey, 2022). Indeed, the effective performance of soldiers has perennially represented a major challenge for armed forces worldwide (Sellman et al., 2010). However, the landscape of military effectiveness is evolving, with increasing emphasis on individual contributions of soldiers (Shamir and Ben-Ari, 2018). This transition towards recognizing the key role of individual actions within the military domain highlights the need for more comprehensive and nuanced research efforts. The evolving dynamics of warfare, with contemporary operational scenarios often demanding swift, adaptable, and strategic responses from soldiers, require a more profound understanding of the factors and psychological attributes that underpin military effectiveness (Goodwin et al., 2018; Bekesiene, 2023; Covington et al., 2024). Given this evolving landscape, it is evident that contemporary research in this domain is instrumental not only in shaping the selection and training processes but also in enhancing overall military performance and readiness in an era marked by dynamic challenges and shifting paradigms (Britt et al., 2013).

In the sphere of military professionalism, encompassing soldiers and officers alike, adherence to rigorous standards is not just an expectation, but a fundamental requirement (Nindl et al., 2018). These exacting standards are essential in equipping military personnel to navigate the myriad of challenging scenarios they may encounter. In this context, the concept of self-efficacy assumes a key role, as it refers to an individual's firm belief in their ability to competently execute tasks, overcome impediments, and succeed in specified circumstances (Boe et al., 2018). Self-efficacy, grounded in an individual's self-perception of their own capabilities, serves as a cornerstone in the soldiers' capacity to confront and effectively manage unforeseen and demanding situations. This psychological attribute fosters resilience, adaptability, and resourcefulness among military professionals, allowing them to rise to the occasion and overcome adversities, on the battlefield or in complex operational environments (Coughlin, 2018). Recognizing the important role of self-efficacy within military contexts is essential not only to understand the psychology of soldiers, but also to optimize training, leadership, and support systems to fortify their ability to perform under the most challenging of circumstances. This understanding is an indispensable facet in ensuring the continued excellence and readiness of military forces in the face of evolving challenges and exigencies (Djourova et al., 2020; Bekesiene et al., 2022, 2023; Kanapeckaitė et al., 2022).

Soldiers and officers who exhibit elevated levels of self-efficacy are notably predisposed to undertaking and excelling in challenging tasks, demonstrating unwavering persistence in the face of adversity, and displaying remarkable adaptability in the ever-evolving landscape of military operations (Myrseth et al., 2018). This psychological attribute, self-efficacy, fundamentally influences the approach of these individuals toward tasks, imbuing them with unwavering confidence and the unshakeable belief in their capacity to achieve success, even in the most demanding circumstances. This optimistic and self-assured mindset exerts a profound and affirmative impact on individuals' performance within military contexts. Self-efficacious military professionals are notably inclined to set ambitious goals and exhibit the requisite determination and exertion to achieve them. Consequently, they are shown to be instrumental in not only achieving individual success but also enhancing the collective effectiveness of military teams. In essence, the development and cultivation of high levels of self-efficacy among military personnel emerge as a crucial and multifaceted element in the acquisition of specific military skills and capabilities (Johansen et al., 2014; Boe et al., 2018). These attributes not only enhance individual proficiency, but also serve as key drivers in overall preparedness, performance, and mission success of military units, highlighting the critical role of self-efficacy within the military domain.

Within the military context, the demand for rapid decision-making and effective problem solving in high-stress situations is a recurring and formidable challenge encountered by military professionals (Myrseth et al., 2018; Smaliukienė et al., 2023). In this crucible of pressure, the presence of strong self-efficacy emerges as a crucial psychological resource. Self-efficacious military professionals have an unwavering belief in their ability not only to confront but also to overcome the multifaceted challenges that high-stress scenarios present. This enhanced sense of self-efficacy contributes significantly to their stress management abilities by instilling the confidence needed to navigate adversity, ultimately reducing anxiety levels, improving focus, and improving their ability to make informed decisions under duress. Furthermore, resilience is an indispensable trait within military circles, encapsulating the ability to rebound from setbacks, adapt to new and dynamic situations, and maintain overall well-being (Harms et al., 2018; Dimas et al., 2021). Individuals with high self-efficacy exhibit a remarkable perspective in the face of adversity, characterizing setbacks as transient obstacles that can be overcome with unwavering effort and unwavering determination. This mindset empowers them not only to bounce back from failures but also to distil valuable lessons from their experiences. Armed with this psychological resource, they persist in their pursuit of goals with resolute determination, bolstering their ability to contribute to mission success and overall well-being within the military environment (Nindl et al., 2018). It can also be said that the interplay of self-efficacy, stress management, and resilience within the military context unveils a nexus of psychological attributes that significantly influence the performance, well-being, and adaptability of military professionals. These qualities are fundamental to navigate high stress and formulating an unwavering and resolute approach to adversity and challenges encountered in military operations (Blacker et al., 2019; Flood and Keegan, 2022).

In the realms of occupational psychology and organizational behavior, contemporary vocational calling is recognized as having profound social significance. Vocational callings represent more than mere career choices; militaries are deeply rooted in personal passions, values, and a sense of purpose (Hall and Chandler, 2005). Contemporary vocational callings are intrinsically linked to personal fulfilment and identity (Ahn et al., 2017; Duffy et al., 2018). When people find vocations that align with their true calling, they experience a deep sense of purpose and satisfaction (Hall and Chandler, 2005; Duffy and Dik, 2013). This alignment with one's calling leads to a stronger sense of identity, as individuals see their work as an integral part of who they are. Experts in occupational psychology have emphasized the importance of identifying and nurturing these callings to achieve higher levels of personal well-being (Bimrose and Hearne, 2012; Slemp et al., 2015). The notion of vocational calling extends to the pursuit of balance and well-being in contemporary society. Experts

in occupational psychology stress the importance of a work-life balance (Akanji et al., 2020). Vocational callings that prioritize personal growth, mental health, and flexibility help people achieve a healthier work-life balance. This, in turn, contributes to improved mental health and overall well-being (Redekopp and Huston, 2020).

In pursuit of comprehending the intricate interplay among vocational calling, resilience, self-efficacy, and their impact on cadets' military performance, this study was fundamentally designed to investigate the moderated mediation effects of self-efficacy in the relationship between resilience and military performance. Research sought to unravel the nuanced dynamics that underpin how vocational calling influences resilience, and, in turn, how self-efficacy acts as a mediator, channelling these influences to affect the ultimate outcome of military performance. To achieve this, the study used a methodological framework that encompasses a multifaceted analysis of these constructs, allowing exploration of interconnectedness and the potential moderating role of vocational calling. This research represents a critical step towards a more comprehensive understanding of the intricate mechanisms that drive professional success and well-being within military cadets, shedding light on the pivotal role that vocational calling, resilience, and self-efficacy play in shaping their performance and outcomes in the military domain.

In the realm of academic research, prior investigations have predominantly focused on the evaluation of students' beliefs and attitudes pertaining to their capacity to attain academic excellence (Caprara et al., 2011; Zimmerman, 2013; Hayat et al., 2020; Bekesiene, 2023). These studies have frequently employed self-efficacy as a mediating factor to understand the relationship between such beliefs and actual academic performance within civilian educational institutions (Yu et al., 2016; Alyami et al., 2017; Doménech-Betoret et al., 2017; Li et al., 2022). However, the literature offers a limited scope when it comes to unravelling the implications of vocational calling on the intricacies of military performance. This lack of information underscores the need for a comprehensive exploration of the multifaceted dynamics that connect resilience, self-efficacy, and collective influence within the military context. In response to this gap, the main objective of this study was to conduct a rigorous examination of direct and indirect pathways that interconnect resilience and self-efficacy within the unique framework of military cadet performance. By exploring these pathways, this research sought to expand our understanding of how psychological attributes such as resilience and self-efficacy contribute to the multifaceted landscape of military success, offering valuable insights that can inform military training, education, and overall performance enhancement strategies.

2 Theoretical background

2.1 Resilience

Resilience in the context of militaries refers to the ability of military organizations and their personnel to withstand, adapt to, and recover from challenges, crises, and adversities while maintaining their operational effectiveness and mission readiness (Britt et al., 2013). It encompasses various aspects of preparation, response, and recovery, both at the organizational and individual levels (Carlson et al., 2012). Additionally, resilience plays an important role in underpinning the vocational calling, influencing individuals' ability to pursue and sustain a career path driven by a deep sense of purpose and passion (Kossek and Perrigino, 2016; Salisu et al., 2020). Therefore, in the pursuit of a vocational calling, militaries often face challenges, setbacks, and obstacles. Thus, resilience enables them to face these challenges with determination and persistence, allowing them to stay committed to their chosen path even in the face of difficulties (Skinner and Pitzer, 2012).

In particular, the vocational calling is often characterized by strong internal motivation and a deep sense of purpose (Hall and Chandler, 2005; Woodruff et al., 2006; Mileham, 2010; Osterberg et al., 2020). There resilience can help militaries maintain their motivation over the long term. During service time, when soldiers face obstacles or experience failures, their resilience allows them to adapt, learn from their experiences, and continue working toward their vocational goals (Snider and Watkins, 2000). Moreover, vocational callings can evolve over time as individuals grow and develop, and resilience is essential for adapting to these changes, whether it involves refining one's career goals, exploring new avenues, or transitioning into different roles while still staying true to one's calling.

In addition, resilience fosters self-efficacy, which is the belief in one's ability to overcome challenges and achieve goals (Howe et al., 2012; Cassidy, 2015). With a strong sense of self-efficacy, militaries pursuing a vocational calling are more likely to persevere and make the necessary efforts to succeed in their chosen field.

Military resilience can be stated to be a multifaceted concept that encompasses a wide range of skills, strategies, and capabilities that aim to ensure that military forces can continue to fulfil their roles and missions even in the face of adversity and uncertainty (Wood et al., 2019). It is an essential aspect of modern military planning and preparedness. Overall, for military personnel, resilience serves as a critical foundation for vocational callings by providing individuals with the psychological and emotional resources needed to navigate the challenges, uncertainties, and personal growth that come with following a deeply meaningful career path. It helps them persist, adapt, and thrive in their chosen vocations, allowing them to fulfil their sense of purpose and passion.

2.2 Self-efficacy

Self-efficacy, as defined by Bandura (1989), refers to the belief in one's ability to perform a specific task. It influences an individual's goal-seeking behavior by determining the level of intensity with which they pursue a particular objective. It is important to note that self-esteem, which involves self-respect, differs from self-efficacy, as the latter is rooted in the belief in one's own capabilities (Gardner and Pierce, 1998).

Bandura (1989) emphasized the significance of the social environment, human cognition, and behavioral abilities in learning and development through his social cognitive theory. He recognized self-efficacy as a more powerful motivator for purpose-seeking behavior than self-esteem or self-satisfaction. Over time, Bandura (2005) developed his social cognitive theory into a comprehensive model where behavioral, cognitive, and environmental factors interact and influence each other, giving rise to new psychological dynamics.

The causal relationship between one's perception of their abilities and their performance in a specific role is influenced and structured by self-awareness, along with social and psychological conditions

(Harrison et al., 1997; Dybowski et al., 2017). Motivated individuals possess the confidence that enables them not only to excel in specific behaviors, but also to perform effectively in diverse tasks and unconventional situations (Gardner and Pierce, 1998; Qiu et al., 2023). Self-efficacy does not just impact current job performance; it also plays a significant role in influencing future organizational behavior. As a result, self-efficacy is considered a psychological variable that predicts a military personnel's performance in the workplace and their organizational behavior (Smaliukienė et al., 2023).

2.3 Vocational calling

Contemporary vocational vocations are ascribed profound social significance by experts in the fields of occupational psychology and organizational behavior (De Vos et al., 2020). This phenomenon is understood as a manifestation of altruistic inclinations, wherein individuals are driven by an inherent desire to contribute to the welfare of others and the broader societal fabric, rather than merely pursuing self-interest or personal gain (Kossek et al., 2021). This altruistic perspective on vocational callings underscores the evolving understanding of work as a means of not only personal fulfilment but also a noble endeavour to enhance the collective well-being of humanity. This shift in perspective sheds light on the complex interplay between individual motivations and the broader societal context within which vocational choices are made, highlighting the importance of social and ethical dimensions in the contemporary workforce (Fassinger, 2008; Afsar et al., 2019a).

In more precise terminology, the concept of vocation is inherently linked to a set of professional values, wherein the individual derives profound gratification and a profound sense of meaning from his work. This sense of fulfilment transcends mere material gain or the traditional markers of social status, instead focusing on the intrinsic rewards of their vocational pursuit (Quigley and Tymon, 2006). Individuals who are in tune with their vocational calling tend to engage in self-directed learning and exhibit innovative behavior, often grounded in the psychological ownership they feel toward their work. This ownership mindset fosters an ongoing process of skill and knowledge development, driven by a strong internal motivation to improve adaptability and contribute meaningfully to their chosen field (Ahn et al., 2017). This interplay between vocation, self-directed learning, and innovative behavior underlines the importance of intrinsic motivation and personal growth in the vocational domain. It reflects a deep-seated commitment to continuous self-improvement, as individuals autonomously acquire the necessary competencies to excel in their roles and adapt to the dynamic demands of their profession (Haynie and Shepherd, 2011). The vocational calling, therefore, not only transcends extrinsic rewards, but also serves as a catalyst for individual growth and professional evolution. This holistic perspective underscores the intricate nature of the relationship between vocational satisfaction, self-directed learning, and the cultivation of skills required for sustained success and adaptability in the contemporary workplace (Hall and Chandler, 2005).

Building upon the framework of self-determination theory (SDT), as elucidated by Lee (2016), the concept of a "sense of calling" emerges as a pivotal psychological mechanism with significant implications on the determination of one's approach to tasks and preferred production methods. SDT, a prominent theory in the realm of motivation and personality, posits that individuals have innate psychological needs for autonomy, competence, and relatedness. Within this theoretical framework, the sense of calling plays a critical role. A sense of calling, as defined by Lee (2016), becomes a lens through which individuals interpret their professional endeavours and work-related tasks. It serves as an internal compass that guides people in their quest for autonomy and competence, enabling them to engage in tasks with a heightened sense of purpose and intrinsic motivation. This sense of calling shapes not only the choices individuals make in terms of their career paths, but also how they approach and execute the tasks within those paths. Additionally, a sense of calling is intricately tied to the way individuals choose to execute their work. It influences their preferred production methods, as individuals driven by a strong sense of calling often seek innovative, meaningful, and purpose-driven approaches to task completion. This can result in a more engaged and proactive work style, as well as a proclivity to find and create new, more effective methods to achieve their professional objectives. All in all, Lee's (2016) incorporation of the concept of a sense of calling within the framework of SDT underscores the profound impact that this intrinsic motivational force has on an individual's vocational choices, approach to tasks, and preferred production methods. Highlight the interplay between intrinsic motivation, psychological needs, and practical aspects of professional work, shedding light on the complex dynamics that underlie human behavior at work.

The latest work of Tomprou and Bankins (2019), adopting a positive psychology perspective, offers a nuanced interpretation of vocational calling. They conceive it as a profound willingness to engage in diverse and multifaceted roles, both within and beyond the boundaries of the traditional working environment. Their perspective aligns with the broader tenets of positive psychology, which accentuate the significance of personal strengths, well-being, and the realization of one's full potential.

Within this positive psychology framework, vocational calling transcends mere job-related tasks and responsibilities (Dumas and Sanchez-Burks, 2015). It encompasses a broader spectrum of roles that individuals willingly assume, driven by an inner calling to make a meaningful and multifaceted contribution to society. This interpretation emphasizes the holistic nature of vocational calling and its intrinsic link to personal growth, self-fulfilment, and the cultivation of a well-rounded sense of self (Duffy and Dik, 2013; Ji and Yoon, 2021).

Moreover, the recent surge of studies on vocational calling has been particularly intriguing due to their recognition of a division between the presence of a calling and the active search for a calling (Wells, 2012). This distinction underscores the dynamic interaction between social and psychological variables. The presence of a calling suggests an individual's alignment with a well-defined vocational path, where they experience a profound sense of purpose and fulfilment (Murphy and Kreiner, 2020). In contrast, the search for a calling reflects a more exploratory phase, where individuals are in the process of discovering their true vocational identity.

This division not only sheds light on the evolving nature of vocational calling, but also highlights the intricate interrelationship between personal psychology and the social context in which these callings are nurtured and realized (Duffy and Dik, 2013). It underscores the role of societal influences, personal exploration, and

self-discovery in the development of vocational callings, contributing to a deeper understanding of the complex dynamics that underlie this phenomenon.

2.4 Professional achievement in the military

Professional achievement within the military is a multifaceted and profound concept that reflects the dedication, competence, leadership, and contributions of service members within the armed forces (Johansen et al., 2014; Šimanauskienė et al., 2021). It signifies not only individual success, but also the collective strength of the military as an institution (Angstrom and Haldén, 2019). One of the most visible and universally recognized indicators of professional achievement in the military is the attainment of higher ranks and positions. Promotion through the ranks signifies an individual's competence, experience, leadership skills, and contributions to the organization (Townley, 2019). It is a clear testament to the trust and responsibility placed in the service member. Advancement often requires a combination of experience, education, and successful performance, and is a significant aspiration for many military personnel (Lacerenza et al., 2018).

3 Research method

3.1 Research models and hypotheses

This study meticulously constructed a comprehensive framework of interrelated variables, grounded in the theoretical underpinnings of cadet resilience, self-efficacy, vocational calling, and professional achievements. This theoretical foundation served as the basis for the formulation of a research model, visually represented in Figure 1, which was designed to empirically investigate the impact of the resilience of the cadets on both self-efficacy and the professional achievements of future military officers.

Furthermore, the study delved into the nuanced role of vocational calling as a potential moderating mediator within the complex relationship between cadets' resilience and self-efficacy. This model aimed to provide a systematic and data-driven exploration of these intricate dynamics, shedding light on the underlying mechanisms that shape the professional development of cadets within the context of a military academy.

3.2 Causality between resilience, self-efficacy, and professional achievement of cadets

The military environment is a crucible that places great demands on the physical, mental, and emotional fortitude of the cadets. Achieving professional success and effectiveness within the military requires a unique blend of attributes, including resilience and self-efficacy (McLarnon et al., 2021).

Resilience, the ability to adapt and bounce back from adversity, forms the bedrock of a cadet's journey towards professional achievement. Cadets often face formidable challenges, ranging from demanding training routines to high-pressure scenarios in the field. Resilience equips them to withstand setbacks, persevere in the face of adversity, and emerge stronger from the experience. As experts in the fields of psychology and military science assert, resilience is a key determinant of success within the military (Nindl et al., 2018; Jones et al., 2022).

Self-efficacy, grounded in an individual's belief in their ability to execute tasks successfully, assumes a central role in a cadet's journey. High self-efficacy engenders confidence and optimism, leading cadets to approach challenges with a sense of competence. Cadets with strong self-efficacy tend to set ambitious goals, persevere through adversity, and exert the effort required for success. In the military context, self-efficacy is essential to make quick decisions, manage stress, and navigate complex tasks (Bergman et al., 2019; Dwyer, 2019; Likhomanov et al., 2020).

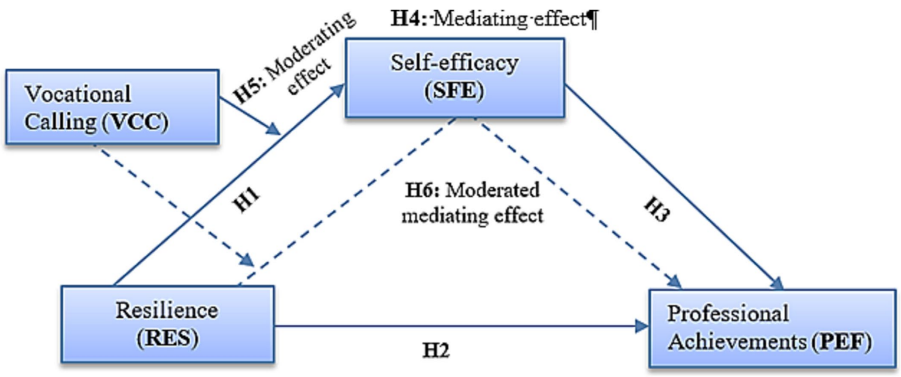

FIGURE 1
The hypothesized theoretical model delineates both the direct and indirect effects of cadets' resilience (RES). Specifically, the direct effects are specified with regard to self-efficacy (Hypothesis H1) and professional achievements (Hypothesis H2). Additionally, the model encompasses the examination of the indirect effects (Hypothesis H4) of cadets' resilience on professional achievement (PEF) through its impact on self-efficacy (SFE). Furthermore, Hypothesis H5 aims to assess the indirect effects of vocational calling (VCC) in its role as a moderator within the relationship between cadets' resilience and self-efficacy. Finally, Hypothesis H6 is formulated to test the moderated mediating effect of vocational calling on self-efficacy in the association between cadets' resilience and professional achievement (see dashed lines).

The causality between resilience and self-efficacy is a reciprocal relationship. Resilience, developed through the experience of facing and overcoming challenges, fosters self-efficacy. The more cadets overcome adversity, the more they come to believe in their ability to deal with future challenges. This relationship is well documented in research within military and psychological fields (Bandura, 1997; Smith et al., 2018). In essence, resilience acts as the crucible in which self-efficacy is forged, and self-efficacy, in turn, bolsters resilience.

Professional achievement within the military is the result of the resilient and self-efficacious drive of cadets. Resilience enables them to endure rigorous training, recover from setbacks, and adapt to ever-changing military scenarios. Self-efficacy empowers them to lead with confidence, make decisive decisions, and excel in the field. Consequently, cadets with high levels of resilience and self-efficacy tend to achieve promotions, excel in leadership roles, and contribute significantly to mission success (Fosse et al., 2015). The causality between cadet resilience, self-efficacy, and professional achievement underscores an interdependent relationship (Gilson et al., 2016). Resilience and self-efficacy reinforce each other, propelling cadets toward their goals and fostering adaptability, determination, and a robust capacity to thrive in the military domain (Davis et al., 2019; Bekesiene, 2023).

Drawing on the extensive body of existing literature and well-established theoretical assumptions, this study hypothesized direct pathways within the proposed model, as depicted in Figure 1. Specifically, research hypotheses posit a direct influence that stems from the resilience of cadets to self-efficacy and professional achievement. These postulations are grounded in cumulative knowledge and theoretical frameworks that underscore the importance of resilience as a precursor to self-efficacy and, subsequently, professional accomplishments.

Direct effect of resilience on self-efficacy:

> *Hypothesis 1 (H1)*. The resilience of the cadets will exert a positive influence on their self-efficacy.

Direct effect of resilience on cadets' professional achievements:

> *Hypothesis 2 (H2)*. The resilience of the cadets will have a positive effect on their professional achievement.

Direct effect of self-efficacy on professional achievement:

> *Hypothesis 3 (H3)*. Self-efficacy will have a positive effect on professional achievement.

3.3 The self-efficacy as mediator

Self-efficacy, a concept rooted in the cognitive theory of social learning, has emerged as a prominent mediator in various domains, serving as a pivotal psychological bridge between one's beliefs and their achievements. Self-efficacy, as conceptualized by renowned psychologist Albert Bandura, refers to an individual's belief in their ability to execute specific tasks successfully. This belief extends beyond mere confidence; it encompasses a deep-rooted conviction in one's capability to confront challenges, persevere through adversity, and achieve desired outcomes. Bandura's social cognitive theory posits that self-efficacy plays a pivotal role in shaping human behavior and performance (Bandura, 1994).

In the realm of education, self-efficacy mediates the relationship between students' beliefs and their academic achievements. Students who believe in their ability to learn and excel in their studies are more likely to set challenging goals, engage in active learning, and persist through difficulties. This self-belief not only influences their motivation, but also affects their approach to learning. Research has consistently shown that self-efficacy is a potent mediator of academic success (Zimmerman, 2000; Caprara et al., 2011).

In the domain of career success, self-efficacy is instrumental in mediating the relationship between an individual's beliefs and their professional achievements (Eccles and Wigfield, 2020; Eliyan et al., 2020; Bekesiene, 2023). Those who have a strong sense of self-efficacy are more likely to set ambitious career goals, persist through setbacks, and demonstrate the determination needed for career advancement. Research in the field of organizational psychology highlights self-efficacy as a predictor of job performance and career success (Stajkovic and Luthans, 1998).

The self-efficacy mediating mechanism operates through a cascade of psychological processes. It influences goal setting, self-regulation, decision making, and resilience. Individuals with high self-efficacy tend to set more challenging goals, self-monitor their progress, make adaptive decisions, and bounce back from failures (Baron and Kenny, 1986; Hoyle, 2006; Baron et al., 2016). These processes collectively mediate the relationship between self-efficacy beliefs and outcomes. It can be stated that self-belief in one's capabilities acts as a catalyst, propelling individuals towards their goals, and mediating the relationship between their beliefs and outcomes. Taking this into account, hypothesis H4 was formulated.

> *Hypothesis 4 (H4)*. Self-efficacy will mediate between cadets' resilience and professional achievements.

3.4 Moderating effect of vocational calling

Vocational calling, often referred to as a "calling" to one's career, is a sociopsychological variable that has garnered significant attention in recent years. This concept delves into the intricate interplay between an individual's career, personal identity, and societal contributions.

A vocational calling transcends the notion of a mere job or career; it encompasses a deep sense of purpose and personal fulfillment derived from one's work. It is the profound belief that one's professional path aligns with their core values, passions, and innate talents. Psychologically, it signifies the desire to contribute meaningfully to society through one's work, often driven by a strong sense of responsibility and moral imperative (Duffy and Dik, 2013).

Vocational calling plays a pivotal role in shaping an individual's self-concept and personal identity. When individuals perceive their work as a calling, it becomes an integral part of who they are. Their self-concept extends beyond the limits of their job description, reflecting a deeper connection between their personal identity and their vocational identity (Aulthouse et al., 2017). This interconnectedness fosters a sense of authenticity, self-esteem, and overall well-being.

The military profession demands unwavering resilience and self-efficacy from cadets as they navigate the complex challenges of training, leadership, and operational missions. However, a less explored dimension in this context is the impact of vocational calling.

Resilience, the ability to bounce back from adversity and adapt to challenging situations, is an essential trait for military cadets. Resilience enables them to withstand rigorous training, cope with stress, and emerge stronger from setbacks. It is a psychological resource that empowers cadets to thrive in the face of adversity, making it a critical determinant of success within the military (Harvey et al., 2018).

The hypothesis under consideration is that vocational calling plays a moderating role in the relationship between cadets' resilience and self-efficacy. Vocational calling is expected to strengthen the connection between resilience and self-efficacy. Cadets who perceive their military service as a calling can draw additional motivation and a stronger belief in their abilities from this deep sense of purpose, amplifying the relationship between resilience and self-efficacy. In essence, vocational calling may serve as an additional source of empowerment, accentuating the psychological and emotional resources available to cadets.

Seco and Lopes (2013) identified the notable moderating and moderated mediating effects of vocational calling in the connection between authentic leadership and job commitment. In a separate study, Park et al. (2019) demonstrated that professional self-efficacy serves as a mediating factor between calling, job performance, and organizational civic behavior among salespeople in an insurance company. In particular, based on the studies mentioned, this research also emphasized the importance of a sense of vocational calling as a moderating factor in the relationship between calling and cadet professional achievement. In light of this, hypotheses H5 and H6 were formulated:

> *Hypothesis 5 (H5).* Vocational calling will play a moderating role in the relationship between cadet resilience and self-efficacy.

> *Hypothesis 6 (H6).* Vocational calling will moderate the mediating effect of self-efficacy in the relationship between resilience and the professional achievements of the cadets.

4 Research methodology

4.1 Design, place of study, and ethical aspects

The present study used a rigorous random sampling method to ensure the representative nature of the data. Data collection took place in February 2023 within the confines of the Lithuanian Military Academy (LMA). Using a digital format, self-reported questionnaires were administered to participants through the Google Forms platform.

Before entering the questionnaire, great care was taken to inform the cadets of the ethical principles governing this research. Emphasis was placed on the absolute guarantee of anonymity and the preservation of data confidentiality. It is imperative to emphasize that participation in the study was entirely voluntary and that no external incentives or rewards were offered to participants.

The sample under scrutiny consisted of 121 cadets, all of whom were currently enrolled in the 3rd and 4th courses at the LMA. Each participating cadet was presented with a comprehensive explanation of the study's objectives and procedures. Additionally, informed consent was obtained from each student prior to their participation in the research. This process ensured that the cadets willingly and knowingly participated while their anonymity was vigilantly safeguarded throughout the research effort.

4.2 Measures

4.2.1 Background factors

In the structured research questionnaire, a set of demographic variables was thoughtfully integrated, specifically encompassing gender, age, level of civilian education, and military experience. These variables were included to provide a comprehensive description of the background characteristics inherent in the study participants. This methodological approach allows for understanding the diverse profile of individuals participating in the research. The assessment of participants' educational achievement level was conducted employing a three-point scale, with 1 denoting 'secondary school', 2 representing 'professional,' and 3 signifying 'Other.' Gender was categorized as a dichotomous variable and was coded as 1 for 'male' and 2 for 'female.' Military cadet' experience was quantified using the following codes: 1 for 'I have no experience', 2 for 'Volunteer in professional military service (PMIS)', 3 for 'National Defence Volunteer Force (NDVF)', 4 for 'Sagittarius Union' and 5 for 'Other'. Additionally, age was measured as a parametric variable on an interval scale, ensuring an accurate representation of participants' age-related data.

4.2.2 Self-efficacy scale

In accordance with the insights offered by self-efficacy theorists, specifically Urdan and Pajares (2006), the use of a universal or generalized scale to assess self-efficacy among cadets would not be appropriate. This position is based on the understanding that cadets should evaluate their own effectiveness, taking into account their unique experiences within the distinct milieu of military training and academic studies, as emphasized by Boe et al. (2018). To address this, a specialized questionnaire was used to gauge self-efficacy in domains relevant to the academic endeavours of the cadets at the military academy.

Although it is worth noting that Buch et al. (2015) had previously validated statements to assess military academic self-efficacy, these statements were adapted for the specific purpose of measuring cadets' perceived competence within the context of the military academy. This adaptation ensured that the questions were tailored to the nuances of the cadets' experiences.

The questionnaire featured seven items, each designed to elicit responses regarding cadet self-efficacy, measured on a 5-point scale. This scale ranged from 1, signifying 'totally disagree,' to 5, representing 'totally agree.' Following the guidance of Nunnally (1978) for scale reliability, it is notable that previous studies, such as those conducted by Buch et al. (2015) and Fosse et al. (2015), demonstrated a high degree of internal consistency for this self-efficacy scale. In both of these earlier studies, the Cronbach alpha coefficients exceeded 0.70, with values ranging from 0.83 to 0.89.

Furthermore, the current study maintains this respectable level of internal consistency, with the adapted self-efficacy scale showing a

Cronbach alpha (α) of 0.892. This observation underscores the reliability and coherence of the scale in measuring the self-efficacy of the cadet within the specific context of the military academy, substantiating its suitability for rigorous scientific assessment.

4.2.3 Professional achievement evaluation

Cadets' professional achievement (PEF) was assessed through an instructor-rated evaluation system. This evaluation system is widely recognized and accepted by military training instructors, representing an effective measure of the improvement of cadets' enhancement in military competencies. The assessment process involves the use of a 5-point Likert-type scale, where 1 signifies 'below average,' 2 corresponds to 'slightly below average', 3 denotes 'average', 4 represents 'slightly above average', and 5 signifies 'above average'.

The evaluation covers a comprehensive range of military skills and attributes, encompassing 10 distinct domains: basics of first aid, preparation of equipment, recognition of topographic signs and object coordinates on the map, knowledge about weapons and shooting achievements, cooperation/communication, leadership, and coping. For each cadet, the responsible instructors assess their performance in each domain and assign a score based on the Likert scale.

To provide an overall assessment of the military capabilities of the cadets, the average score is computed across the 10 evaluated domains. This aggregated score offers a comprehensive overview of a cadet's military proficiency. In particular, this approach ensures a well-rounded evaluation considering a multitude of crucial competencies. The military performance assessment tool exhibits a high degree of internal consistency, as indicated by a Cronbach alpha (α) coefficient of 0.803. This high level of internal consistency underscores the reliability and coherence of the assessment instrument, reinforcing its suitability to measure the achievement of the cadets in a scientifically rigorous manner.

4.3 Methods of statistical analysis

Before conducting statistical analyses, a sample size evaluation test was performed using the widely recognized software package G*Power version 3.1.9.4. (Faul et al., 2009). The objective was to assess the sample size necessary for the F tests in a linear multiple regression analysis, which involved three predictor variables. The specified criteria for this analysis included a significance level of 0.05, a desired statistical power of 0.95, and an anticipated effect size of 0.15. The outcome of the sample size evaluation test determined that a sample size of 119 would be required to achieve the desired statistical power of 0.95 for the specified analysis. Furthermore, a *post hoc* test was conducted to estimate the statistical power achieved. This *post hoc* analysis was performed with a significance level of 0.05, using a sample size of 121 from a valid dataset, and considering the same effect size of 0.15. The results of this *post hoc* analysis revealed that, even with a slightly reduced sample size of 117, a high statistical power of 0.954 could still be attained. These preanalysis procedures underscore the robustness of the statistical power achieved in the subsequent linear multiple regression analysis, even with a slightly smaller sample size than initially estimated, while maintaining the desired significance level and effect size.

The empirical research for this study was carried out using IBM SPSS 29v and IBM AMOS 29v statistical software packages. These software tools were instrumental in performing a series of essential statistical analyses. First, a frequency analysis was performed to systematically examine the demographic characteristics of the sample under scrutiny. This comprehensive analysis provided valuable insights into the composition of the study's participants, allowing for a more nuanced understanding of the research context. Subsequently, a correlation analysis was performed to elucidate the interrelationships between the various measurement variables, serving as a crucial preliminary step before hypothesis testing (Tehseen et al., 2017). This analysis allowed for the assessment of the strength and direction of associations between the variables, helping in hypothesis formulation and model development (Fornell and Larcker, 1981). To ensure the validity of the measurement variables, a verification factor analysis was performed. This analytical step was crucial to confirm the reliability and validity of the measurement tools used in the research. In addition, the internal consistency of the measurement instruments was rigorously evaluated using the Cronbach alpha coefficient, enhancing the reliability of the data collected. The hypothesized relationships between the model constructs were assessed using SPSS AMOS version 29, and the coefficient weights were selected in alignment with the recommendations of previous researchers (Bekesiene et al., 2017a,b; Bekesiene et al., 2022; Smaliukienė et al., 2023). These scholars have advocated for a versatile methodology to assess the appropriateness of a theoretical model. Consequently, the goodness of fit for the models was evaluated using the following criteria: (1) the probability statistic of χ^2 likelihood ratio, (2) the Tucker and Lewis Index (TLI), (3) the Comparative Fit Index (CFI), and (4) the Root Mean Square Error of Approximation (RMSEA), along with the corresponding confidence intervals (CI) (Hu and Bentler, 1999).

Finally, the six hypotheses of the study were rigorously tested through the application of SPSS PROCESS macro models 4 and 7, developed by Hayes (2017). These advanced statistical models were used to fulfil the overarching objectives of the study, facilitating a comprehensive analysis of the complex relationships and effects postulated in the research hypotheses. Furthermore, a bootstrapping analysis was performed involving 5,000 iterations and the acceptance of statistical significance was established at a 95% level for bias-corrected confidence intervals (95% CI). For the assessment of indirect relationships, it was deemed statistically significant if the value of zero was not included within the 95% bias-corrected CI. These analytical approaches align with the recommendations of scholars such as Hayes and Scharkow (2013) and Hair (2019).

5 Study results

5.1 Preliminary analyses of the data sample

The demographic characteristics of the sample indicate that 98 participants (81%) were male, while 23 (19%) were female. In terms of age distribution, 79 respondents (65.3%) were under the age of 19, 32 respondents (26.4%) were between 20 and 21 years old, 9 respondents (7.5%) fell within the age range of 22 to 24 years, and one respondent (0.8%) was over 25 years old. Regarding military experience, 71 participants (58.7%) had no prior military experience, 26 (21.5%) had volunteered at PMIMS, 19 (15.7%) had gained their experience in the Sagittarius union, a cadet (0.8%) mentioned that they had served in the NDVF, and 4 (3.3%) had other forms of military experience. Regarding education achievement, 120 participants (99.2%) were secondary

school graduates, and only one (0.8%) had different educational credentials. Additional details are presented in Table 1.

Furthermore, Pearson's correlation analysis was chosen to determine the correlation between resilience (RES), self-efficacy (SEF), vocational calling (VCC) and professional achievement (PEF). The results of the analysis conducted showed that the resilience of the cadets showed a significant and positive correlation between self-efficacy (RES&SEF, $r = 0.568$, $p < 0.01$), vocational calling (RES&VCC, $r = 0.490$, $p < 0.01$), and professional achievement (RES&PEF, $r = 0.376$, $p < 0.01$). Additionally, self-efficacy was identified as indicating positive and highly significant relationships with vocational calling (SEF&VCC, $r = 0.691$, $p < 0.01$). These results are presented in Table 2.

5.2 Analysis of latent factors and verification of reliability

A verification analysis was conducted to verify the validity and suitability of each variable presented in this study (Table 3). The fit of the model for this was evaluated using the significance probability of $\chi 2$ test (normed fit index, $\chi^2/DF = 1.675$, $p < 0.001$), Tucker-Lewis index (TLI = 0.943); Confirmatory factor index (CFI = 0.965); Root mean square error of approximation (RMSEA = 0.075).

TABLE 1 The demographic characteristics of study participants.

Demographic characteristics	M (±SD) or N (%)
Gender	
1: Male (%)	98 (81%)
2: Female (%)	23 (19%)
Age (M;±SD)	19.5 (±1.444)
Military experience (*N*; %)	
1: I have no experience	71(58.7%)
2: Volunteer at professional military service (PMIS)	26 (21.5%)
3: National defence volunteer force (NDVF)	1(0.8%)
4: Sagittarius union	19(15.7%)
5: Other	4(3.3%)
Education (*N*; %)	
1: Secondary	120 (99.2%)
2: Professional	0 (0%)
3: Other	1 (0.8%)

PMIMS, permanent mandatory initial military service; NDVF, national defence volunteer force.

The central feasibility of the composition concept has been rigorously substantiated by empirical investigation, with a confirmed standard value of 0.5. Furthermore, its conceptual reliability, a critical measure of its consistency and robustness, has been established at an impressive level of 0.7. Additionally, the average variance extracted (AVE) for this concept stands at a commendable value of 0.5, exceeding the standard benchmarks, thus affirming its significant presence in the studied domain. These findings underline the scientific validity and strength of the composition concept within the context of the examined research framework. The measurement model used in this study is well regarded within the scientific community for its robustness and appropriateness. The reliability of the measurement model is substantiated by Cronbach's alpha coefficients, with all variables consistently achieving values of 0.6 or higher, as established in previous research (Hair et al., 2014). This elevated level of internal consistency attests to the trustworthiness and dependability of the measurement model, thus reinforcing confidence in the data collected and the subsequent analyses undertaken in the study.

5.3 Hypotheses testing results

The analytical procedures were conducted with the help of advanced statistical software tools, specifically IBM AMOS version 29 and IBM SPSS version 29. To evaluate the postulated relationships among constructs within the specified models, the Confirmatory Factor Analysis (CFA) was employed. The use of CFA allowed for a rigorous examination of the theoretical framework and its associated constructs.

Furthermore, the hypotheses of the theorized model were evaluated using PROCESS macro version 3.5. This analytical tool facilitated a comprehensive examination of the intricate interplay and mediation effects between variables, allowing a deeper understanding of the underlying processes outlined in the research hypotheses. Such meticulous data analysis techniques enhance the robustness and precision of the research findings, aligning with contemporary scientific standards.

5.4 Hypothesis confirmation

In order to ascertain the potential moderating influence of vocational calling on the mediating mechanism of self-efficacy within the context of the relationship between cadets' resilience and their innovative behavior, an advanced statistical approach was employed. Specifically, the PROCESS version 3.5 macro, Model 7, was used to perform this analysis.

TABLE 2 The relationships between study variables.

Latent variables	Resilience	Self-efficacy	Vocational calling	Professional achievement
Resilience (RES)	1			
Self-efficacy (SEF)	0.568**	1		
Vocational calling (VCC)	0.490**	0.691**	1	
Professional achievement (PEF)	0.376**	0.463**	0.346**	1

**Pearson correlation significance at the 0.01 level (2-tailed).

TABLE 3 Confirmatory factor analysis and reliability analysis of the whole composite concept.

Latent variables	Factor	λ	α	CR	AVE
Resilience (RES) 5	I am able to adapt when changes occur	0.752	0.838	0.888	0.616
	I can overcome anything	0.714			
	I stay focused and think clearly in stressful situations	0.757			
	Failures do not break my resolve so easily	0.856			
	I consider myself a strong person who can overcome life's challenges and difficulties	0.834			
Self-efficacy (SEF) 6	I am a person who can graduate from General Jonas Žemaitis Lithuanian Military Academy (hereinafter - LKA)	0.855	0.892	0.916	0.646
	I will be able to mobilize and find the necessary strength to do the hard work related to my studies at LKA	0.851			
	I will be able to endure the most difficult moments of studying at LKA	0.822			
	I will be able to finish LKA with higher grades than my colleagues	0.758			
	I will achieve results that I can be proud of	0.785			
	After graduation, I intend to be an officer	0.743			
Vocational calling (VCC) 10	I like being an officer	0.852	0.946	0.953	0.671
	I think it's fun to serve in the military	0.735			
	The military profession inspires me	0.888			
	I feel called to serve in the army	0.818			
	I find the service of an officer satisfying	0.803			
	I see opportunities to realize myself	0.829			
	The profession of an officer will help me to constantly deepen my knowledge and improve	0.866			
	Military service will help me improve my personal qualities	0.774			
	The activities of an officer correspond to my personal values	0.789			
	I am satisfied with my decision to pursue the military profession	0.826			
Professional achievement	Compile a detailed fire card	0.797	0.803	0.914	0.604
	Know the non-sound control signals	0.766			
	Prepare the equipment	0.782			
	Recognize topographic signs	0.773			
	Set object coordinates on the map	0.774			
	Weapons and shooting	0.793			

Chi-square (CMIN) = 962.867; degrees of freedom (DF) = 575; normed fit index (CMIN/DF) = 1.675; Tucker-lewis index (TLI) = 0.943; confirmatory factor index (CFI) = 0.965; root mean square error of approximation (RMSEA) = 0.075.

To ensure the robustness of the results, a bootstrapping procedure involving 5,000 resamples was meticulously specified. This resampling method enhances the reliability of the estimated effects and their associated confidence intervals. Additionally, a confidence interval set at 95% was chosen, serving as a critical metric to determine the significance of the observed moderating effect. By adhering to these rigorous analytical techniques, a comprehensive evaluation of the moderating role of vocational calling in the mediating relationship between cadets' resilience and innovative behavior was achieved.

First, following the analysis of the resilience of the cadets as an independent variable and its influence on self-efficacy as a dependent variable, it was revealed that hypothesis H1 is substantiated, indicating that the resilience of the cadets exerts a positive effect on self-efficacy (RES → SEF, for H1: $\beta = 0.189$, $p < 0.01$, see Model 1, Table 4).

TABLE 4 Causal relationships between the concept of theoretical model structure.

Predictors	(β)	SE	*t*	*p*	LLCI	ULCI
Model 1 (outcome variable: Self-efficacy (SEF))						
Constant	4.161	0.028	147.823	0.000	4.106	4.217
RES → SEF	0.189	0.059	3.227	0.002	0.073	0.305
VCC → SEF	0.556	0.069	8.028	0.000	0.419	0.693
RES × VCC → SEF	−0.217	0.096	−2.250	0.026	−0.407	−0.026
Increase of R^2 according to interaction terms:			R^2-chnd		F	*p*
			0.019		5.062	0.026
Model 2 (outcome variable: professional achievement (PEF))						
Constant	3.066	0.375	8.180	0.000	2.323	3.808
RES → SEF	0.121	0.071	1.709	0.090	−0.019	0.261
VCC → SEF	0.340	0.090	3.765	0.000	0.161	0.519

(β), Unstandardized coefficient; SE, standard error; LLCI and ULCI, Bias-corrected 95% confidence interval of lower and upper limit.

Second, in the examination of the relationship between the resilience of the cadets and the professional achievement, it was found that the resilience of the cadets did not have a significant impact on the professional achievement (RES → SEF, for H2: β = 0.121, $p = 0.090$, see Model 2, Table 4). Consequently, hypothesis H2 was rejected.

Third, hypothesis H3 was formulated to explore the impact of self-efficacy on professional achievement, and the analysis demonstrated that self-efficacy has a positive and statistically significant effect on professional achievement (SEF → PEF, for H3: β = 0.340, $p < 0.01$, see Model 2, Table 4).

In the fourth stage of our analysis, the interaction between the resilience of the cadets and the vocational calling was observed to produce a statistically significant result (RES × VCC → SEF, for H5: β = − 0.217, $p < 0.05$). This significant finding aligns with hypothesis H5, which postulated the existence of a modulating effect within the model. The proportion of variance explained by this interaction, indicated as R2, was determined to be 0.019, with a significance level of $p < 0.05$, underscoring the empirical support for the hypothesized moderating influence (see Table 4). This outcome serves as a noteworthy validation of the intricate interplay between resilience, vocational calling, and their combined effect on the outcome variable, thereby advancing our understanding of this dynamic relationship.

Fifth, it was established that the perceived resilience of the cadets indeed validates the mediating role of self-efficacy in its association with professional achievement (see Table 5). The total effect within the pathway from the resilience of cadets to professional achievement was found to be β = 0.272 ($p < 0.001$), with a direct effect of β = 0.121 ($p = 0.090$). The supporting evidence for the indirect effect of self-efficacy as a mediator was confirmed through a bootstrapping analysis, as evidenced by the absence of zero within the confidence interval bounds. This observation supports hypothesis H4, which postulated that self-efficacy would act as a mediator factor in the relationship between cadets' resilience and their professional achievement.

The conditional effect of the resilience of the cadets in relation to the vocational calling was found to be significant when comparing the vocational calling values from M − 1SD (−0.435) to the mean (0.000), but not in the case of M + 1SD (0.435). Specifically, if the vocational calling was high, the effect of self-efficacy on professional achievement was observed to be not significant (see Table 6).

The region of significance, determined using the Johnson-Neyman method of illumination analysis for the complete range of moderating variables, is presented in Table 7. This approach provides a means to discern areas where the moderating effect based on the moderating variable is significant. The influence of cadet resilience on professional achievement through self-efficacy was found to be notable in regions where vocational calling values were below zero ('0').

In other words, in cases where the value of vocational calling was less than '0.000', vocational calling played a significant role in moderating the mediating effect of self-efficacy in the relationship between the resilience of the cadets and professional achievement. Since the moderating impact of vocational calling was statistically significant, the results of this moderating effect were visualized in Figure 2 to illustrate the form of this interaction.

To understand the pattern of this significant interaction, vocational callings were categorized into low, medium, and high groups to examine average changes. It was observed that when self-efficacy was low, the group with higher vocational calling exhibited lower levels of professional achievement compared to the group with lower vocational calling. On the contrary, the group with lower vocational calling demonstrated higher professional achievement, even when self-efficacy was high.

The indirect conditional effect of vocational calling (VCC) on the relationships between cadets' resilience (RES) and professional achievement (PEF) was found to be significant when comparing vocational calling values from M − 1SD (−0.435) to the mean (0.000), but it was not significant in the case of M + 1SD (0.435). Specifically, a low or average level of vocational calling was associated with a moderated mediating effect of vocational calling on the impact of cadets' resilience on professional achievement through self-efficacy.

Furthermore, the moderated mediation index of vocational calling was calculated to be −0.074, and hypothesis H6, which postulates the existence of a moderated mediation effect, was supported with a 95% confidence interval (CI) that did not include zero in the lower limit (−0.180) and the upper limit (−0.015; see Table 8).

6 Discussion

This research aimed to evaluate the direct and indirect relationships between resilience and personal achievements of the cadets. Our objective was to identify the key factors essential for the personal achievements of cadets as future officers and empirically analyse the conceptual framework that can guide the development of resources. In this context, we analysed a model of cadets' resilience, examining the relationship between self-efficacy and personal professional achievements, and we also verified the moderated mediating effect of vocational calling.

First, vocational calling was found to positively affect the self-efficacy of participants under the resilience of the cadets. Future officers should be interdependent in situations that are not independent. Cadets resilience was found to affect their self-efficacy positively. Military resilience involves maintaining high levels of operational readiness even in the face of changing and unpredictable circumstances (Beckner et al., 2022; Bekesiene et al., 2022, 2023; Flood

TABLE 5 The total, direct, and indirect effects of cadets' resilience on professional achievements.

Resilience (RES)	Effect (β)	SE	LLCI	ULCI
Total effect	0.272	0.061	0.151	0.394
Direct effect	0.121	0.071	−0.019	0.261
Indirect effect	0.151	0.053	0.055	0.267

Effect (β), Unstandardized coefficient; SE, standard error; LLCI and ULCI, Bias-corrected 95% confidence interval of lower and upper limit.

TABLE 6 The conditional effect of cadets' resilience according to vocational calling.

Vocational calling (VCC)	Effect (β)	SE	*t*	*p*	LLCI	ULCI
−0.435 (M − 1SD)	0.283	0.059	40.833	0.000	0.167	0.399
0.000 (M)	0.189	0.059	30.227	0.002	0.073	0.305
0.435 (M + 1SD)	0.095	0.083	10.139	0.257	−0.070	0.260

M, mean; SD, standard deviation; Effect (β), Unstandardized coefficient; SE, standard error; LLCI and ULCI, Bias-corrected 95% confidence interval of lower and upper limit.

TABLE 7 Conditional effect of focal predictor at values of the moderator.

Vocational calling (VCC)	Effect (β)	SE	*t*	*p*	LLCI	ULCI
−1.452	0.504	0.131	3.848	0.000	0.244	0.763
−1.342	0.480	0.121	3.954	0.000	0.239	0.720
−1.232	0.456	0.112	4.071	0.000	0.234	0.678
−1.122	0.432	0.103	4.200	0.000	0.228	0.636
−1.012	0.408	0.094	4.340	0.000	0.222	0.595
−0.902	0.384	0.086	4.487	0.000	0.215	0.554
−0.792	0.361	0.078	4.633	0.000	0.206	0.515
−0.682	0.337	0.071	4.764	0.000	0.197	0.477
−0.572	0.313	0.065	4.851	0.000	0.185	0.441
−0.462	0.289	0.060	4.852	0.000	0.171	0.407
−0.352	0.265	0.056	4.717	0.000	0.154	0.377
−0.242	0.242	0.055	4.408	0.000	0.133	0.350
−0.132	0.218	0.055	3.933	0.000	0.108	0.327
−0.022	0.194	0.058	3.350	0.001	0.079	0.308
0.088	0.170	0.062	2.737	0.007	0.047	0.293
0.198	0.146	0.068	2.157	0.033	0.012	0.280
0.234	0.138	0.070	1.980	0.050	0.000	0.277
0.308	0.122	0.075	1.642	0.103	−0.025	0.270
0.418	0.099	0.082	1.201	0.232	−0.064	0.261
0.528	0.075	0.090	0.828	0.409	−0.104	0.253
0.638	0.051	0.099	0.515	0.608	−0.145	0.247
0.748	0.027	0.108	0.251	0.802	−0.187	0.241

and Keegan, 2022). This readiness enables military forces to respond promptly and effectively to various threats, whether they are natural disasters or security challenges. Resilience in the military requires the ability to adapt to new and evolving threats, technologies, and tactics. Military organizations must continuously assess and adjust their strategies, equipment, and training to remain effective and resilient in a dynamic environment. Training plays a crucial role in building military resilience. Soldiers are physically and mentally prepared to endure hardships, respond to crises, and carry out their duties under adverse conditions. This training includes simulated exercises, scenario planning, and drills (Wampler et al., 2006; Mjelde et al., 2016; Kanapeckaitė et al., 2022; Bekesiene, 2023). Moreover, leaders within military organizations must exhibit resilience in their decision-making, adaptability to changing situations, and the ability to inspire and lead their troops effectively, especially in high-stress and uncertain environments (Jackson et al., 2012; Adler and Castro, 2013; Southwick et al., 2017).

Self-efficacy has also been shown to play a fully mediating role in the relationship between cadets' resilience and professional achievements. In the dynamic and demanding world of military service, the journey from cadet to officer is marked by numerous challenges and transformations. Cadets, the future leaders of our armed forces, undergo rigorous training and face a constantly evolving environment. To excel in this role, they must not only possess the required skills but also a vital psychological attribute: self-efficacy. Self-efficacy, a concept introduced by renowned psychologist Bandura (1999, 2001, 2003, 2012), refers to an individual's belief in their capacity to accomplish specific tasks and attain goals. It is a central component of social cognitive theory, emphasizing the interection between cognitive, behavioral, and environmental factors. In particular, the journey from cadet to officer is marked by moments of adversity and setbacks. Furthermore, high self-efficacy equips cadets with the mental resilience needed to bounce back from failures, learn from experiences, and persevere in the face of obstacles. In addition, self-efficacy serves as a powerful motivator, and cadets who believe in their abilities are intrinsically driven to excel (Boe et al., 2018). This internal motivation is more sustainable than extrinsic factors and fuels their determination to achieve professional excellence. It means that a cadet's self-efficacy is a primary psychological mechanism for accepting change and professional achievement for military (Souza et al., 2014).

Therefore, it is meaningful to verify the statistical mediating effect of self-efficacy from the perspective of the cadets, and to try on their own for self-development with the support of their resilience. Vocational calling also plays a moderating role in the relationship between cadet resilience and self-efficacy and has a conditional effect on cadet resilience and professional achievements. The vocational calling of the study participants serves as a valuable source of guidance, allowing them to make prompt and informed decisions when faced with significant dilemmas. Nevertheless, the empirical findings of this study suggest that an excessive level of self-consciousness or an unwavering belief in one's calling can impede professional achievements when not balanced with self-efficacy.

Lastly, this result diverges from previous studies (Lee, 2016; Afsar et al., 2019b), which suggested a positive impact of the sense of calling on work performance. Instead, our findings align with the conclusions drawn by Ji and Yoon (2021).

The research carried out has limitations that must be considered when interpreting the presented results. A general limitation is that the instrument used to assess the strengths of self-efficacy was based

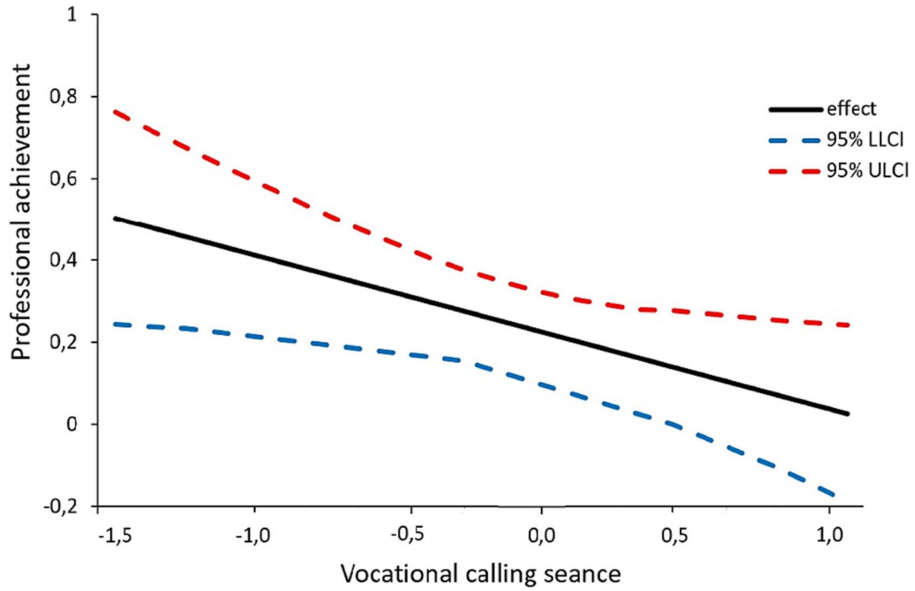

FIGURE 2
Graphical representation of the conditional effect of cadets' resilience on self-efficacy at values of the moderator vocational calling.

TABLE 8 The conditional effect taking into account the vocational calling.

Self-efficacy (SEF)	Effect (β)	SE	LLCI	ULCI
−0.435 (M − 1SD)	0.096	0.041	0.028	0.188
0.000 (M)	0.064	0.033	0.014	0.143
0.435 (M + 1SD)	0.032	0.039	−0.032	0.125
Index of moderated mediation		**SE**	**LLCI**	**ULCI**
−0.074		0.051	−0.180	−0.015

M, mean; SD, standard deviation; Effect (β), Unstandardized coefficient; SE, standard error; LLCI and ULCI, Bias-corrected 95% confidence interval of lower and upper limit.

on self-evaluation and self-perception. Additionally, contextual factors related to the geopolitical situation during this study may have influenced the self-esteem of the cadets. It is also noteworthy that while self-efficacy beliefs and vocational calling can offer valuable insights into predicting cadets' military performance, they are not the sole determinants. Military performance is a multifaceted outcome influenced by numerous factors, including training, experience, teamwork, leadership, and situational demands. Additionally, other variables such as aptitude, study behaviors, social support, and specifically environmental factors contribute to the overall outcomes observed in cadets.

7 Conclusion

In conclusion, the conducted study expands the understanding of the moderating role of vocational calling that has important implications for military training and cadet development. It highlights the importance of nurturing a sense of calling among cadets, as this can potentially enhance their resilience and self-efficacy. Also, can be noted that vocational calling is not only an inherent belief in the significance of one's military service but also a sociopsychological variable that may have a moderating effect on the relationship between cadets' resilience and self-efficacy. This hypothesis underscores the multifaceted nature of military success and the interplay between psychological attributes and a profound sense of purpose. It reinforces the importance of nurturing a vocational calling among cadets, as it can serve as a powerful catalyst for their resilience and self-efficacy, ultimately shaping their achievements within the military. Subsequent investigations within this domain should undertake a comprehensive exploration of the underlying mechanisms by which vocational calling exerts its influence on the psychological resources of cadets, thereby elucidating its ramifications on their aptitude to excel within the military sphere.

Further research efforts may encompass a multidimensional analysis of the intricate interplay between vocational calling, self-efficacy, and other pertinent psychological determinants to provide a more profound understanding of the dynamics at play. Based on the findings of this study, the following recommendations for future research can be presented: (1) expand the sample size to further validate the structural relationships between variables; (2) conduct follow-up studies to analyse differences between cadet groups based on study year, gender, and military service experience; (3) additionally, it can be consider introducing leadership styles and organizational culture as predictors of organizational psychology.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by General Jonas Žemaitis Military Academy of Lithuania. Written informed consent from the patients/participants or patients/participants' legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

ON: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. AV: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Train to sustain: a randomised controlled trial evaluation of a vitality training employing behaviour-change techniques

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Introduction: This paper reports on the effects of a 9-week vitality training that employed behaviour-change techniques and was evaluated using a randomised controlled trial (RCT) in three large companies based in the Netherlands.

Methods: A total of 84 adult employees from three participating organisations in the Netherlands were enrolled in the study. A parallel group RCT design was employed and participants were assigned using individual random assignment to either an intervention ($n = 38$) or a waitlist control group ($n = 46$). The intervention consisted of a 9-week vitality training employing the behaviour-change techniques of self-persuasion, implementation intentions, and self-efficacy, which was delivered in-house over five fortnightly 2-hour sessions. Primary outcomes (i.e., reported energy and stress) and secondary outcomes (i.e., reported daily life satisfaction and work capacity) were assessed prior to, immediately after, and 3 months following the intervention.

Results: A mixed MANOVA revealed a significant interaction effect between treatment group and time period for the combination of reported energy, stress, daily life satisfaction, and work capacity. Subsequent univariate ANOVAs revealed significant interactions between treatment group and time period for reported energy, stress, and daily life satisfaction; however, not for reported work capacity. Improvements in outcomes were observed for both groups following their completion of the vitality training; however, not all improvements reached statistical significance. Reported self-efficacy regarding managing work-life balance was found to mediate the relationship between the effects of the intervention and reported energy; however, such an effect was not found for stress.

Discussion: An intervention drawing upon evidence-based behaviour-change techniques shows promise for improving indicators associated with burnout; although, it is recommended that in future research a larger-scale evaluation be conducted over a longer time period with an active control group to establish effectiveness.

Clinical trial registration: https://www.anzctr.org.au/, ACTRN12622001268730.

KEYWORDS

behaviour change, burnout, randomised controlled trial, self-efficacy, vitality, work-related stress

1 Introduction

Vitality has important implications for individuals' personal lives as well as for their working lives and is positively related to one's physical and mental health (Ryan and Frederick, 1997), wellbeing, and life satisfaction (as per Guérin's model, see Guérin, 2012). In the workplace, vitality is related to thriving (Kleine et al., 2019), work engagement (see the Job Demands-Resources model, Bakker et al., 2014), and reduced burnout levels (Demerouti et al., 2001; Kristensen et al., 2005). Consequently, enhancing employee vitality not only benefits individuals but also the organisations for which they work.

The Job Demands-Resources (JD-R) theory is a unifying job design theory that explains how job demands and resources can influence job performance through employee wellbeing, and how employees use proactive as well as reactive work behaviours to influence the job demands and resources they face (Bakker et al., 2014; Bakker and Demerouti, 2017). The JD-R theory originated from the engagement and burnout literatures (Demerouti et al., 2001), and, over the past two decades, JD-R theory "has been able to synthesize knowledge from various theories of job stress and work motivation, including two-factor theory (Herzberg, 1966), job characteristics theory (Hackman and Oldham, 1976), the job demands–control model (Karasek, 1979), the effort–reward imbalance model (Siegrist, 1996), and conservation of resources theory (Hobfoll et al., 2018). Bakker et al. (2023, p. 32) as a theoretical framework that helps to synthesise previous theorising on job stress and motivation, the JD-R theory provides a comprehensive understanding and has been used as the explanatory lens in our scholarly work.

We build on the notion that vitality, thriving, work engagement, and reduced burnout levels are, in turn, related to important work outcomes, including job performance (Taris, 2006; Christian et al., 2011) and turnover intentions (Wefald et al., 2012). In particular, we address a gap in the literature by investigating whether enhancing personal resources can contribute to personal wellbeing and whether this can be trained.

Although the scientific study of vitality is fairly recent (i.e., emerging in the early 1990s; Gould, 1991), vitality has been defined and measured in diverse ways in the literature. Vitality is often used interchangeably with terms such as vigour and energy, and described as either a feeling, state, or an experience (Lavrusheva, 2020). A recent scoping review of the vitality-related research domain conceptualised vitality as having the following fundamental characteristics: (i) it is subjective in nature; (ii) it is a positive experience; (iii) it fluctuates and can be restored; (iv) it can be managed or harnessed by an individual; and (v) it is simultaneously comprised of physiological and psychological energy (Lavrusheva, 2020). Given that vitality is a subjective experience, an individual's vitality is typically assessed using self-report measures, with various scales applied across disciplines (see Lavrusheva, 2020). Examples hereof are the Subjective Vitality Scale (SVS; Ryan and Frederick, 1997), the vitality subscale of the RAND 36-Item Health Survey (SF–36; see Tarlov et al., 1989), and the vigour subscale of the Utrecht Work Engagement Scale (UWES; Schaufeli and Bakker, 2003). Despite variations in how vitality is defined and measured, energy is a core component across different contexts and scales, ranging from individual wellbeing to workplace engagement.

Numerous factors have been reported as precursors to the experience of vitality, and these have recently been organised into three overarching categories: physiological, psychological, and environmental (Lavrusheva, 2020). In the case of physiological antecedents, developing healthy lifestyle habits, such as increased sleep, exercise, fruit, and vegetable intake, has been associated with increased vitality (Strijk et al., 2009; Smolders et al., 2013; Conner et al., 2017). Psychological factors associated with increased vitality include self-regulation, working from one's own goals, and the practice of mindfulness (Fritz et al., 2011; Niessen et al., 2012). Furthermore, environmental factors associated with increased vitality include aspects of the work context, such as meaningful work and learning something new, as well as leisure activities (activities in the natural environment and during weekends) (Sheldon et al., 1996; Ryan et al., 2010). These findings have important implications for designing interventions to increase vitality.

For instance, that work situations can drain or replenish an individual's vitality highlights the importance of building individuals' capabilities to recognise and manage situations that affect their energy levels (Op den Kamp et al., 2018). Furthermore, the diversity of factors highlights the necessity of adopting holistic and personalised approaches to address multiple factors and tailor interventions to meet diverse individual needs. Importantly, many of the aforementioned precursors to vitality may be positively influenced by individuals performing specific actions (*cf.* internal circumstances that may be more difficult to change, such as personality traits, see Ryan and Frederick, 1997; Tasselli et al., 2018). This suggests that person-directed interventions could benefit from employing behaviour-change strategies (Abraham and Michie, 2008) to enable individuals to self-manage situations in their work or non-work lives to enhance their vitality.

The proposed behaviour-change approach draws parallels with interventions targeting 'job crafting' behaviours (Tims and Bakker, 2010; Van den Heuvel et al., 2015; Devotto and Wechsler, 2019), where individuals actively shape their work tasks or relationships, and/or employ cognitive crafting (Zhang and Parker, 2019) to improve work engagement. A recent meta-analysis by Oprea et al. (2019) provides strong evidence for the relationship between job crafting interventions and their components with work engagement and job performance. Despite this, insights from a systematic review (Devotto and Wechsler, 2019) enrich our understanding about the potential moderating role of *intervention focus* on outcomes. As an example: Interventions that focussed on gaining job and personal resources and cognitions, such as increased meaning, were associated with enhanced work engagement; conversely, those targeting the reduction of hindering job demands did not have a similar effect on work engagement but had a positive effect on health outcomes. These variations emphasise the importance of tailoring crafting behaviours to individual needs, considering specific motivational (e.g., work engagement) or health-related requirements.

Interestingly, evidence from the work-life balance literature suggests that improvements in work life may spill over into non-work life and vice versa (Sirgy and Lee, 2018). Applied to the domain of

Abbreviations: ANOVA, analysis of variance; BC, bias corrected; CI, confidence interval; CBT, cognitive behaviour therapy; MBI, Maslach Burnout Inventory; MANOVA, multivariate analysis of variance; RCT, randomised controlled trial; SF–36, RAND 36-Item Health Survey; SVS, Subjective Vitality Scale; T0, Time Point 0 (i.e., baseline data collection period); T1, Time Point 1 (i.e., post-intervention data collection period); T2, Time Point 2 (i.e., follow-up data collection period); UWES, Utrecht Work Engagement Scale; VTES, Vitality Training Evaluation Scale.

vitality, this suggests that it may not be necessary for individuals to focus *exclusively* on managing situations in the workplace to experience benefits in their working life. In view of this, a vitality training employing behaviour-change techniques could take a whole-life perspective (Hirschi et al., 2020) and consider the intersection of work and non-work roles (Greenhaus and Kossek, 2014), which would allow employees to tailor the focus of the vitality training to their specific needs—whether their vitality needs fell in the area of work or in their non-work life. This is important in light of protecting and further enhancing one's career sustainability across the lifespan (De Vos et al., 2020; Van der Heijden et al., 2020).

A number of reviews (Maricuțoiu et al., 2016; Dreison et al., 2018) have called for controlled evaluations of interventions, such as randomised controlled trials (RCTs), and for the inclusion of follow-up measures to examine their longer-term effects (e.g., 1–6 months after intervention completion). Particularly in the burnout literature, experts have advocated for the development, implementation, and evaluation of a broader range of interventions (Dreison et al., 2018), particularly tailored to individual participants (Maricuțoiu et al., 2016) to address both individual and organisational needs (Dreison et al., 2018). That is, although a 'one-size-fits-all' intervention approach may be desirable for the internal validity of an evaluation, an intervention's effects may be diminished if they are not carefully aligned to the needs of the participants. To this end, a vitality training that applies an evidence-based method, while allowing participants to target their individual needs in using these methods, may be valuable. To the best of our knowledge, no previous interventions to enhance vitality have employed behaviour-change techniques that would enable such an approach.

Our study aims to explore the effects of a novel vitality training that incorporates behaviour-change techniques on employees' reported energy and subjective experiences of stress, daily life satisfaction, and work capacity. In doing so, we contribute to the scholarly literature in the field of JD-R, specifically by advancing empirical knowledge on the value of proactive vitality management. While previous research has focused on determining the role of job demands and job resources in explaining employee wellbeing, and consequently, job performance, proactive vitality management focuses on the role of changing the employees themselves. Whereas job crafting (Tims and Bakker, 2010; Van den Heuvel et al., 2015; Devotto and Wechsler, 2019) is aimed at changing the situation in terms of job demands and job resources, proactive vitality management, as proposed in recent years by JD-R theory (Bakker et al., 2023), is mainly aimed at *improving employees' personal physical and psychological resources* to promote optimal functioning at work (*ibid.*). As such, we build on JD-R theory to explain employee wellbeing via the enhancement of personal resources.

In addition, we sought to address methodological limitations of previous evaluations by employing an RCT design and by exploring whether any observed effects of the intervention were maintained 3 months following its implementation. To estimate the immediate and longer-term effects of the intervention, we employed sequential training phases for the intervention and waitlist control groups, and assessed outcomes before the intervention, immediately after, and 3 months following it. As the training was designed to improve participants' vitality, reported energy and stress were considered as primary outcome variables for this study. Given that vitality is expected to influence participants' wellbeing and work functioning over time, daily life satisfaction, and work capacity were included as secondary outcomes to explore the broader impacts of our training. We hypothesised that the intervention would significantly improve the aforementioned outcome measures as follows:

> *Hypothesis 1 (H1)*: A significant interaction effect will be observed between treatment group and measurement time period for the combination of reported energy, stress, daily life satisfaction, and work capacity.
>
> *Hypothesis 2 (H2)*: The intervention will have a significant effect on our primary outcome measures of reported energy (*H2*a) and stress (*H2*b), resulting in a significant increase in reported energy and a significant decrease in reported stress for the intervention group (Time Point 0 to Time Point 1), and later for the control group (Time Point 1 to Time Point 2).
>
> *Hypothesis 3 (H3)*: The intervention will have a significant effect on our secondary outcome measures of daily life satisfaction (*H3*a) and work capacity (*H3*b), resulting in significant increases in reported daily life satisfaction and work capacity of the intervention group (Time Point 0 to Time Point 1), and later for the control group (Time Point 1 to Time Point 2).

From a behaviour-change perspective, training-based interventions serve a function of building capability (Michie et al., 2011), and skill enhancement and application contributes to the development of self-efficacy (Bandura, 1990; Bandura and Locke, 2003). Through this lens, improvements in reported energy and stress levels following training in proactive vitality management may be linked to an increased belief in one's ability to proactively manage and balance their own work-life situation. As such, we explored whether self-efficacy to manage one's work-life balance mediated the effects of the intervention on our primary outcome measures of energy and stress. Finally, we explored the acceptability of the intervention by examining participants' subjective experiences of the vitality training method and its effects.

Therefore, our study contributes to the scholarly literature in this field in the following ways. First, we use a novel training method comprised of evidence-based behaviour-change techniques (Abraham and Michie, 2008). Second, we use a training method that allows individuals to tailor the focus of the training to their individual needs (Taylor and O'Driscoll, 1998). Third, we explore the effects of the training using an RCT, including assessments 3 months following the intervention. Fourth, we explore whether reported self-efficacy is a mechanism by which the training influences reported energy and stress (*cf.* Strecher et al., 1986).

2 Materials and methods

2.1 Participants

Participants were employees from three large organisations based in the Netherlands, who volunteered to take part in an intervention advertised as a vitality training. The sample size was determined on a pragmatic basis, including employees across participating organisations who elected to complete the training and participate in

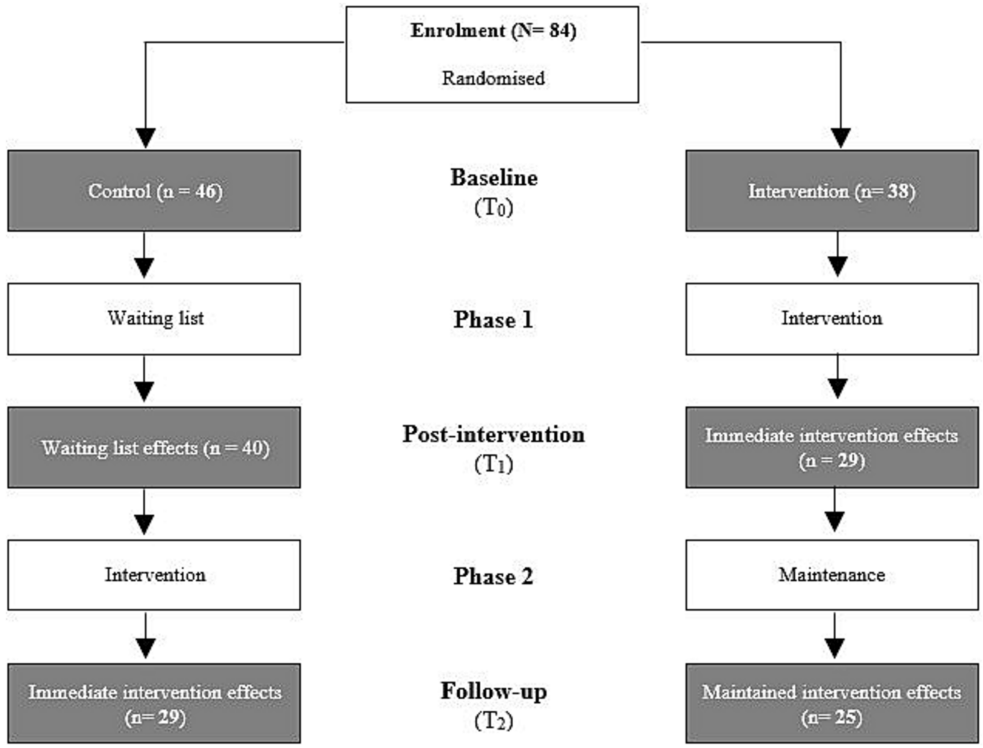

FIGURE 1
Overview of the design of the vitality training evaluation study.

the study. A total of 84 employees (52 females, 32 males), with a mean age of 47.39 years (age range 29–62 years) enrolled and participated in the study. The types of organisations that participants worked for included education ($n = 21$), commercial ($n = 43$), and government ($n = 20$). The educational training of the participants was largely above higher vocational level. The average number of years worked in the organisation was 13.36 years (SD = 9.84).

2.2 Design

A parallel group RCT design was used, with two phases, and with individual random assignment by the trainer to an intervention group ($n = 38$) or a waitlist control group ($n = 46$) within their organisation. A waitlist control group was used to control for traditional threats to internal validity, as this was ethically appropriate and reported as useful for initial evaluations of novel interventions (Mohr et al., 2009). Intervention allocation was concealed from participants, but not from data analysts. A flowchart of the study design is presented in Figure 1. The intervention group commenced the vitality training during Phase 1 and the control group was put on a waiting list for the training during this time. During Phase 2, the control group completed the vitality training and the intervention group was on a maintenance phase. The outcome measures were assessed at three time points during the trial (T_0–T_2 in Figure 1), each with a 2-week data collection period, allowing changes in these measures to be assessed within and between the groups before and after the intervention, as well as during a 3-month follow-up for the intervention group. All measures were assessed in Dutch and were completed anonymously using Qualtrics.[1] The study was conducted in the Netherlands in full compliance with the applicable rules of the institutional review board (Ethics Committee Faculty of Social Sciences, Radboud University, the Netherlands) and informed consent was obtained from all participants. All ethical codes as maintained in the NIP (the Dutch Association of Psychologists), the American Psychological Association, and the British Psychological Society were followed.

2.3 Intervention: vitality training employing behaviour-change techniques

The training was designed to include scientifically-tested behaviour-change techniques that allowed participants to identify their own areas of concern, to set a limited number of personally relevant and meaningful goals, and to develop personalised strategies for change. In terms of ease of implementation and to promote habit formation (i.e., requiring repetition over time, see Lally et al., 2010), the intervention was comprised of subsequent short sessions, whereby participants could practice and evaluate their behaviour-change

1 Note that as part of a larger project on workplace wellbeing, participants completed a number of additional measures regarding their work history, their current work environment, and broader measures of their wellbeing at each measurement time point. We have contained the measures reported in this study to those most directly related to assessing the effectiveness of the vitality training.

process over time. The overall aim of the intervention was to increase reported levels of energy and to reduce reported levels of stress as proxies for burnout symptoms.

2.3.1 Techniques central to the training method

The vitality training employed a specially designed 'method', which required that participants worked through assignments employing evidence-based behaviour-change techniques, including self-persuasion, implementation intentions, and self-efficacy techniques (Hagger et al., 2020). These techniques were selected to: (i) increase commitment to the self-defined goals (self-persuasion); (ii) increase the chance that these goals will be put into action (implementation intentions); and (iii) increase the confidence participants have in themselves to execute these actions (self-efficacy). Each of these techniques is described in more detail below.

2.3.1.1 Self-persuasion

This technique requires that individuals provide their own reason for working on a specific goal or for changing their behaviour. Self-persuasion thus draws on individuals' personal motivations and has been shown to have greater effects on changing individuals' behaviour than external forms of persuasion (Aronson, 1999). For example, having people generate their own reasons for why they should not smoke led to less smoking directly following the experiment compared to providing individuals with high quality arguments that were generated by others (Müller et al., 2009). The effects of self-persuasion are thought to occur due to higher personal relevance and involvement in the behaviour-change process and less resistance towards the message source (Aronson, 1999 for a review). Moreover, it has been reported that producing one to two self-generated arguments may have greater persuasive outcomes than ten (externally) provided arguments, even if the provided arguments are rated as being of better quality (Müller et al., 2017). This effect, however, only held when the number of self-generated arguments was low. That is, the effects of self-persuasion diminished if individuals generated many arguments for why they should or should not perform a particular response. Therefore, in the current intervention, participants had to write down one or two reasons why they should work on particular areas or perform particular actions they had defined earlier in the training.

2.3.1.2 Implementation intentions

After commitment to the self-set goals using self-persuasion, the next step was to implement these goals using concrete action plans, that is, implementation intentions (Gollwitzer, 1999). In line with the Theory of Planned Behaviour (Ajzen, 1991; Gollwitzer, 1999), concrete action plans generate stronger intentions that are more likely to translate into observable changes in behaviour (*cf.* the intention-behaviour gap; Sheeran, 2002). Research into the intention-behaviour relationship and goal setting suggests that the more specific our goals, the more effective they are (i.e., larger and more sustainable behavioural changes). For instance, asking people to plan where, when, and how they will make an appointment increased cervical cancer screening (Sheeran and Orbell, 2000). Similarly, reminding people of their higher-order (overarching) goal via implementation intentions has been shown to enhance their self-control in tempting situations for dieting behaviour (Van Koningsbruggen et al., 2011). Further, a meta-analysis into the effects of implementation intentions revealed this technique to have a medium to large effect on goal achievement (Gollwitzer and Sheeran, 2006).

In the intervention applied in the current study, participants identified and wrote down how they would respond in a particular situation in line with their personal goals. Creating an 'If-Then' plan for action meant that participants' responses in a given situation were already intended or planned and that a particular situation at work and/or at home served as a cue for the target response (i.e., less needed to be decided 'on-the-spot' or in the situation itself) (as per Sheeran and Orbell, 2000).

2.3.1.3 Self-efficacy

Given that reduced self-efficacy may be an antecedent for burnout (Lemyre et al., 2008; Cherniss, 2017) and that enhanced self-efficacy is associated with improved performance (Bandura, 1990; Bandura and Locke, 2003), fostering participants' self-efficacy was considered a crucial final step for all goal-setting assignments during the vitality training. At the end of all goal-setting assignments, participants were required to assess how confident they felt about their ability to achieve their developed goal or plan (using a scale of 1–10, from very low to very high). If participants indicated low self-efficacy for a specific goal or plan, they were asked to reflect on which aspect(s) were less achievable and to use insights from their reflection to formulate a goal they felt more capable of achieving. Thus, this self-assessment served two main purposes: (i) to help ensure that participants developed personal goals and plans that were realistic and achievable (and therefore more likely to be acted on) (Locke and Latham, 2002), and (ii) to have participants evaluate their choices and goals at regular intervals during the intervention (i.e., increased self-monitoring). In so doing, participants could realise that they do have the capacity to change aspects of their work-life situation, and, in the context of this intervention, thus have some control over their energy levels (Levin et al., 1998).

2.3.2 Training sessions and method

The intervention consisted of five 2-hour group sessions that were performed in-house, on the organisations' premises, which were held fortnightly over a 9-week period. The sessions were conducted in small groups of participants within each organisation, with group sizes ranging from seven to 13 participants.[2] The sessions included the following topics: (1) Personal energy balance analysis; (2) physical and mental energy; (3) working from qualities, values, and goals; (4) personal vitality strategy; and (5) evaluation and maintenance.

During the personal balance analysis, participants were introduced to different types of energy, and examined the activities in their daily life and the impact of these activities on their energy levels. During the session on physical and mental energy, participants were introduced to their mind–body interaction and examined the signals they received from their bodies that might indicate mental and physical fatigue. The third session introduced participants to the idea

2 Specifically: the educational organisation included one intervention group (n=10) and one waitlist control group (n=11); the commercial organisation included two intervention groups (n=21) and two waitlist control groups (n=22); and the government organisation included one intervention (n=7) and one waitlist control group (n=13).

of 'flow' (Csikszentmihalyi and LeFevre, 1989; Nakamura and Csikszentmihalyi, 2014) and the benefits of aligning their daily lives with their qualities, values, and future goals. As such, participants examined their qualities, values, and goals and analysed the fit between these and the activities in their daily life. In the fourth session, participants analysed the various resistances or personal barriers that interfered with achieving their personal goals. In the final session, participants reviewed what they had learned, achieved, and what they would need to remember to maintain the effects of the training and to continue improving their energy balance. For the duration of the training, each participant completed exercises that were contained in a specially-designed workbook, which was structured according to the aforementioned session topics and to the application of the behaviour-change techniques within each session. A description of the scenarios for each session is provided in Appendix 1.

Within each of the training sessions, the intervention method consisted of an initial evaluation of the previous session using a gain frame (Levin et al., 1998), discovering relevant values and goals drawing upon the technique of self-persuasion (as per Müller et al., 2009, 2017), developing personalised plans for change using implementation intentions (as per Sheeran and Orbell, 2000), and ended with participants rating and reviewing their confidence in their ability to achieve their goals set during the session (self-efficacy, as described earlier in the method) (also see the assessment of plan execution self-efficacy described in Scholz et al., 2007). Where confidence was self-identified as low to moderate (versus moderate to high), participants were encouraged to revise their implementation intention, either by making the 'If' (situation) or the 'Then' (response) components less challenging or by aligning the goal more closely with the value(s) they identified in the self-persuasion exercise.

2.4 Trainer

The intervention was delivered by the (independent) developer of the training, who held a PhD in clinical psychology and worked as a researcher, university lecturer, and vitality trainer. Adherence to the intervention method was controlled for, across sessions and participant groups, using a checklist, which was reviewed following each session.

2.5 Measures

The Vitality Training Evaluation Scale (VTES) was developed for this study and contained 20 items that measured participants' subjective experiences of energy, stress, daily life satisfaction, and work capacity, as well as their reported self-efficacy with respect to managing their work-life balance. The primary variables of interest were energy and stress, while secondary variables of interest were daily life satisfaction and work capacity. Self-efficacy with regard to managing one's work-life balance was included as a possible process measure (i.e., a possible mediator for the effects of the vitality training). Participants responded to all of the VTES items using visual analogue scales ranging from 0 to 100 (never to always). The internal consistencies for each of the factors is described below. A matrix of the correlations between each of the factors at baseline is provided in Table 1.

TABLE 1 Correlation matrix showing bivariate correlations between the vitality training evaluation scale factors at baseline.

	VTES factor			
	2.	3.	4.	5.
VTES factor				
1. Energy	−0.35**	0.69***	0.54***	0.22
2. Stress	1	−0.34**	−0.38**	−0.25*
3. Daily life satisfaction		1	0.54***	0.26*
4. Work capacity			1	0.34**
5. Self-efficacy				1

*Significant at the 0.05 level. **Significant at the 0.01 level. ***Significant at the 0.001 level.

2.5.1 Primary outcomes: energy and stress

Three VTES energy items established participants' subjective energy levels, which assessed the extent to which participants reported feeling (i) energetic, (ii) physically fit, and (iii) mentally fit. The factor 'energy' was a mean of these three items, and had good internal consistency (Cronbach's alpha: 0.88) (as per Kline, 2000). The mean of the energy items was 57.09 (SD = 22.57), where higher scores reflect higher levels of reported energy.

Two items established the extent to which participants felt stressed and overloaded. Participants responded to these items using visual analogue scales ranging from 0 to 100 (never to always). The factor 'stress' was a mean of these two items and was found to have good internal consistency (Cronbach's alpha: 0.87), the mean being 38.82 (SD = 3.63).

2.5.2 Secondary outcomes: daily life satisfaction and work capacity

Four items measured participants' subjective daily life satisfaction, including the extent to which they reported (i) being satisfied with their daily life, (ii) paying attention to the activities in their daily life, as well as being (iii) motivated towards and (iv) inspired by the activities in their daily life. A sample item used to assess daily life satisfaction is: "To what extent do you feel motivated for the activities in your daily life?" The factor 'daily life satisfaction' was a mean of these four items, which had good internal consistency (Cronbach's alpha: 0.915) (as per Kline, 2000). The mean of the items for daily life satisfaction was 63.49 (SD = 18.22), where higher scores reflect higher reported daily life satisfaction.

As regards work capacity, six items ascertained the extent to which participants felt (i) motivated, (ii) productive, and (iii) efficient at work, felt (iv) inspired by their work, and the extent to which they felt capable of (v) concentrating and (vi) achieving their goals at work. A sample item used to assess work capacity is: "To what extent do you feel productive at work?" The factor 'work capacity' was a mean of these six items, which had good internal consistency (Cronbach's alpha of 0.89) (as per Kline, 2000). The mean for the work capacity items was 65.56 (SD = 16.86), where higher scores reflect higher reported work capacity.

TABLE 2 Mean (SD) and number of participants across demographic variables and reported work experience for each treatment group (n = 65).

Variable		Treatment group		
		Control	Intervention	Total
Gender	Male	12	13	25
	Female	25	15	40
Age (years)		48.92 (9.04)	45.79 (8.18)	47.57 (8.76)
Industry	Research	9	5	14
	Commercial	17	16	33
	Semi-government	11	7	18
Tenure (years)		14.99 (10.69)	10.93 (7.71)	13.24 (9.67)
Sessions attended (out of five)		4.41 (0.57)	4.54 (0.65)	4.47 (0.61)

2.5.3 Process measures: self-efficacy

Participants' reported ability to manage their work-life balance was ascertained using five items: their perceived (i) ability to change their work-life balance, (ii) influence on having a good work-life balance, (iii) ability to make choices and (iv) set boundaries regarding their work-life balance, and the extent to which (v) their goals regarding their work-life balance were achievable. A sample item used to assess self-efficacy is: "To what extent do you feel capable of setting boundaries with regard to your work-life balance?" Although reliable and valid measures of general self-efficacy already exist (Sherer et al., 1982), self-efficacy is context-specific and a general self-efficacy scale may not be sensitive to changes in a specific domain following training (e.g., see Wang and RiCharde, 1988). Since the vitality training included exercises to help participants manage their personal work-life situation, we chose to develop our own measure of self-efficacy specifically for this study that related to managing one's work-life balance. The factor 'self-efficacy' was the mean of the five aforementioned items and was found to have good internal consistency (Cronbach's alpha: 0.89) (Kline, 2000). The mean of the self-efficacy items was 67.96 (SD = 18.30), where higher scores reflect higher reported self-efficacy. The item referring to one's perceived influence on a good work-life balance had the greatest deviation from the factor mean (M = 77.35, SD = 20.87). Although Cronbach's alpha would increase to 0.91 if this item was deleted, we retained all five items in the factor as the reliability was deemed sufficient, and in order to protect construct validity.

2.5.4 Participant evaluations of the intervention

The perceived effects and value of the vitality training were assessed at the completion of the intervention. Ten items measured the extent to which participants agreed that: (i) the vitality training was helpful; (ii) useful in their everyday life; (iii) had an effect on them; and that (iv) the training effects were lasting. Participants were also asked to rate the extent to which they agreed that they: (v) reached their personal goals during the training; (vi) that the training had an impact on their energy balance; and that (vii) the training would be helpful for other employees in their organisation. Moreover, they were also asked to rate the approach of the training, including the extent to which they agreed that: (viii) the training method was of good quality; and (ix) enjoyable; and that (x) the atmosphere within the group was good. Responses were made using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), and a sample item is: "The training has had an effect on my energy balance".

2.6 Data cleaning, screening, and analysis strategy

Participants were retained in the analysis to evaluate the intervention if they attended a minimum of three out of the five sessions (n = 65 after data cleaning). The retained participants attended a mean of 4.47 sessions, with over 50% of these participants attending all five sessions (52.8%). Of the retained participants, 52 completed all surveys and 51 had complete data for the variables of interest at all three time points (T_0–T_2) (n = 24 intervention group, n = 27 control group). The characteristics of the sample, post data cleaning, were as described in the participants' section and are summarised for each treatment group in Table 2. Although the mean age and tenure were higher for the control group, these differences were not statistically significant. As a precaution, we also examined the correlations between age and tenure with each of the dependent variables at baseline (T_0): Significant relationships were not found across the larger part of the dependent variables,[3] and so age and tenure were not included in our model when examining the effects of the training.

Before conducting the analyses, the data was screened for potential problems, and appeared to meet the assumptions for multivariate analysis of variance (MANOVA). Although no multivariate outliers were detected, one univariate outlier was detected for work capacity at Time Point 2 for a participant in the intervention group (z-score of −3.29). On visual inspection, the value did not appear to be an error, as the low mean for work capacity was consistent with the participant's scores on the remaining variables, and so the value was retained. At baseline, one participant reported having taken a significant period of sick leave: We considered excluding this participant; however, the overall findings did not change whether the

3 In particular, age was positively related to daily life satisfaction (r = 0.28, p = 0.026). Regarding tenure: a significant negative relationship was observed with stress (r = −0.30, p = 0.014) and a significant positive relationship was observed with work capacity (r = 0.31, p = 0.013). All other correlations were non-significant.

TABLE 3 Means and standard deviations of outcome variables for each treatment group at each time point.

	Baseline (T0)		Post-training (T1)		Follow-up (T2)	
	Control $n = 27$	Intervention $n = 24$	Control $n = 27$	Intervention $n = 24$	Control $n = 27$	Intervention $n = 24$
Primary outcome variables						
Energy	62.01 (18.92)	49.72 (23.52)	54.81 (23.30)	58.11 (19.64)	65.16 (18.13)	59.49 (16.22)
Stress	32.44 (24.11)	46.77 (25.25)	39.93 (27.35)	30.29 (21.39)	37.57 (21.39)	37.50 (24.38)
Secondary outcome variables						
Daily life satisfaction	66.48 (16.36)	59.80 (19.56)	60.19 (21.62)	65.46 (14.31)	69.53 (15.79)	65.76 (14.52)
Work capacity	67.25 (15.97)	59.86 (16.66)	62.09 (16.32)	61.69 (16.02)	69.23 (14.17)	64.07 (13.71)

The sample size presented in this table is smaller than what is provided in Figure 1 due to the data cleaning described in section 2.6 and due to the nature of the mixed MANOVA, which applied 'missing listwise.'

TABLE 4 Matrix of bivariate correlations between treatment group and outcome variables at each time point.

	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Treatment group[a]	−0.19	0.21	−0.09	−0.23	0.07	0.12	−0.23	0.26*	0.03	0.28*	−0.19	0.03	−0.13	−0.19	<0.01
2. Energy T0	1	−0.35**	0.69**	0.54**	0.22	0.50**	−0.12	0.47**	0.46**	0.23	0.42**	−0.25	0.32*	0.26	−0.02
3. Stress T0		1	−0.34**	−0.38**	−0.25*	−0.30*	0.31*	−0.23	−0.28*	−0.12	−0.25	0.36**	−0.06	−0.16	−0.07
4. Daily life satisfaction T0			1	0.54**	0.26*	0.43**	−0.22	0.47**	0.34**	0.31*	0.29*	−0.31*	0.35*	0.47**	−0.08
5. Work capacity T0				1	0.34**	0.41**	−0.11	0.40**	0.64**	0.26*	0.41**	−0.05	0.35*	0.62**	0.03
6. Self-efficacy T0					1	0.29*	−0.42**	0.36**	0.29*	0.55**	0.21	−0.15	0.23	0.36**	0.52**
7. Energy T1						1	−0.45**	0.62**	0.68**	0.44**	0.56**	−0.28*	0.45**	0.35*	0.05
8. Stress T1							1	−0.43**	−0.45**	−0.41**	−0.31*	0.35*	−0.24	−0.23	−0.43**
9. Daily life satisfaction T1								1	0.63**	0.49**	0.49**	−0.34*	0.63**	0.52**	0.19
10. Work capacity T1									1	0.41**	0.47**	−0.10	0.53**	0.60**	0.19
11. Self-efficacy T1										1	0.40**	−0.38**	0.44**	0.43**	0.59**
12. Energy T2											1	−0.44**	0.63**	0.59**	0.30*
13. Stress T2												1	−0.44**	−0.30*	−0.34*
14. Daily life satisfaction T2													1	0.77**	0.38**
15. Work capacity T2														1	0.27
16. Self-efficacy T2															1

[a]A positive correlation with treatment group reflects a higher score on the outcome variable of interest for the intervention group. *Significant at the 0.05 level. **Significant at the 0.01 level.

participant was included or excluded from the analysis, and so we decided to retain this participant to maximise statistical power. Although context appears important for the effects of organisational interventions (Randall and Nielsen, 2012), we did not stratify our analyses by the different organisations due to the small sample size.

Given that the VTES factors of energy, stress, daily life satisfaction and work capacity were significantly correlated at baseline (see Table 1), a mixed MANOVA examining the VTES factors was performed to assess changes across time (Time Points 0–2) within and between the treatment groups (control, intervention). Follow-up univariate analysis of variance (ANOVA) and simple effects tests were performed where appropriate. Given that the group sizes were approximately equal and the assumptions were met, we reported Wilks's lambda, which may be more powerful (see Stevens, 1979). SPSS 25.0 was used for all statistical analyses, and all significance tests were performed using two-tailed tests with alpha set at 0.05. Bonferroni adjustments were not applied for the subsequent ANOVA tests, as this was considered too conservative (i.e., with four dependent variables). However, the simple effects tests applied a Bonferroni correction for multiple comparisons (as described in Zar, 2010).

Because we did not conduct an *a priori* power calculation, and our sample size was reduced following data cleaning, we performed a series of power calculations following our analyses. Power was calculated using G*Power version 3.1, with a significance level (α) of 0.05 and a desired power (1-β) of 0.80. These analyses revealed that for a mixed-MANOVA with two groups and 12 measurements, sample sizes of $N = 851$, $N = 123$, and $N = 59$ would be required to detect small ($f^2 = 0.02$), medium ($f^2 = 0.15$), and large ($f^2 = 0.35$) effect sizes (as per Cohen, 1988), respectfully. In addition, a sensitivity analysis using G*Power revealed that with sample size of $N = 65$, the current study was powered to detect an effect size classified as medium to large ($f^2 = 0.31$).

3 Results

3.1 Intervention effects

The group means and standard deviations are provided in Table 3; the inter-correlations are presented in Table 4, with all correlations being in the expected directions. The mixed MANOVA assessing changes over time within and between the treatment groups revealed that the main effect for time point was non-significant, $\Lambda = 0.78$, $F(8, 42) = 1.51$, $p = 0.181$, $\eta_p^2 = 0.224$; similarly, the main effect for treatment

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TABLE 5 Between- and within-subject effects for univariate ANOVAs examining the effect of the vitality training.

Measure		Effect	
Primary outcome variables			
	Energy	Treatment group	$F(1, 50) = 1.25$, $p = 0.269$, $\eta_p^2 = 0.024$
		Time point	$F(2, 100) = 3.47$, $p = 0.035$, $\eta_p^2 = 0.065$
		Treatment group × time point	$F(2, 100) = 4.16$, $p = 0.018$, $\eta_p^2 = 0.077$
	Stress	Treatment group	$F(1, 50) = 0.14$, $p = 0.712$, $\eta_p^2 = 0.003$
		Time point	$F(2, 100) = 0.46$, $p = 0.633$, $\eta_p^2 = 0.009$
		Treatment group × time point	$F(2, 100) = 5.76$, $p = 0.004$, $\eta_p^2 = 0.103$
Secondary outcome variables			
	Daily life satisfaction	Treatment group	$F(1, 49) = 0.19$, $p = 0.664$, $\eta_p^2 = 0.004$
		Time point	$F(2, 98) = 2.46$, $p = 0.091$, $\eta_p^2 = 0.048$
		Treatment group × time point	$F(2, 98) = 3.28$, $p = 0.042$, $\eta_p^2 = 0.063$
	Work capacity	Treatment group	$F(1, 50) = 1.16$, $p = 0.287$, $\eta_p^2 = 0.023$
		Time point	$F(2, 100) = 4.35$, $p = 0.015$, $\eta_p^2 = 0.080$
		Treatment group × time point	$F(2, 100) = 2.77$, $p = 0.067$, $\eta_p^2 = 0.052$

group was also non-significant, $\Lambda = 0.96$, $F(4, 46) = 0.54$, $p = 0.710$, $\eta_p^2 = 0.045$. However, the treatment group by time interaction effect was statistically significant, $\Lambda = 0.69$, $F(8, 42) = 2.31$, $p = 0.038$, $\eta_p^2 = 0.306$. Given this significant interaction effect for the combination of variables, we subsequently performed univariate ANOVAs for each of the dependent variables of interest using a 2 (treatment group: control, intervention) × 3 (time point: baseline, post-intervention, follow-up) design, with treatment group as the and time point as the within-subjects variable. The between- and within-subject effects for each of the outcome measures are displayed in Table 5 and the interaction effects between treatment group and each time point are displayed in Figures 2, 3.

3.1.1 Energy

An examination of the impact of the training on reported energy levels revealed a significant main effect for time point. Pairwise comparisons revealed that reported energy was significantly higher at Time Point 2 than at Time Point 1. However, the main effect can be better understood when examining the significant interaction effect between treatment group and time point, displayed in Figure 2A. Pairwise comparisons revealed that the intervention group reported significantly lower levels of energy than the control group prior to the intervention ($p = 0.036$, 95% CI [−24.32, −0.83]); however, there was no significant difference between treatment groups immediately following the intervention ($p = 0.510$, 95% CI [−8.08, 16.07]) or at the 3-month follow-up ($p = 0.190$, 95% CI [−16.07, 3.28]). Pairwise comparisons examining the differences between time point for each group revealed that although the intervention group reported higher levels of energy following the intervention when compared to baseline, this improvement in reported energy did not reach statistical significance ($p = 0.235$, 95% CI [−3.18, 19.96]). For the control group, a significant improvement in reported energy levels was observed following exposure to the intervention (i.e., when comparing energy at Time Points 1 and 2), ($p = 0.003$, 95% CI [3.34, 20.18]). Thus, it appears that the significant main effect for time point is largely driven by the significant improvement in reported energy by the control group following training. No other differences were statistically significant.

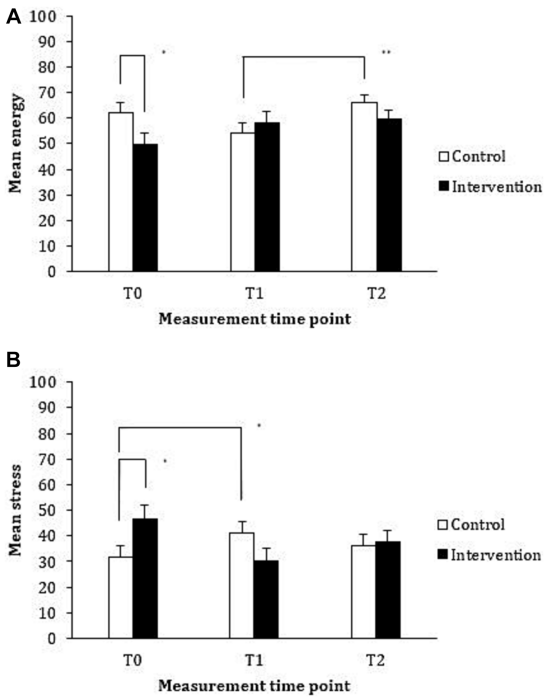

FIGURE 2
Mean reported energy **(A)** and stress **(B)** levels for the control (waiting list) and intervention (vitality training) groups at baseline (T0), immediately following (T1), and at 3 months following the intervention (T2).

3.1.2 Stress

The impact of the training on reported stress levels revealed a significant interaction between treatment group and time point (see Figure 2B; all within and between-group effects are reported in

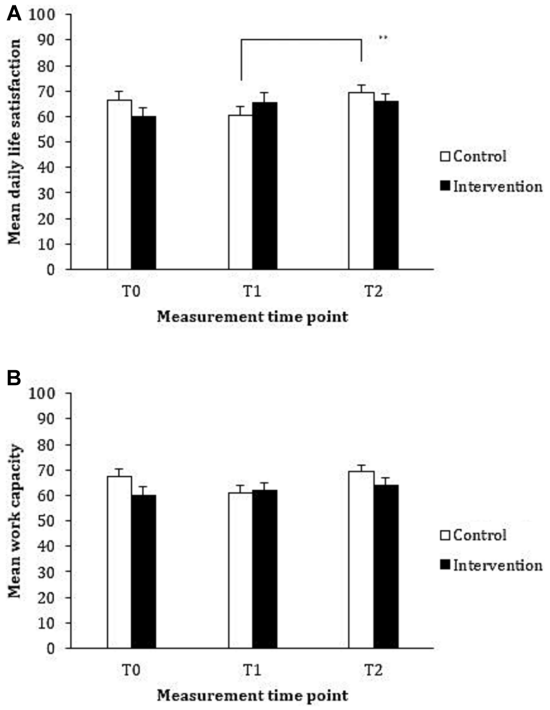

FIGURE 3
Mean reported daily life satisfaction **(A)** and work capacity **(B)** for the control (waiting list) and intervention (vitality training) groups at baseline (T0), immediately following (T1), and at 3 months following the intervention (T2).

Table 5). Pairwise comparisons revealed that the intervention group reported significantly higher levels of stress than the control group prior to the intervention ($p = 0.032$, 95% CI [1.39, 28.90]); however, the differences between treatment groups immediately following the intervention ($p = 0.130$, 95% CI [−24.46, 3.22]) and at follow-up ($p = 0.857$, 95% CI [−11.75, 14.08]) were not statistically significant. Pairwise comparisons between time points for each of the treatment groups revealed that there was a significant improvement in reported stress levels immediately following the training for the intervention group (i.e., from Time Point 0 to Time Point 1) ($p = 0.017$, 95% CI [−30.64, −2.32]). Although participants in the control group reported lower levels of stress following the training, this improvement in reported stress levels was not statistically significant ($p > 0.99$, 95% CI [−17.24, 8.10]). No other differences were statistically significant.

3.1.3 Daily life satisfaction

Examining the effect of the training on reported daily life satisfaction revealed no main effects; however, a significant treatment group by time point interaction emerged (as displayed in Figure 3A). Although the differences between treatment groups at each time point during the trial were in the expected direction, pairwise comparisons revealed that these differences did not reach statistical significance. When examining the differences across time point for each of the treatment groups, the improvement in reported daily life satisfaction for the intervention group from pre- to post- training was not statistically significant ($p = 0.394$, 95% CI [−3.48, 14.79]). However, the improvement in reported daily life satisfaction for the control group following training (i.e., from Time Point 1 to Time Point 2) was statistically significant ($p = 0.004$, 95% CI [2.52, 16.14]). No other differences were statistically significant.

3.1.4 Work capacity

Examining the impact of the training on reported work capacity revealed no main effect for treatment group, but a main effect for time point was revealed. Pairwise comparisons revealed that work capacity significantly improved from Time Point 1 to Time Point 2 ($p = 0.018$, 95% CI [0.76, 10.15]). Although the interaction effect between treatment group and time point was in the predicted direction (displayed in Figure 3B), the interaction effect did not reach statistical significance.

3.2 Self-efficacy as a mechanism for intervention effects

To explore whether reported self-efficacy mediated the effect of the vitality training on our primary outcome measures of energy and stress, a bootstrapping approach (Preacher and Hayes, 2004) was performed using the PROCESS macro in SPSS. The conducted bootstrapping technique involved repeatedly sampling (10,000 times) on the dataset to estimate the indirect effect, and using bias-corrected confidence intervals. The (bias-corrected) 95% CIs were then examined to see whether they contained zero (i.e., where a confidence interval does not contain zero, this indicates statistical significance).

We examined whether increases in self-efficacy regarding managing one's work-life balance mediated increases in reported energy levels in the training group. Specifically, we examined the extent to which increases in self-efficacy from baseline to post-intervention mediated the increase in energy observed in the intervention group. To model changes in energy, baseline scores were entered into the bootstrap analysis as a covariate, and post-intervention scores were entered as the dependent variable; similarly, to model changes in self-efficacy, baseline scores were entered as a covariate, and post-intervention scores were entered as a mediator. Treatment group (control, intervention) was entered as the independent variable. The indirect effect of treatment group on reported energy levels following the training through self-efficacy was significant (see Table 6).

A similar procedure was performed for reported stress levels, and the results of these analyses are displayed in Table 6. The indirect effect of treatment group on reported stress levels following training through self-efficacy was not statistically significant, suggesting that self-efficacy did not mediate the effects of the training on reported stress.

3.3 Participant evaluations

A self-reported evaluation of the intervention by the participants (using a 5-point Likert scale) revealed that they believed that the vitality training was helpful (M = 3.96, SD = 0.52), useful in their everyday life (M = 3.91, SD = 0.49), had an effect on them (M = 4.04, SD = 0.44), and had lasting effects (M = 3.45, SD = 0.61). In particular, participants moderately agreed that they reached their personal goals made during the training (M = 3.28, SD = 0.60) and that the vitality training had an impact on their energy levels (M = 3.55, SD = 0.64). In terms of the approach of the training, participants reported that the

TABLE 6 Bootstrap analyses for detecting the indirect effect of the vitality training on primary outcome variables.

Outcome variable	Mediator variable	Bootstrap estimate		BC 95% CI[a]	
		Estimate	SE	Lower	Upper
Energy[b] T0–T1	Self-efficacy T0–T1	3.49	2.38	0.18	9.33
Stress[c] T0–T1	Self-efficacy T0–T1	−2.26	2.10	−6.88	1.56

[a]BC = Bias-corrected confidence intervals (i.e., corrected for the median). Confidence intervals containing zero represent non-significant effects at the 0.05 level of significance; 10,000 bootstrap samples. [b]Positive estimates for energy reflect that increases in energy are predicted for the intervention group. [c]Negative estimates for stress reflect that reductions in stress are predicted for the intervention group.

method was of good quality (M = 4.06, SD = 0.56), and enjoyable (M = 3.81, SD = 0.65), and that the atmosphere within the group was good (M = 4.38, SD = 0.56). Finally, participants thought that the vitality training would be helpful for other employees in their organisation (M = 3.92, SD = 0.62).

4 Discussion

The current research sought to explore the effects of a 9-week intervention in the form of a vitality training employing behaviour-change techniques on reported levels of energy, stress, daily life satisfaction, and work capacity using an RCT. In addition, we sought to examine whether any immediate effects of the intervention were maintained 3 months later for those in the intervention group, and whether the effects of the intervention were replicated in the control group over this time period. Finally, we were interested in exploring whether self-efficacy to manage one's work-life balance mediated the effects of the intervention on reported energy and stress, and explored the acceptability of the training as reported by participants.

4.1 The effects of the intervention

A key finding was the significant interaction effect between treatment group and measurement time point for the combination of reported energy, stress, daily life satisfaction, and work capacity, thereby supporting *Hypothesis 1*. Follow-up analyses revealed significant interaction effects between treatment group and measurement time point for reported energy, stress, and daily life satisfaction, but not for work capacity. Reported energy levels increased for both groups after they, respectively, completed the vitality training; however, only the observed increase in reported energy for the control group reached statistical significance, herewith providing partial support for *Hypothesis 2*a. Similarly, reported stress levels improved for both groups following completion of the training; however, only the reduction in reported stress levels for the intervention group reached statistical significance, thereby providing partial support for *Hypothesis 2*b. Partial support was found for *Hypothesis 3*a regarding the secondary outcome measure of daily life satisfaction: Reported daily life satisfaction increased for both groups after, respectively, completing the vitality training; however, only the increase for the control group reached statistical significance. Although the differences in reported work capacity within groups across time were in the predicted direction, the interaction did not reach statistical significance, and thus *Hypothesis 3*b was not supported by our data.

Taken together, the findings of the current evaluation suggest that a vitality training grounded in evidence-based behaviour-change techniques shows some promise as an approach for improving indicators associated with burnout, as measured at the completion of the vitality training. It is also important to note that significant decrements were not observed in the intervention group at 3 months following their completion of the training, suggesting that the effects of the training were sustained over this time period. This evidence is encouraging for the potential benefits of a vitality training employing the behaviour-change techniques of self-persuasion (see Aronson, 1999; Müller et al., 2009, 2017), implementation intentions (see Gollwitzer, 1999; Sheeran and Orbell, 2000; Van Koningsbruggen et al., 2011), and self-efficacy to target indicators associated with burnout. Although preliminary, this evidence is particularly encouraging since the vitality training was a relatively short intervention and the participants did not score extremely high on reported symptomology prior to intervention; that is, greater changes or effects might have been observed immediately following training, had participants reported symptoms that were more severe prior to the intervention (*cf.* Maricuțoiu et al., 2016). The implications of these findings are valuable from a workplace wellbeing and sustainable career (De Vos et al., 2020; Van der Heijden et al., 2020) perspective, given the reported incidence and prevalence of work-related stress and burnout and its association with increased mental and physical symptoms for individuals (Nixon et al., 2011; Van Zwieten et al., 2014) and increased absenteeism and commitment for organisations (Golembiewski et al., 1998).

It is interesting that the improvements observed following training did not reach statistical significance for both groups across all of the variables. It is plausible that the lack of consistent effects observed across treatment groups are attributable to insufficient statistical power, but could also be explained by the differences observed between these groups prior to intervention. For instance, at baseline, the overall pattern of scores across the measures suggested that participants in the intervention group had worse symptoms overall than participants in the control group (i.e., lower levels of energy, daily life satisfaction, and work capacity, and higher levels of stress), and the significant improvement observed for this group following intervention was for the outcome of stress. On the other hand, for the control group – whose overall pattern of scores across the measures was more favourable – significant improvements were observed for reported levels of energy and daily life satisfaction. It could be that baseline stress levels moderate the effects of the training, whereby the

effect of the training on stress is stronger for those with higher baseline stress levels, while the effect on energy is stronger for those with lower baseline stress levels. Accordingly, it could be that participants prioritise and tailor the focus of the training to these baseline needs. The possible moderating effects of baseline energy and stress could be empirically tested, and it is recommended that subsequent evaluations also record and explore the role of a participant's focus during the training on its effects.

In addition, the finding that training did not have a significant effect on participants' reported work capacity could be explained by insufficient power; however, this could also be explained by the relatively short intervention and assessment periods. That is, it may take substantially longer to see significant improvements in the aspects of work capacity assessed – particularly for concentration, productivity, and effectiveness, which are indicators of work performance. That we obtained preliminary evidence for improvements to reported energy following training may mean that flow-on effects could be observed for work capacity over a longer time period, and this should be examined in a subsequent evaluation.

4.2 The role of self-efficacy

Exploring the indirect effect of the intervention on reported energy and stress provided preliminary support for a mediating role of self-efficacy in the effects of the intervention on reported energy; however, this effect was not found for reported stress. That self-efficacy was found to mediate the relationship between the effects of the intervention and reported energy provides preliminary evidence for the value of interventions targeting self-efficacy regarding managing one's work-life balance to increase energy levels. However, since self-efficacy was not directly manipulated and was measured at the same time point as energy in this study, it is recommended that future work in this area establishes the causal ordering of the effect – particularly as increasing evidence is emerging for reciprocal relationships involving self-efficacy (Simbula et al., 2011; Granziera and Perera, 2019).

That self-efficacy was not found to mediate the effect of the training on stress may be an artefact of the measurements used (e.g., if stress evokes greater affective evaluations, rather than cognitive evaluations), or it may be that the reported effects are underestimated since other factors could influence stress. The explanation that we offer, however, is that the vitality training topics and activities did not focus on stress directly – rather, the focus was on adaptive responses that could increase energy (i.e., topics included: energy balance analysis; physical and mental energy). Thus, while the vitality training may have a positive effect on stress, it is plausible that this does not occur via enhanced self-efficacy about managing one's work-life balance.

4.3 Participants' evaluation of the training

Participants evaluated the vitality training favourably, with the average ratings suggesting that they liked the training method and the atmosphere, and that they saw value in the training for themselves and other employees in their organisation. Importantly, on average, they agreed that the training had had a positive and lasting effect on them, and that their energy balance was improved. What is less clear from the quantitative ratings, is what specific improvements to the intervention participants would recommend in order to strengthen their experience and the perceived effectiveness of the training. Overall, however, the vitality training appears to be an acceptable intervention from the perspective of participants.

4.4 Strengths and limitations of the current research

The vitality training evaluated in the current research has many strengths, including its scientific basis, and its relatively short duration and ease of implementation. Importantly, the intervention may have moderate effects on reported energy, stress, and daily life satisfaction, with these effects maintained 3 months after the intervention. Regarding the methodology of the current research, the main strengths are in the design (using an RCT), and the congruence between the targets of the intervention and the outcome measures of interest. Previous meta-analyses of the effects of burnout interventions have acknowledged a lack of control conditions and random allocation of participants to treatment groups, herewith limiting the validity and reliability of the findings of such evaluations (*cf.* Maricuțoiu et al., 2016). As such, the use of an RCT in the current research makes a significant contribution to the literature in this area. Similarly, experts in this field have called for more tailored interventions, which consider the diverse range of experiences and problems that individuals may experience when confronted with burnout symptoms. Drawing upon the behaviour-change techniques of self-persuasion (see Aronson, 1999; Müller et al., 2009, 2017) and implementation intentions (see Gollwitzer, 1999; Sheeran and Orbell, 2000; Van Koningsbruggen et al., 2011) – where participants self-generated their reasons and strategies for change – ensured an evidence-based approach, while providing sufficient flexibility for participants to tailor the intervention to their personal work-life situation. This approach, combined with the recruitment of participants across three distinct organisations, likely increases the external validity of the findings with respect to other work-life situations. Thus, the current intervention makes a significant contribution by targeting behaviour in the form of establishing adaptive responses to the work-life situation – rather than targeting coping strategies, which have been criticised previously (*cf.* Le Blanc and Schaufeli, 2008) – and by allowing a more tailored approach to changing the precursors to burnout. The study is novel and makes a valuable contribution to an important area of vitality in the workplace, which may be particularly important at this time given the significant disruptions to workloads following the covid-19 pandemic (Kranenburg et al., 2022; Collie, 2023).

Despite the aforementioned strengths, there are also limitations to the current research that must be acknowledged. In interpreting our findings, it is important to recognise potential limitations associated with the employed measures. The outcome measures lack formal validation, and while their internal consistencies and interrelationships suggest meaningful associations, future research with a larger sample size should undertake a comprehensive examination of the underlying factor structure to establish a more robust foundation for interpretation. An apparent limitation is the relatively small number of participants who were recruited and retained, and who completed all measures throughout the study,

which increases the chance of failing to detect an effect of the training where there is one. Given that statistically significant differences were detected in the current study, it appears there was sufficient statistical power to explore the impact of the training. However, since there was substantial variability in the data and the study was underpowered to detect medium to small effect sizes, it is recommended that a larger-scale trial be conducted to (i) confirm the impacts reported, (ii) potentially allow medium effects to be detected, and (iii) to enable sub-group analyses. In addition, although participants of this study were recruited from diverse types of organisations – namely, government, education, and commercial organisations – these do not represent all types of organisations, which means that our findings may not generalise to other settings. Similarly, participants self-selected to participate in the training and the research. While this is fairly common practice (e.g., for randomised clinical trials Martínez-Mesa et al., 2016) and generally considered ethical as it reflects the voluntary nature of participation, this could have introduced selection bias and may imply that the findings cannot be generalised to other groups. Furthermore, the participants did not report high symptomology prior to the intervention. This has been noted elsewhere as a limitation of burnout intervention evaluations more broadly (*cf.* Maricuțoiu et al., 2016), and in our case could have led to an under-assessment of the real effect of the vitality training.

Another aspect of the research that limits its internal validity is that participants developed and worked on different personal goals during the intervention. Although this was the objective of the current intervention (i.e., to allow individual tailoring), this makes it difficult to make any conclusions about the specific outcomes or target behaviours that contributed to the effectiveness of the intervention. Similarly, as several behaviour-change techniques were implemented in the vitality training, it is hard to isolate which specific technique(s) contributed to the observed effects of the intervention, lowering the internal validity of the current research and restricting the suggestions that can be made about which elements should be harnessed in future interventions. Finally, while a waitlist control group was employed in the current research, no alternative active control or intervention group was included, herewith limiting the internal validity of the study. This makes it difficult to establish whether just participating in any intervention was superior to being on a waitlist control group (e.g., see quantifications of the Hawthorne effect using placebo-controlled trials; McCarney et al., 2007), rather than establishing that the behaviour-change elements – in particular – were effective. In addition, it would be useful to examine changes to the outcome measures at an even greater latency following the intervention: If it is the case that employees learn how to make changes over time, it is plausible that greater improvements to energy levels may be seen at a later stage. Another limitation of the current research is that observable behaviour was not measured. The reliance on self-reported measures only, instead of including observable behaviour, can be seen as a limitation that has been acknowledged previously (e.g., see a review of the intention-behaviour gap, Sheeran, 2002). On the other hand, as work-related stress tends to be conceptualised as an individual's experience of the work situation (e.g., see Maslach et al., 2009), it could be argued that the omission of objective measures may not be hugely limiting in this case. However, future extensions of this work could include gathering objective data on the behaviour(s) that participants select to work on during the vitality training, as well as objective measures of productivity and absenteeism.

4.5 Practical implications

JD-R theory, being the underlying framework of our empirical study, can also be used to guide the practical implications of our study. Overall, interventions aimed at increasing employee wellbeing, and through this, enhance job and organisational performance, may often take place at an organisational level, for example, by improving the balance between job demands and job resources. However, our study has indicated that a focus on individual-level interventions, such as the 9-week vitality training proposed in our study, can pay off as well. In particular, this example of proactive vitality management, that employs well-known behaviour-change techniques of self-persuasion, implementation intentions, and self-efficacy, is a fruitful human resource management (HRM) practice for enhancing desired employee outcomes (i.e., increased energy and reduced stress, being primary outcomes in our study, and increased daily life satisfaction, being a secondary outcome in our study). Moreover, building on our findings, we invite practitioners in the field of (sustainable) HRM, and particularly those intending to enhance employee vitality, to take account of employees' self-efficacy to manage their work-life balance as this factor plays an important role in translating the primary effects of the intervention into the desired outcome of increased energy. Obviously, the implementation of proactive vitality management stands or falls with a supportive line manager who helps the employee with tailor-made work-life balance strategies. At the same time, employees themselves need to carry responsibility for protecting their work-life balance, for instance by separating work and family time, duties, and activities, or by exploring opportunities to enrich each other. This dual responsibility, wherein both employer and employee objectives are aligned, is needed to foster sustainable careers (De Vos et al., 2020) wherein both health and happiness (employee-related indicators of sustainable careers; Van der Heijden, 2005), and productivity (employer-related indicator of sustainable careers; *ibid.*) are all prioritised.

5 Conclusion

The present study extended previous investigations into interventions for vitality by exploring the effects of a vitality training that employed behaviour-change techniques using an RCT. The results of the current research provide preliminary evidence for the benefits of employing the behaviour-change techniques of self-persuasion, implementation intentions, and self-efficacy in a vitality training for reported energy, stress, and daily life satisfaction levels, without significant decrements to these indicators 3 months after the completion of training. However, the effects of the training on work capacity were less clear and may need to be assessed over longer time periods with a larger sample. The current evaluation identified self-efficacy to manage one's work-life balance as playing a possible mediating role in the effects of the intervention on reported energy; however, an indirect effect of the training through self-efficacy was not observed for changes to reported stress. Future extensions of this work should focus on examining the relative role that each of the behaviour-change techniques and training elements play in producing these effects, and in testing the causal ordering of the role of self-efficacy. Such research could make significant contributions to developing

much needed effective interventions to enhancing vitality and addressing symptoms associated with burnout.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The study was conducted in the Netherlands in full compliance with the applicable rules of the institutional review board (Ethics Committee Faculty of Social Sciences, Radboud University, the Netherlands) and informed consent was obtained from all participants. All ethical codes as maintained in the NIP (the Dutch Association of Psychologists), the American Psychological Association, and the British Psychological Society were followed.

Author contributions

BP: Conceptualization, Data curation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing. ML: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing. PP: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing. BH: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1320826/full#supplementary-material

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Relationships between team characteristics and soldiers' organizational commitment and well-being: the mediating role of psychological resilience

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Background: Military operations call for a great deal of readiness and resilience on the part of the soldiers, once confronted with high-stress scenarios. Resilience, in this context, has to do with the ability to effectively cope with the adverse impacts of setbacks and the accompanying stressors, ensuring that overall performance and combat effectiveness remain unhampered. In the modern military context, it is relevant to examine more deeply the phenomenon of soldiers' resilience, its importance in positive organizational and personal outcomes as well as the role of team factors for the improving of soldiers' resilience. The study aimed to examine team-level factors that determine soldiers' psychological resilience and to reveal the mediating role of resilience in the relationships between team factors and organizational commitment and well-being.

Sample: A cross-sectional convenience sample included 422 soldiers on professional military duty in the Lithuanian Armed Forces.

Methods: Data were collected using self-administered questionnaire. We applied structural equation modeling to assess the research models.

Results: Team cohesion and colleague support proved to be reliable predictors of increased psychological resilience; individuals with higher resilience were more committed to the organization and experienced higher well-being; the results confirmed the hypotheses that soldier resilience has a mediating effect on the relationships between team characteristics and their commitment, and well-being.

Conclusion: The findings help clarify the relationships between team characteristics, soldiers' resilience, commitment and well-being. They may be useful for improving soldier resilience through team cohesion, mutual support, cooperation, and for integrating team-building interventions into military resilience training programs.

KEYWORDS

soldier, psychological resilience, team characteristics, commitment, well-being

1 Introduction

The Lithuanian Armed Forces as an organization continually updates its technology, weaponry, and various operational strategies. However, there is a significant gap in research related to the importance of individuals and their professional and personal competencies within the organization. When studying resilience, it is beneficial to apply an approach specific to the context (Stokes et al., 2019). Organizational resilience reflects the organization's "ability to survive and potentially thrive during crisis" (McManus et al., 2008). Research on individual psychological resilience in a professional setting is still in its infancy. The issue of psychological resilience among military personnel is complex and multifaceted, requiring comprehensive scientific research.

Literature reveals that psychologically resilient soldiers are better equipped to lead and assist their colleagues. They can inspire their subordinates to develop similar psychological skills and attitudes, thereby fostering a culture of resilience within the military. Continuous improvement and adaptability are possible only in military organizations that actively seek to create an environment for enhancing and supporting psychological resilience. Research on psychological resilience among soldiers is dominated by clinical psychology contexts related to health impairment or PTSD prevention, while there is a lack of research related to the daily context of the profession and to the difficulties arising from everyday life. Psychological resilience is of particular importance in the military, in that service members often face various hardships, stressors, and traumas during their service. Recent conflicts, for instance, the war in Ukraine, have increased the need for research on psychological resilience and related phenomena. Technological advancements and the dynamic security environment contribute to constant changes within military organizations, placing pressure on soldiers and leaders to adapt and meet evolving challenges. Understanding what influences psychological resilience in soldiers can assist both soldiers and leaders in developing strategies for coping with stressful situations, thereby enhancing soldier commitment to the organization and their overall well-being.

Recently, researchers have been exploring resilience in civil applications to a greater extent. Research indicates that resilience is not limited to crisis management; it is a long-term capability that helps maintain physical and mental equilibrium in daily activities, and it can be strengthened and nurtured (Kuntz et al., 2016; Yost, 2016). Psychological resilience is a dynamic process that depends on the surrounding system, where various factors continuously interact (Masten, 2013). In Lithuania, psychological resilience in the context of work or military service has not been extensively studied. Resilience in the workplace has been investigated in various industries and professions, for example, general business organizations (Shin et al., 2012), healthcare (Gabriel et al., 2011), and the military (Lee et al., 2013). The majority of workplace resilience research focuses on the individual level (King et al., 2016). Conceptualizations of resilience at the individual level can be found in the works of Vanhove et al. (2015), Britt et al. (2016), Kossek and Perrigino (2016).

There is a paucity of research examining the specific characteristics of military organizations, with most studies being focused on healthcare workers and educators. Further exploration is needed to better understand the phenomenon of psychological resilience, attract and retain psychologically resilient military personnel, and ensure adequate national defense.

Limited research suggests that psychological resilience in soldiers may be one of the factors that determine their commitment and well-being. It is, therefore, appropriate to use an ecological resilience approach to investigate the team factors that enhance psychological resilience in soldiers. The current study aimed to examine team-level factors that determine soldiers' psychological resilience and to reveal the mediating role of resilience in the relationships between team factors and organizational commitment and well-being.

Our study examines the issue of psychological resilience in soldiers from several perspectives: we look at team factors as antecedents of psychological resilience, or in other words, the context in which the soldier operates; we investigate the relationship between soldiers' psychological resilience, commitment and well-being; and, most importantly, we seek to establish the role of psychological resilience as a mediating variable in the relationships between team factors and organizational commitment and well-being.

2 Theoretical background and research hypotheses

2.1 Psychological resilience of soldiers

Resilience can be understood as a cultivated competence to act in the face of adversity and to reflect on the crisis or challenge and subsequently improve (Kuntz et al., 2016) in the military context. Military personnel are exposed to a wide range of challenging and traumatic events during training, exercises, and deployments in combat environments that can be detrimental to their health, well-being and performance; and military psychologists are interested in the factors associated with resilience to these experiences. In the literature, resilience is often understood as the ability to "bounce back" from stressful events. Resilience is defined and measured in a variety of ways (Meredith et al., 2011; Fikretoglu and McCreary, 2012). Luthans and Youssef (2007) defines resilience as the ability to adapt "in the face of significant risk or adversity." Luthans linked resilience to better attitudes toward work/activity and better health outcomes (Snyder, 2002). An Army study on psychological capital (PsyCap) by Schaubroeck et al. (2011) found that in a sample of soldiers deployed in Iraq, higher levels of PsyCap were associated with lower stress appraisal, and the protective effect of PsyCap was stronger for soldiers serving in units with higher levels of combat stress. Research on soldiers recognizes that personality can change throughout adulthood. Fikretoglu and McCreary (2012) defines resilience as a positive adaptation to significant adversity, with resilience being a response to stressful circumstances (e.g., demonstrating positive adaptation). When examining resilience in soldiers, researchers highlight that individuals in the military experience a range of traumatic events during combat training, missions and are constantly exposed to adverse environments as well as low-level stressors (e.g., living in difficult conditions, away from family) (Adler et al., 2011). It is widely acknowledged that psychological resilience is essential to cope with the cognitive, emotional and social stressors associated with the impact of war (Nindl et al., 2018). Psychological resilience is central to military preparedness as it plays an important role in dealing with physiological stressors; moreover, a soldier under psychological stress

(i.e., a soldier who is unable to cope with psychological stressors) will not be able to carry out military operations well, however physiologically fit he or she may be (Nindl et al., 2018). Resilience and mental health are interrelated; it demonstrates that military personnel can effectively reduce negative psychological symptoms by improving their resilience level and adopting mature coping styles under stressful situations (Cao et al., 2023).

Contemporary scholarly discourse, as elucidated by Okojie et al. (2023), has advanced the understanding of employee resilience, reorienting the paradigm from a focus on intrinsic coping mechanisms in response to stress to a more contextual examination of resilience manifestation within daily occupational settings (Kuntz et al., 2016). This construct of employee resilience is theorized as a dispositional attribute, instrumental in catalyzing psychological processes that facilitate an individual's recuperation from strenuous, traumatic, or catastrophic occupational experiences (Kuntz et al., 2016). Furthermore, this research posits employee resilience as a dynamic and malleable capacity within the realm of organizational studies, suggesting that it is not merely an innate trait but a developable faculty. The interplay between individual capacities and the occupational milieu plays a pivotal role in enabling employees to surmount professional obstacles (Kuntz et al., 2016). In light of this, the importance of organizational strategies aimed at nurturing employee resilience and fostering workplace engagement has become increasingly salient (Okojie et al., 2023). The dearth of research specifically addressing the unique daily stresses and challenges encountered by military personnel is a noteworthy gap in the current academic discourse. This lacuna is particularly significant, given the intrinsic characteristics of military service which inherently differ from civilian occupational contexts. In summary, the absence of focused research on the daily challenges faced by soldiers, considering the singular nature of military service, represents a critical gap in the broader field of stress and resilience studies.

2.2 Team characteristics and psychological resilience

Military service is fundamentally distinct from other forms of occupation due to its inherent emphasis on collective operation, typically within small unit structures. This characteristic positions military service as a prime subject for studies in team dynamics, situating it within the broader purview of environmental or contextual research in organizational psychology. We explored two team characteristics in this study – team cohesion and colleagues support.

2.2.1 Team cohesion and soldier resilience

Team cohesion is a dynamic process that reflects the tendency of a team to stick together and remain united in pursuit of its goals (Kirke, 2010). A team is identified by its significant autonomy and capability to execute tasks necessitating member interdependence and role distribution (Rasmussen and Jeppesen, 2006). Participation in a team yields various beneficial outcomes such as commitment, job satisfaction, safe behavior, and effective performance (Rasmussen and Jeppesen, 2006). Teamwork holds a critical place in military operations. In contemporary warfare, the emphasis is on the deployment of smaller, highly efficient units. This approach is favored because it allows for rapid, adaptable and unpredictable actions, key attributes for successful military maneuvers (Society for Military Psychology, 2007). Unit cohesion has been found to have a strong positive relation with physical and psychological outcomes of military personnel (Williams et al., 2016). Research also has demonstrated the relation between unit cohesion and organizational outcomes, including perceptions of individual readiness and unit readiness (Griffith, 2002). Increased cohesion showed increased resilience, confidence, and managing react (Williams et al., 2016). Unit cohesion plays a key role in the psychological health of new soldiers, and positive social climates in operational units play a protective role with respect to the outcomes of well-being (Bliese and Britt, 2001). Cohesion is defined as the ability to establish trust and teamwork through members' bonds (Ha and Jue, 2022). Because cohesion closely relates to work performance and adaptation to military life, it is necessary to pinpoint several methods for improving cohesion among soldiers (Ha and Jue, 2022). In challenging environments, reliable, and sustainable team performance and well-being is only possible when the team is resilient (Alliger et al., 2015). In military settings, team members often collaborate tightly, sharing knowledge, and striving toward common objectives when assigned a task. It is essential for team members, each with unique roles and duties, to cooperate effectively and adapt rapidly in order to accomplish shared goals, as highlighted by Lee et al. (2013). Moreover, a resourceful work environment – characterized by the availability of necessary tools, information, and support – empowers employees to perform their tasks more efficiently and effectively. It enables them to navigate challenges and leverage opportunities, thereby aligning their individual performances with broader organizational goals.

2.2.2 Colleague support and soldier resilience

Support from colleagues has to do with a belief that colleagues are concerned about an individual's well-being and notice their contribution to the overall performance (Ladd and Henry, 2000). Kox et al. (2022) showed that support is a decisive factor in achieving team goals, with higher levels of colleague support achieved under uncertainty. In uncertain, risky, and vulnerable situations found in the military, the role of colleague support in facilitating cooperation becomes particularly crucial. Support plays a pivotal role in team collaboration, significantly contributing to the attainment of collective objectives. It fosters self-assurance and a sense of security within the group and is instrumental in enabling team members to predict each other's actions in scenarios requiring swift decision-making, as observed by Kox et al. (2022). Researchers identified the following determinants for resilience in the workplace (assumptions of resilience at the team level): emotions; collective positive emotions such as shared enthusiasm, optimism, comfort or relaxation, tend to increase resilience at the team level; and interpersonal processes (Stephens et al., 2013) wherein the ability to experience a range of emotions in teams was positively related to team resilience, and mediated the effects of intra-team trust on team resilience. Sharing negative emotions helped teams resolve their members' problems, whilst sharing the positive ones helped them recover from difficulties (Stephens et al., 2013). Previous studies showed that the team members' support can predict team performance. In many operational Army situations, teams of people are bystanders in the execution of tasks, which can lead to a breach of trust due to unfamiliarity, hence undermining cooperation (Kox et al., 2022). The impact of colleague support on employee well-being and performance is multifaceted.

Perceived support from colleagues is often associated with enhanced team cohesion and a more collaborative work environment, fostering a culture of mutual respect and shared responsibility.

Effective social support, a key aspect of unit cohesion, has been linked to lessening the impact of traumatic stress and depressive symptoms among US veterans (Jones et al., 2012). This sense of cohesion likely plays a direct role in mental health by encouraging colleague support. It was noted that many personnel would prefer to turn to their fellow unit members for assistance with personal or emotional issues (Jones et al., 2012). Empirical studies in organizational psychology suggest that the quality of interpersonal interactions and the availability of support systems within a work setting are the crucial determinants for employee performance. This, in turn, fosters a sense of belonging and commitment among employees, which is pivotal for their psychological well-being and productivity. Research in this domain extends beyond the examination of individual behaviors to encompass the interactional patterns, shared norms, and collective decision-making processes that define the functionality of these units. The environmental or contextual approach in team research here acknowledges the interplay between individual soldiers and the overarching military system, including its hierarchical structure, cultural norms and operational demands. In summary, support from colleagues, encompassing both emotional empathy and recognition of contributions, plays a critical role in shaping an individual's workplace experience. It not only bolsters personal well-being and motivation but also contributes to the development of a positive and productive organizational culture.

2.3 Psychological resilience and commitment to the organization

Commitment to the organization is an individual's connection to the organization, manifested by his/her involvement in the organization's activities, acceptance of the organization's values and goals, willingness to remain a member (Meyer et al., 1993). Organizational researchers (e.g., Miller and Lee, 2001; Meyer et al., 2002) have long been interested in the topic of employee commitment to the organization. Two main approaches can be found in the literature: behavioral, sometimes described as exchange (Becker, 1960), and psychological, also known as attitudinal. Some authors identify a third approach, an integrative approach, which encompasses the first two (Cohen, 2006). Commitment to the organization refers to the employee's emotional attachment, loyalty, and willingness to contribute to the success of the company. Commitment to the organization is often associated with job satisfaction, engagement and the intention to stay with the organization. The following factors contribute to commitment to the organization: job satisfaction, trust in management, alignment with the organization's values and culture, fairness and justice in the workplace, and opportunities for personal and professional development. The lack of organizational commitment among soldiers has a negative impact on their productivity, which contributes significantly to their early exit from the armed forces and career change after receiving a full universal education. Team factors, resilience, and the relationship between commitment have been little studied by researchers. No research on these constructs has been carried out in Lithuania with professional soldiers.

2.4 Psychological resilience and well-being

Well-being is defined as a phenomenon that encompasses the positive and negative evaluations that an individual give to his or her life as a whole (Diener, 2006). Organizational researchers (e.g., Miller and Lee, 2001; Meyer et al., 2002) have long been interested in the topic of employee commitment to Two HRM concepts can improve employee and organizational performance, namely resilience and well-being (Merdiaty et al., 2021). Resilience and well-being have implications for different organizational arrangements, which depends on organizational management to provide employees with the needs they require to improve their performance (Merdiaty et al., 2021). Internal and external factors make resilience and well-being highly attractive to every organization, and the challenge of HRM is to create a balance to achieve the right level of resilience and well-being so that employees and organizations can work together to develop their creativity and productivity (Merdiaty et al., 2021). In resilience research, there is empirical evidence of positive relationships between organizational citizenship and corporate commitment to the organization (Merdiaty et al., 2021).

Some studies have shown that well-being has a positive impact on two forms of personal resilience: the worker's ability to cope with stress (personal resilience) and resilient behavior in the workplace (employee resilience); apparently, there is an interesting relationship between the two concepts: whether employees with good well-being in the workplace can increase employee resilience, and vice versa (Merdiaty et al., 2021). Understanding the nature of the link between employee and personal resilience links resilience and well-being through positive and emotional affect to suggest that the two constructs are distinct but reciprocally related (Merdiaty et al., 2021). The gap between resilience and well-being varies considerably across organizational contexts and can be influenced by the state of the country, gender, politics, finance, leadership, organizational form and age, making it challenging to conceptualize appropriate interventions to improve performance (Merdiaty et al., 2021).

Resilience is promoted as an essential aspect of development in an uncertain world full of disruptions and surprises. However, these terms often remain ambiguous when applied, and it is not clear which term, that is, well-being or resilience, is used in different organizations (Chaigneau et al., 2022). Well-being is increasingly understood as a multidimensional concept consisting of objective indicators (what people have achieved or are able to achieve) and subjective measures (how they assess their situation). Well-being is not limitless and looks at how people create well-being in an environment of limited resources (Chaigneau et al., 2022). Resilience is also a multidimensional construct and is often defined as the ability of a system to withstand disturbances while maintaining its structure and functionality (Chaigneau et al., 2022). Both of these concepts are complex and are increasingly understood as dynamic and socially contingent. Taking into account the needs, values and contexts of specific contexts in their practical application is essential to ensure the measurement of well-being and resilience indicators (Chaigneau et al., 2022). Recent literature on well-being suggests that material, relational and subjective domains of well-being influence the person's resilience and ability to adapt and cope with stressors and shocks (Chaigneau et al., 2022).

Relationships between individuals, communities, and organizations can help build resilience to change by providing social support and access to knowledge and resources (Chaigneau et al.,

2022). It can be concluded that all dimensions of well-being can be the sources of resilience, as they influence adaptive capacity and in turn the potential for well-being improvement through adaptation (Chaigneau et al., 2022). Earlier research has demonstrated that individuals with resilience are able to sustain their physical and mental health by not only mitigating the detrimental effects of challenging periods but also by enhancing their psychological well-being (Connor and Davidson, 2003).

2.5 Mediating role of soldiers' psychological resilience on commitment and well-being

From a social-ecological point of view, the field, or living space, can be understood as the social-ecological system that surrounds a human being – that is, an individual, a group, a community, an institution or a society. Field theory itself corresponds to many of the basic principles of socio-ecological research. In order to define the field or life space, Lewin first examined what he called psychological ecology, a life space within the designated area. It is the place where psychological, (subjective) and non-psychological (objective) factors intersect (Lewin, 1951). Ungar et al.'s (2013) research suggests that an ecological perspective helps us understand how people can develop resilience in a complex and changing world. Emphasizing the importance of connections to the social and physical environment, his work highlights the role of wider social and environmental factors in promoting resilience, rather than focusing solely on individual traits or characteristics.

Different models of resilience focus on the interaction between the individual and the resilience environment, where individuals mobilize personal and social resources in response to stressful situations to protect themselves from risk (Mak et al., 2011).

Organizational commitment refers to an individual's psychological attachment to an organization, characterized by the strong identification with and the desire to maintain membership in the organization to support its goals (Vakola and Nikolaou, 2005). Research has been conducted on the relationship between employee burnout, organizational commitment, and the intention to leave a job in South Korean newspaper companies. It was discovered that employees experiencing burnout showed reduced organizational commitment and heightened intention to leave (Jung and Kim, 2012). Additionally, Son et al. (2022) observed that in healthcare workers during the COVID-19 pandemic, resilience plays a mediating role between organizational commitment, anxiety responses, and their quality of life. In the realms of resilience, human resource management, and fostering employee dedication to the organization, it becomes vital to enhance resilience and investigate its connections with other organizational elements, especially in more complex professional settings.

While few empirical studies directly examined the links between resilience and well-being, Mak et al. (2011) explored a mediating role of the positive cognitive triad (self-esteem, positive worldview, and hope) between resilience traits and well-being (Mak et al., 2011). In order to understand how students adapt to the daily stresses associated with student life, a positive thinking model was tested that may explain interconnectedness between resilience and well-being (Mak et al., 2011). Resilience was selected as a key construct in positive psychology and is believed to play an important role in promoting human well-being (Mak et al., 2011). Resilience was found to be related to the individual's general adjustment, job performance, social functioning, physical and social psychological health (Mak et al., 2011).

Resilience research has so far paid insufficient attention to the multifaceted aspects of resilience and occupational context (Liu et al., 2019). In the context of resilience, well-being and human resource management, it is proposed to study resilience from an interdisciplinary perspective related to different occupational contexts. Understanding the contexts can improve the overall understanding of the importance of the phenomenon and how resilience can be developed from an organizational perspective (Liu et al., 2019). Increasing resilience in an organization can serve as one of the factors for positive change in organizational behavior research so that psychology focuses not only on the worst things that happen in life and fixing them, but also on creating a positive environment (Liu et al., 2019). Intuitively, resilience refers to recovery, as both individuals and organizations are exposed to stressful situations throughout their lifecycle (Liu et al., 2019). Thus, resilience can be an important intellectual concept to understand the differences in the behavior of organizational actors when they bounce back (Liu et al., 2019). The role of occupational context may have implications for theoretical developments in resilience research (Kossek and Perrigino, 2016). In organizational research, resilience can be understood as the skill and ability to be resilient in the face of overwhelming stress and change (Coutu, 2002).

From a dynamic perspective, resilience as a capacity can be increased and manifested in a dynamic process in response to traumatic events (Liu et al., 2019). Risk is a necessary component in the contexts studied. Risk is prevalent across domains and occupations, and effective risk management requires resilience (Liu et al., 2019). Different approaches to resilience are complementary since resilience has a multidimensional nature.

Recent research has identified the importance of resilience for community-level phenomena, such as resilience in entrepreneurial ecosystems (Roundy et al., 2017), while in modern society resilience is required in a wide range of organizational contexts. And examining resilience from an interdisciplinary perspective can help reveal new insights (Liu et al., 2019).

Different organizational environments also bring a critical perspective to the issue of levels of analysis when examining the antecedents, processes and consequences of resilience (Liu et al., 2019). Most existing resilience research stemming from positive psychology or positive organizational behavior tends to focus on the individual level (Liu et al., 2019). For example, sports players need to correct mistakes, put them aside and recover quickly (Liu et al., 2019). Entrepreneurs face adverse situations, high uncertainty, stressful events, and challenging circumstances and need resilience to achieve entrepreneurial performance (Bullough et al., 2014).

Increasingly, research is beginning to change the level of analysis in ways that have recognized the importance of team resilience in sporting activities (Morgan et al., 2013) and military training studies (Seligman, 2011). Moving to the organizational level, previous research has identified the importance of resilience in community-level phenomena such as entrepreneurial ecosystems (Roundy et al., 2017).

The Chinese financial services industry was investigated with a sample of 2040 banking employees. This study found that labor

resources can positively affect resilience and subsequent employee engagement (Liu et al., 2019).

Branicki, Steyer, and Sullivan-Taylor sought to uncover microprocesses involved in building resilient organizations. The study interviewed 137 resilient managers from the United Kingdom and France. The authors juxtaposed everyday "business as usual" and extreme events as two scenarios to explore the implications for individual and organizational resilience. This study shows that microprocesses have important implications for resilience at both individual and organizational levels (Liu et al., 2019).

As resilience can be difficult if not impossible to develop, it may be easier for organizations to recruit people with high resilience levels. Shin et al. (2012) emphasize theories of resilience, suggesting that in response to demanding and stressful environments, individuals seek psychological or material resources to protect them from the effects of such stressors. Therefore, Shin et al. (2012) argue that organizations should undertake interventions to strengthen the individual resources of existing employees prior to any change in order to reduce the stress experienced during organizational change and enhance commitment to the organization (Tonkin et al., 2018).

Previous studies have indicated that resilience, a key human attribute, plays a significant role in influencing subjective well-being or happiness (Li et al., 2014; Tan et al., 2021). Individuals who exhibit resilience tend to show greater perseverance in challenging situations, handle daily hardships more effectively, and possess a stronger ability to deal with life stressors (Mandleco, 2000; Shreffler et al., 2021). People possessing greater resilience are capable of preserving their physical and mental health, as they are able to mitigate the adverse impacts of challenging circumstances (Connor and Davidson, 2003).

Expanding upon prior investigations, including Ungar et al.'s (2013) ecological viewpoint, this research posits that individuals can cultivate resilience amidst the complexities of a dynamic world. Emphasizing the significance of interactions with social and physical surroundings, this study delves into how social and environmental elements contribute to the formation of resilience, transcending mere individual attributes. The primary objective is to explore the interplay between team characteristics, soldiers' psychological resilience, commitment and well-being. Crucially, this research seeks to understand the mediating function of psychological resilience in the relationship between team factors and soldier commitment and well-being. The hypotheses are visually presented in Figure 1.

3 Research hypotheses

The theorized direct and indirect links among study constructs were then tested: examining how team cohesion directly affects commitment and resilience in soldiers as well as their well-being; assessing a direct pathway between colleague support and soldier resilience; and evaluating indirect effects between all analyzed constructs.

H1: Team cohesion directly affects soldier commitment: soldiers who value team cohesion more highly are more committed to the organization.

H2: Team cohesion directly affects soldier well-being: soldiers who value team cohesion more highly also value their own well-being.

H3: Team cohesion directly affects soldier resilience: soldiers who value team cohesion higher are more psychologically resilient.

H4: Colleague support directly affects soldier resilience: soldiers who value colleague support higher are more psychologically resilient.

H5a: Soldier resilience positively mediates the relationship between team cohesion and commitment: team cohesion strengthens psychological resilience in soldiers, which increases their commitment to the organization.

H5b: Soldier resilience positively mediates the relationship between colleague support and commitment: colleague support strengthens psychological resilience in soldiers, which increases their commitment to the organization.

H6a: Soldier resilience positively mediates the relationship between team cohesion and soldier well-being: team cohesion strengthens psychological resilience in soldiers, which increases their well-being.

H6b: Soldier resilience positively mediates the relationship between colleague support and soldier well-being: colleague support strengthens psychological resilience in soldiers, which increases their well-being.

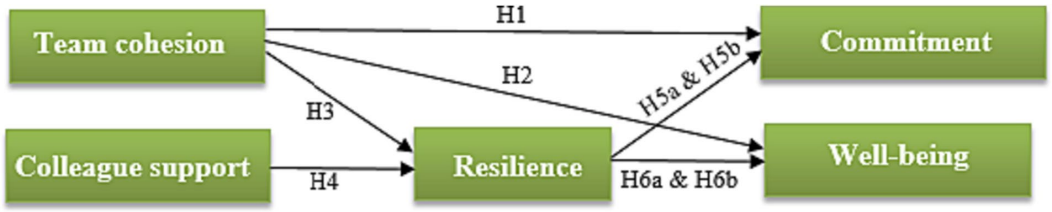

FIGURE 1
Theoretical model designed to characterize direct and indirect effects of three components team cohesion (TEM), colleague support (SUP), soldiers' resilience (SREM): direct effects of team cohesion (TEM) to commitment (COM) are specified by hypothesis H1, to well-being (WLB) by H2, and to resilience (SREM) by H3; direct effects of colleagues' support (SUP) to soldiers' resilience (SREM) by H4; the indirect effects of team cohesion (TEM) (hypothesis H5a) and colleagues' support (SUP) (hypothesis H5b) to commitment (COM) through soldiers' resilience (SREM); and hypotheses H6a & H6b are specified to test the indirect effects of team cohesion (TEM, H6a) and colleagues' support (SUP, H6b) to well-being (WLB) through soldiers' resilience (SREM).

4 Research methodology

4.1 Research sample

This study used a random sampling method. Four-hundred twenty-two Lithuanian professional military service personnel participated in the study. The participants' socio-demographic characteristics were as follows: 380 (90.0%) males and 39 (9.2%) females; three individuals did not indicate their gender. Participants ranged in age from 19 to 58 years with a mean age of 34.41 years (SD = 8.94). One-hundred fifty-five (36.7%) managers and 235 (55.7%) professionals took part in the survey: 28 (6.6%) respondents answered "other" to the question on job title, and four did not specify it at all. Two-hundred and one (47.6%) respondent had been working for up to 10 years, 104 (24.6%) for 10–20 years, 115 (27.3%) for more than 20 years, and two respondents did not indicate their length of service. The majority of participants, that is, 194 (46.0%), have a Bachelor's or Master's degree; 55 (13.0%) have a college degree, 51 (12.1%) – a vocational degree, and 119 (28.2%) – a secondary education. Two respondents did not indicate their educational background. An online self-completion questionnaire was used to collect the data. The questionnaire was not publicly available and was only open to soldiers who had received information about the study and an invitation to respond. The information and the invitation were distributed through the commanders of the army units. In the cover letter, we introduced the purpose of the study and provided instructions for completing the questionnaire. Participants were informed that the study was conducted in accordance with the ethical requirements of research, that the participants' responses would be analyzed in aggregate for scientific purposes only, and that the confidentiality of their responses was guaranteed. Participation was entirely voluntary, without any remuneration.

4.2 Measures

The questionnaire consisted of demographic questions on respondents' age, gender, education, length of service, the force in which they serve, and scales to measure the study variables: team characteristics (team cohesion and colleague support), psychological resilience, commitment to the organization and well-being. The whole composite concept assessment are presented in Table 1.

4.2.1 Team cohesion

Perceived team cohesion was measured using the Perceived Cohesion Scale developed by Bollen and Hoyle (1990), which has been used in a number of studies to assess the perceived cohesion of a group or team. The authors state that the scale consists of "Perceived Belonging" and "Emotional Experiences" subscales (Bollen and Hoyle, 1990). Principal component factor analysis of the Lithuanian sample identified one factor explaining 64.94% of the variance (KMO = 0.813; Bartlett's sphericity chi2 = 1630.84, $p < 0.001$). The weights of the statements in the factor range from 0.470 to 0.741. In the light of these data, we analyzed one generalized indicator of team cohesion, which was calculated as the average of the responses to the six statements (e.g., "The soldiers in my team have a lot in common"). Responses are scored on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

TABLE 1 The whole composite concept assessment.

Model variables	Statements	λ	CA	CR	AVE
Commitment	COM1	0.670	0.900	0.920	0.562
	COM2	0.709			
	COM3	0.682			
	COM4	0.765			
	COM5	0.807			
	COM6	0.834			
	COM7	0.827			
	COM8	0.689			
	COM 9	0.741			
Well-being	WLB1	0.607	0.840	0.892	0.582
	WLB 2	0.810			
	WLB 3	0.854			
	WLB 4	0.822			
	WLB 5	0.649			
	WLB 6	0.800			
Colleague support	SUP1	0.859	0.839	0.906	0.762
	SUP2	0.902			
	SUP3	0.857			
Team cohesion	TEM1	0.747	0.883	0.917	0.649
	TEM 2	0.832			
	TEM 3	0.852			
	TEM 4	0.841			
	TEM 5	0.861			
	TEM 6	0.685			
Soldiers' resilience	SREM1	0.712	0.872	0.903	0.510
	SREM 2	0.669			
	SREM 3	0.722			
	SREM 4	0.737			
	SREM 5	0.761			
	SREM 6	0.761			
	SREM 7	0.738			
	SREM 8	0.570			
	SREM 9	0.734			

λ, standardized factor loadings; CA, Cronbach alpha; CR, construct reliability; AVE, average variance extracted.

4.2.2 Colleague support

Perceived colleague support was measured by the three-statement scale presented in the Copenhagen Psychosocial Questionnaire.[1] Sample statement: "How often are your colleagues willing to listen to your problems at work if you need it?" Full psychometric descriptions of the Copenhagen Questionnaire and the individual scales can be found in Burr et al. (2019) and Kristensen et al. (2005). Responses

1 https://www.copsoq-network.org/licence-guidelines-and-questionnaire/

ranged from 1 point (never) to 5 points (always). Principal component factor analysis in the present sample identified one factor, which explained 76.21% of the data variance (KMO = 0.713; Bartlett's sphericity chi2 = 522.83, $p < 0.001$). The weights of the statements in the factor range from 0.734 to 0.814.

4.2.3 Psychological resilience

Psychological resilience in soldiers was measured using the Employee Resilience scale which consists of nine items (Näswall et al., 2019). It is an employee-centered measure of psychological resilience that empirically examines resilience at the employee level, enabling organizations to monitor employee psychological resilience and identify areas that contribute to the development of their resilience. Sample statement: "I learn from mistakes in the service and improve the way I do my job." Responses are scored on a Likert scale from 1 point (strongly disagree) to 5 points (strongly agree). Principal component factor analysis in our sample identified one factor explaining 50.94% of the variance (KMO = 0.892; Bartlett's sphericity chi2 = 1568.86, $p < 0.001$). The weights of the statements in the factor range from 0.570 to 0.761.

4.2.4 Commitment

Organizational Commitment was measured by The Organizational Commitment Questionnaire (OCQ) (Commeiras and Fournier, 2001; Yousef, 2003). The scale consists of 9 statements such as "I tell my friends about my organization as a great organization to work for." Responses are scored from 1 – strongly disagree to 5 – strongly agree. Principal component factor analysis identified one factor explaining 56.20% of the variance (KMO = 0.909; Bartlett's sphericity chi2 = 1942.65, $p < 0.001$). The weights of the statements in the factor range from 0.670 to 0.834.

4.2.5 Well-being

Well-being was measured by combining indicators of life satisfaction and feelings of happiness. Life satisfaction was measured on a five-statement scale developed by Diener et al. (2009) (e.g., "For the most part, my life is close to my ideal"). Happiness was measured with one additional statement, "I feel like a happy person" (Diener, 2000; Ervasti and Venetoklis, 2010; Carr and Chung, 2014). Responses were rated on a five-point Likert scale, with 1 point (strongly disagree) and 5 points (strongly agree). Principal component factor analysis identified one factor that explained 58.16% of the variance in the data (KMO = 0.861; Bartlett's sphericity chi2 = 1063.17, $p < 0.001$). The weights of the statements in the factor range from 0.607 to 0.854.

4.3 Statistical analyses

Statistical analyses were conducted utilizing IBM SPSS Statistics 29v and SPSS AMOS 29v. The individual level of analysis was applied to collected demographic data and study constructs, which include team cohesion, colleague support as well as resilience, commitment and well-being in soldiers. Descriptive statistics were employed to assess the statistical means and standard deviations (M and ± SD) of the construct variables. Subsequently, the Pearson bivariate correlation procedure was utilized to examine the relationships between constructs involved in this study. To mitigate the impact of common method bias in the study, two distinct methods were employed. The first approach involved the development of instruments that emphasized the anonymity and confidentiality of responses. As a second approach, Harman's single-factor test was utilized to examine the potential variance introduced by common method bias (Tehseen et al., 2017). Structural Equation Modelling (SEM) served as the analytical framework to assess the hypothesized model. Preceding the modeling phase, a factor analysis was conducted to evaluate identified latent constructs and variables. Subsequently, the modeling process continued with theoretical causal model path analysis, following the methodology outlined by Crowley and Fan (2013). SEM identified causal interactions among eight factors. The theorized direct and indirect links among study constructs were then tested: examining how team cohesion directly affects commitment, resilience and well-being in soldiers (hypotheses: H1-H3); assessing the direct pathway between colleague support and soldier resilience (hypothesis: H4); and evaluating the theorized indirect effects between all constructs (hypotheses: H5a & H5b and H6a & H6b). Consistent with the proposed theoretical model design, five variables were recognized, comprising three observed endogenous variables (soldier resilience, soldier commitment, soldier well-being), two observed exogenous variables (team cohesion and colleague support).

The hypothesized relationships among model constructs were rigorously examined using SPSS AMOS 29v, with coefficient weights chosen to evaluate the causal relations. In accordance with the recommendations of previous scholars (Smaliukienė et al., 2023), who advocate for a multipurpose methodology for assessing the adequacy of a theoretical model, the goodness of fit was assessed based on several criteria. The following criteria were employed to evaluate model fit: the probability statistic of χ^2 likelihood ratio, the Tucker and Lewis Index (TLI), the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA) with related confidence intervals (CI). Only values exceeding 0.95 for the TLI and CFI indices (Hu and Bentler, 1999) and values below 0.08 for the RMSEA measure (Browne and Cudeck, 1992) were considered acceptable. Data analysis and model parameter estimation were executed using the full information maximum likelihood method (Maydeu-Olivares et al., 2010). A bootstrapping analysis with 5,000 iterations was conducted, and confidence recognition was set at 95% for bias-corrected confidence intervals (95% CI). Following the criteria outlined by Hair (2019) and Hayes and Scharkow (2013), the effects of indirect relationships were deemed statistically significant if zero was not included in the 95% bias-corrected CI.

5 Results

The scholarly literature pertaining to structural equation modeling consistently advocates a systematic two-step approach for the comprehensive evaluation of models incorporating latent variables, as delineated in studies spanning references (Kanapeckaitė et al., 2022). In adherence to this established methodology, our investigation comprised two pivotal phases: first, the examination of the adequacy and construct validity of our measurement model; second, the examination of structural models and associated hypotheses. Throughout both stages of analysis, we applied the maximum likelihood procedure, a widely endorsed statistical technique in the

TABLE 2 Descriptive statistics, correlations, and scales' Cronbach's alpha coefficients.

Model variables	Descriptive statistics		Correlations				
	M	± SD	COM	WLB	SUP	TEM	SRES
Dependent variables							
Commitment (COM)	3.780	0.661	(0.900)				
Well-being (WLB)	3.784	0.628	0.538**	(0.840)			
Independent variables							
Colleague support (SUP)	3.893	0.811	0.404**	0.331**	(0.839)		
Team Cohesion (TEM)	3.809	0.689	0.572**	0.384**	0.533**	(0.883)	
Mediator							
Soldier resilience (SREM)	4.002	0.509	0.515**	0.511**	0.460**	0.433**	(0.872)

Pearson's correlation is significant at: **$p < 0.01$ level (2-tailed). M – mean; ±SD – standard deviation. Cronbach's alpha coefficients are shown in parentheses on the diagonal.

field of structural equation modeling. This particular approach ensures a rigorous assessment of the proposed models, contributing to the robustness and reliability of our research findings (Table 1).

5.1 Preliminary analyses for scale evaluations

In the initial stage of our analysis, we assessed the conceptual model for its adequacy. Descriptive statistical analysis was conducted at the individual level, and preliminary information on research variables was gathered. The normality of the data was deemed acceptable, as indicated by kurtosis and skewness measurements, with absolute values below 3 and 7, respectively—meeting established criteria (Wang et al., 2020). Additionally, a thorough check for multicollinearity showed no evidence thereof. All tolerance values exceeded the 0.20 threshold, signifying the absence of multicollinearity in the examined variables. This analysis ensures the independence of variables, reinforcing the integrity of subsequent analyses. Furthermore, we estimated the convergent and discriminant validity of the designed constructs, which involved examining correlations and assessing convergent and discriminant validity for all variables in the conceptual model. The results of this analysis are presented in Table 2.

The correlation coefficients presented in Table 2 showed that commitment is positive associated with soldier well-being ($r = 0.538$, $p < 0.01$), team cohesion ($r = 0.572$, $p < 0.01$) and colleague support ($r = 0.404$, $p < 0.01$). Commitment indicated positive and highly significant relationship with employee resilience ($r = 0.515$, $p < 0.01$). The employee resilience showed statistically significant relations with soldier well-being ($r = 0.511$, $p < 0.01$), colleague support ($r = 0.460$, $p < 0.01$) and team cohesion ($r = 0.433$, $p < 0.01$).

Subsequently, confirmatory factor analysis was rigorously conducted to assess the validity of the constructed model, which includes five distinct constructs. The results clearly demonstrated satisfactory convergent validity, meeting established criteria (Byrne, 2013; Bekesiene et al., 2023). Importantly, all factor loadings were statistically significant at the value of p <0.001 level, affirming the robustness of the model and providing a solid foundation for subsequent stages of analysis and interpretation.

5.2 Hypotheses testing results

Modeling analysis was conducted using IBM AMOS 29v software. Confirmatory factor analysis was employed to test the theorized links among constructs in specified models: Model 1 investigated how team cohesion influences commitment (H1); Model 2 evaluated the pathway between team cohesion and soldier well-being (H2); Model 3 verified the effect of team cohesion on soldier resilience (H3); and Model 4 tested the impact of social support on soldier resilience (H4). Finally, the indirect effects theorized by hypotheses H5a & H5b and hypotheses H6a & H6b between all constructs were assessed. The goodness-of-fit of the theorized model was evaluated based on test results designed to demonstrate the model fit.

5.2.1 Evaluation of direct effects based on study hypotheses

Firstly, we examined the direct effects of team cohesion on soldier commitment (H1, Model 1), soldier well-being (Model 2), and soldier resilience (H3, Model 3). Additionally, we estimated the direct effect of social support on soldier resilience (Model 4).

Examination of the hypothesized direct effects within the study model was conducted through the application of structural equation modeling analysis. The obtained results indicated a commendable fit to the data ($\chi^2 = 1.048$ [df = 2, $p = 0.59$], CFI = 1.000; NFI = 0.999; TLI = 1.007; RMSEA = 0.000, 90% CI: 0.00–0.08; and PCLOSE = 0.819). Notably, the χ^2 test of exact fit demonstrated statistical significance, and the Comparative Fit Index (CFI) surpassed the recommended threshold value of 0.90, as proposed by Hu and Bentler (1999) and Maydeu-Olivares and García-Forero (2010). Furthermore, the Root Mean Square Error of Approximation (RMSEA) for the close fit test was well below the established threshold of 0.08, as outlined by Hair (2019).

Moreover, the analysis revealed a substantial, positive and direct impact of team cohesion on soldier commitment (H1: $\beta = 0.430$, $p < 0.001$), soldier well-being (H2: $\beta = 0.201$, $p < 0.001$) and soldier resilience (H3: $\beta = 0.262$, $p < 0.001$). Consequently, the hypotheses positing the direct effects of team cohesion were substantiated for soldier commitment (H1),

TABLE 3 The results of direct effects of hypothesized model evaluated by SEM analysis.

Evaluation		Coeff. β	S.E.	St. Coeff. β	C.R.	*p*
H1	*Model 1*					
	TEM → COM	0.412	0.040	0.430	10.393	***
		Coeff. β	S.E.	St. Coeff. β	C.R.	*p*
H2	*Model 2*					
	TEM → WLB	0.183	0.041	0.201	4.424	***
		Coeff. β	S.E.	St. Coeff. β	C.R.	*p*
H3	*Model 3*					
	TEM → SREM	0.193	0.037	0.262	5.282	***
		Coeff. β	S.E.	St. Coeff. β	C.R.	*p*
H4	*Model 4*					
	SUP → SREM		0.201	0.031	0.320	6.463

Commitment (COM), Well-being (WLB); Colleague support (SUP); Team cohesion (TEM); Soldier Resilience (SREM). Standardised coefficients, St. Coeff. β. Critical Ratio for regression weight, C.R.; Standard error of regression weight, S.E Significance at: ***$p < 0.001$ (2-tailed); 5,000 sample size for bootstrap was used.

TABLE 4 The effect of team cohesion and colleague support on soldier commitment and well-being by soldier resilience evaluated by using SEM analysis.

	Soldier resilience	Commitment				Well-being			
Variables	Direct	Direct	Indirect	95% CI		Direct	Indirect	95% CI	
	St. Estim. β	St. Estim. β	St. Estim. β	LLCI	ULCI	St. Estim. β	St. Estim. β	LLCI	ULCI
Independent variables									
Team cohesion	0.262***	0.430***	0.086***	0.051	0.133	0.201***	0.111***	0.064	0.166
Colleague support	0.320***		0.106***	0.063	0.160		0.136***	0.085	0.193
Mediator									
Soldier resilience		0.330***				0.424***			
Model assessment by R^2	0.260	0.416				0.294			

St. Estim. β– standardized estimations. Significance at: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (2-tailed). R^2 – squared multiple correlation. Lower limit of 95% CI, LLCI; Upper limit of 95% CI, ULCI; bootstrap sample size = 5,000.

soldier well-being (H2) and soldier resilience (H3) (refer to Model 1, Table 3).

Furthermore, the undertaken analysis facilitated the examination of the direct effects of colleague support on soldier resilience. The findings indicated that support exerts a substantial, positive, and direct impact on soldier resilience (H4: β = 0.320, $p < 0.001$). Consequently, the hypothesis H4 postulating the direct effect of colleague support on soldier resilience was validated. Complete details are provided in Table 3.

5.2.2 Mediation effect of resilience

Consistent with the research methodology, the theorized indirect effects (hypotheses: H5a & H5b and H6a & H6b) were subjected to examination. Hypotheses H5a & H5b were formulated to investigate the mediating relationships involving soldier resilience as a mediator in the relationship between team cohesion and commitment. Additionally, hypotheses H6a & H6b explored the relationships between team cohesion and resilience and well-being among soldiers.

The analysis carried out showed that the designed model indicated good consistency with the collected data ($\chi^2 = 1.048$ [df = 2, p = 0.59], CFI = 1.000; NFI = 0.999; TLI = 1.007; RMSEA = 0.000, 90% CI: 0.00–0.08; and PCLOSE = 0.819). The detailed study results presented in Table 4 confirmed that team cohesion and colleague support was positively and significantly related to soldier commitment: team cohesion (H5a: β = 0.086, $p < 0.001$), and colleague support (H5b: β = 0.106, $p < 0.001$). Additionally, soldier resilience was positively related to soldier commitment (β = 0.330, $p < 0.001$) and soldier well-being (β = 0.424, $p < 0.001$). Approximately 42% of the variance in soldier commitment was accounted by the predictors ($R^2 = 0.416$, Table 4) and 30% of the variance for soldier' well-being ($R^2 = 0.294$, Table 4).

Furthermore, the outcomes of the modeling regarding the indirect effects of team cohesion and colleague support on commitment and well-being via soldier resilience as a mediator were assessed using the bias-corrected percentile bootstrap approach with 5,000 bootstrap samples, estimated at a 95% confidence interval. The analysis established positive and statistically significant indirect relationships

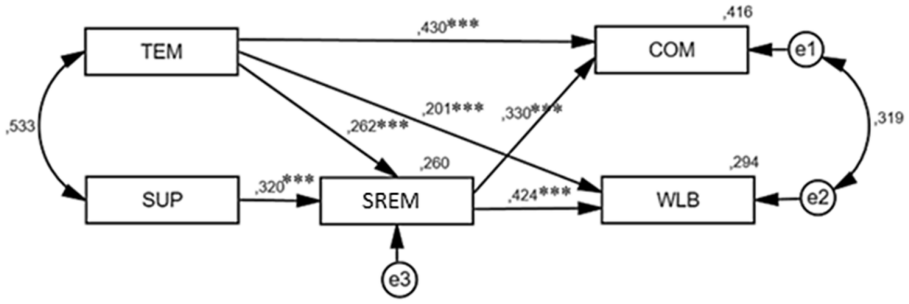

FIGURE 2
Graphical representation of structural modeling analysis results when mediation effect of soldier resilience is taken into account ($\chi^2 = 1.048$ [df = 2, $p = 0.59$], CFI = 1.000; NFI = 0.999; TLI = 1.007; RMSEA = 0.000, 90% CI: 0.00–0.08; and PCLOSE = 0.819). The standardized path coefficients are presented close to the arrows and significance indicator (***$p < 0.001$) is marked up.

from team cohesion (standardized effect = 0.086, $p < 0.001$, 95% CI = [0.051, 0.133]) and colleague support (standardized effect = 0.106, $p < 0.001$, 95% CI = [0.063, 0.160]) to commitment (Table 4).

Moreover, the weighted indirect effect through soldier resilience on soldier well-being was affirmed: from team cohesion (H6a: standardized effect = 0.111, $p < 0.001$, 95% CI = [0.064, 0.166]) and colleague support (H6b: standardized effect = 0.136, $p < 0.001$, 95% CI = [0.085, 0.193]). Subsequent to the bootstrap test with a sample size of 5,000 and a 95% CI excluding zero, the significant indirect effects of team cohesion and colleague support on well-being via soldier resilience were revealed (Table 4).

While the modeling results indicated that the mediation of soldier resilience for soldier commitment can be characterized as "partial mediation" (Baron and Kenny, 1986) for team cohesion ($\beta = 0.430$, $p < 0.001$), and soldier well-being ($\beta = 0.201$, $p < 0.001$), a distinct situation emerged concerning soldier resilience mediation effects when assessing the impact of colleague support on commitment and well-being. Colleague support did not exhibit a direct link with commitment, but indirect effects ($\beta = 0.106$, $p < 0.001$ for commitment and $\beta = 0.136$, $p < 0.001$ for well-being) were identified as positive and significant. Accordingly, soldier resilience fully mediates the relationships between colleague support and commitment as well as well-being (Figure 1).

Accordingly, the hypotheses H5a and H5b, asserting that "soldier resilience positively mediates the relationship between team cohesion and colleague support for soldier commitment" can be partially confirmed for team cohesion (H5a) and fully confirmed for colleague support (H5b). Similar situations arise with H6a & H6b, which posit that "soldier resilience positively mediates the relationship between team cohesion and colleague support for soldier well-being." Resilience fully mediates colleague support (H6b) but only partially mediates team cohesion (H6a). The modeling results are visually depicted in Figure 2, and all estimates of the model are methodically detailed in Table 4.

6 Discussion

This research focused on evaluating direct and indirect relationships among the dimensions of team cohesion, colleague support, soldier resilience, commitment to the organization and well-being. Based on the ecological system theory (Krebs, 2009), an ecosystem is described as a sophisticated network of relationships involving developing individuals and their interactions with the environment (Liu et al., 2019). This theory underscores the reciprocal nature of the relationship between individuals and their environmental context.

To our knowledge, our study is one of the first to examine the selected factors in a sample of soldiers from the perspective of organizational psychology and human resources, whereas previous studies have mostly focused on soldiers' health or its factors. The research suggests that team characteristics - team cohesion and colleague support – are important factors affecting psychological resilience among soldiers. According to the previous studies positive social relationships function as an important factor affecting mental resilience (Bartone et al., 2012). Previous studies mostly focused on the resilience role in preventing the post-traumatic stress disorder and coping styles (Zhao et al., 2020).

Results of the study show that team cohesion directly affects commitment in soldiers. There is a paucity of research examining the specific characteristics of military organizations. Teamwork holds a critical place in military operations. These results are consistent with earlier studies showing positive relationships between team cohesion and commitment. Participation in a team yields various beneficial outcomes, such as organizational commitment, job satisfaction, safe behavior, and effective performance (Rasmussen and Jeppesen, 2006).

Received results also propose that team cohesion directly affects soldier well-being, because cohesion closely relates not just to soldier performance but to their adaptation to military life, as well. Supportive relationships act as social buffers against work-related stressors, facilitating a more pleasant and intrinsically rewarding work experience. This, in turn, fosters a sense of belonging and commitment among soldiers, which is pivotal for their psychological well-being and productivity. Unit cohesion plays a key role in the psychological health of new soldiers, and positive social climates in operational units play a protective role with respect to well-being outcomes (Bliese and Britt, 2001).

Results of our study also propose that team cohesion directly affects soldier resilience. Team resilience is a shared construct that emerges through composition (Stephens et al., 2013). Stephens et al. (2013) conceptualize team resilience as an emergent state that describes the characteristics of a team, which are typically dynamic in nature and change depending on a team context, inputs, processes, and outcomes. This perspective emphasizes the team level of analysis and describes

team resilience as a result of the interaction between contextual factors and team members.

Colleague support directly affects soldier resilience. In military settings, team members often collaborate tightly, sharing knowledge and striving toward common objectives when assigned a task. It is essential for team members, each with unique roles and duties, to cooperate effectively and adapt rapidly in order to accomplish shared goals, as highlighted by Lee et al. (2013). When an emotional regulation mode of self-comfort is carried out, the role of social support becomes greater, and a more positive coping method can be adopted. Supportive relationships act as social buffers against work-related stressors, facilitating a more pleasant and intrinsically rewarding work experience.

The current modeling analysis conducted confirmed the partly mediation of resilience between team cohesion and both dependent variables – commitment and well-being among soldiers.

This study has shown that resilience mediated the relationship between team cohesion and commitment to the organization. This finding explains that it is common in the military environment to operate in teams and small units, and that their members, individually and collectively, increase the soldier's individual resilience, which in turn increases his/her commitment to the organization. A committed soldier is more effective in performing tasks and has a greater sense of satisfaction with service and pride in the organization to which he belongs. Soldiers with higher commitment demonstrate loyalty and have greater intrinsic motivation to perform, which can be valuable in certain roles and in leadership, as well.

Furthermore, this study confirmed that resilience fully mediated the dimension of colleague support and commitment. In the military context, colleagues play a particularly important role. As Ungar et al.'s (2013) research shows, social and environmental factors foster resilience, and resilience in turn fosters identification with the unit in which soldiers serve and their commitment. Supportive relationships promote a sense of belonging and commitment among soldiers. The ability to experience a range of emotions in teams is positively related to team resilience and mediated the effects of intra-team trust on team resilience. Sharing negative emotions helped teams resolve their members' problems, while sharing positive emotions helped teams recover from difficulties (Stephens et al., 2013).

This study has shown that resilience mediated the relationship between team cohesion and well-being. Soldiers who experience higher levels of team cohesion demonstrate greater resilience, which in turn increases their well-being. Taking into account the needs, values and contexts of specific contexts in their practical application is essential to ensure the measurement of well-being and resilience indicators (Chaigneau et al., 2022). Exploring the phenomenon of resilience in the military context thus makes sense, as it can help professionals in the field of human resources management develop effective measures and programs for improving soldier resilience.

Furthermore, this study confirmed that resilience fully mediated the relationship between colleague support and soldier well-being. Overall, this is partly in line with previous research. In our case, the context chosen for the team factors reveals a new angle on resilience as a competency that is developed at work and leads to desirable outcomes. Earlier research has demonstrated that individuals with resilience are able to sustain their physical and mental health by not only mitigating the detrimental effects of challenging periods but also by enhancing their psychological well-being (Connor and Davidson, 2003).

7 Conclusion and implications

This research contributes to the existing body of knowledge on resilience by demonstrating that the beneficial impacts of military team dynamics on soldier commitment to the organization and well-being are mediated through resilience. Prior studies predominantly concentrated on aspects such as stress reduction and interventions related to health and the prevention of health disorders. Our study specifically reveals that team factors enhance soldier resilience, which subsequently leads to increased commitment and well-being among individuals. Therefore, our findings not only corroborate but also expand upon previous research that has established connections between resilience and various organizational factors. Different models of resilience focus on the interaction between the individual and the resilience environment, where individuals mobilize personal and social resources in response to stressful situations to protect themselves from risk (Mak et al., 2011). Ungar et al.'s (2013) study advocates for an ecological approach to comprehend how individuals cultivate resilience in a multifaceted and evolving global context. This perspective underscores the significance of an individual's interaction with their social and physical environments. Ungar's research illuminates what a crucial role broader social and environmental influences play in promoting resilience, moving beyond a narrow focus on personal traits or characteristics. Our study reveals that team cohesion and colleague support in the military context are important for soldier resilience. Therefore, when studying psychological resilience in soldiers, it is important to consider not only the factors of individual resilience but also the importance of their immediate social environment. Further research is needed to understand how soldier resilience and organizational resilience can be fostered through organizational interventions in order to determine to what extent such resilience indicators actually matter Tonkin et al. (2018).

From a practical point of view, the results of the study can help design interventions to increase resilience in soldiers and have a positive impact on their well-being and commitment to the organization.

8 Limitations

This research acknowledges certain constraints that must be considered when interpreting its findings. A primary limitation is the reliance on self-reporting instruments for evaluating team characteristics, resilience, commitment and well-being. In this context, geopolitical circumstances may have affected soldier well-being, potentially biasing self-assessments. Another constraint is the limited representation of female participants in the study, which may have implications for the comparative analysis of personal characteristics across gender groups. Additionally, it is important to recognize that team factors are not the sole predictors of soldier resilience. Resilience might be influenced by a multitude of elements,

including but not limited to, training, leadership style and current service environment. Other influential factors such as educational background and leadership approach also play a significant role in shaping resilience, commitment, and well-being in soldiers.

Structural organization of military operations, predominantly executed through small, cohesive units, necessitates a high degree of interdependence and coordination among soldiers. This environment creates a unique socio-psychological context, wherein team dynamics, including communication, leadership, group cohesion, and conflict resolution, become critical factors influencing both individual and unit performance.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Before the start of the survey, the permission of the Ethics Committee of the Institute of Psychology of Vilnius University no. 74 (2022.01.06) was obtained.

Author contributions

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Prioritizing competencies for soldier's mental resilience: an application of integrative fuzzy-trapezoidal decision-making trial and evaluation laboratory in updating training program

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Background: The development of resilience is of the utmost importance in military training due to the demanding and high-stress nature of combat situations. Although there have been numerous studies on resilience competencies in the military, there is a research gap when it comes to identifying the most essential competencies that should be prioritized in training programs, particularly within compressed timeframes. With the current geopolitical landscape and ongoing military conflicts in Europe, it is necessary to expedite training of soldiers, including resilience training, without compromising the effectiveness of the program. This study aims to address this research gap by using a reductionist approach to resilience training and identifying the critical competencies that senior soldiers need to be trained to coach younger soldiers to maintain psychological strength during deployment. By filling this research gap, the study will contribute to the development of more efficient and targeted resilience training programs that optimize the ability of soldiers to adapt and excel in challenging military environments.

Methods: To address the issue, this study assessed the competencies comprising the master resilience training (MRT) program, widely recognized as one of the most effective military resilience training programs. Two groups of military experts, totaling 16 individuals, were involved in the evaluation process, representing two military contexts. The first group consisted of Ukrainian military experts whose experiences primarily focused on defending their own country's territory. The second group comprised Lithuanian military experts who had greater expertise in conducting military missions abroad. The assessment of resilience competencies was carried out using a deep analysis approach through the application of effective multi-criteria decision making (MCDM). Specifically, the decision-making trial and evaluation laboratory (DEMATEL) method was used, which is a significant multicriteria technique used to determine relationships among criteria and assign weight coefficients. In this study, the DEMATEL model was extended using trapezoidal fuzzy numbers (TrFN-DEMATEL) to accommodate decision-making under uncertainty conditions.

Results: The research findings highlight the critical importance of three core resilience competencies: self-regulation, mental agility and strength of character. The importance of each competency varies depending on the specific military context. When defending one's own country's territory, strength of character emerges as the key factor in enhancing soldiers' mental resilience. Conversely, during military operations abroad, self-regulation is the primary factor that promotes psychological resilience. Furthermore, the results show that these three primary competencies form a 'cause group' that influences other competencies through a cause-and-effect dependency.

Conclusion: Based on the findings, the theoretical conclusion is drawn that the importance of resilience competencies is contextually differentiated. Furthermore, each resilience competency is associated with a set of causes or effects. These are valuable insights for improving resilience competency training programs.

KEYWORDS

cognitive skills, resilience training, experienced warriors, trapezoidal-fuzzy numbers, DEMATEL

1 Introduction

Building resilience is a crucial aspect of military training that enhancing soldiers' capacity to adapt to combat stress. While many military resilience training programs aim to develop a range of competencies relevant to building resilience, the current geopolitical landscape and ongoing military conflicts in Europe underscore the need for expedited solder training, including resilience training. In the face of compressed training timeframes for new deployments, it becomes essentials to adopt a reductionist approach to resilience training program, focusing on the most critical competencies for success in combat situations and military life. By adopting this approach, we can ensure that soldiers receive the necessary training to develop the resilience required to excel in their service.

Numerous studies have examined building resilience competencies in the military environment, many of these studies rooted in positive psychology theory. This theory posits that resilience is an individual's ability to adapt positively to stressful situations (Masten et al., 2009). Positive adaptation is based on two key assumptions: first, that the individual has experienced high levels of adversity, and second, that the individual responds positively in their own interest when exposed to such situations (Deppa and Saltzberg, 2016a). Both positive adaptation and responses to unfavorable circumstances are central to the definition of resilience (Luthar et al., 2000). In the military context, resilience prevents from the adverse effects of combat deployment, which can cause various mental disorders, including post-traumatic personality transformation (Thomsen et al., 2011; McInerney et al., 2022) as well as increases soldiers long-term commitment to the military organization (Bekesiene et al., 2023a). Consequently, selecting the competencies that would have the greatest impact on resilience and developing these competencies during training could significantly shorten the pre-deployment training without jeopardizing the ability to withstand the adverse psychological effects.

To address this issue, we conducted a revision of the competences included in the master resilience training (MRT) program. Developed from the principles of positive psychology and thoroughly tested in military settings (Reivich et al., 2011), MRT is regarded as one of the most effective military resilience training programs available today (McInerney et al., 2022). This is a train-the-trainer program where senior soldiers are trained to help juniors ones by focusing and developing six groups of competencies: self-awareness, self-regulation, optimism, mental agility, strengths of character, and connection (MRT Skills Overview, 2014). Each competence developed using several prophylactic interventions (Carr et al., 2013). For example, to grow self-awareness, the senior solder encourages junior ones to reflect on their experiences, both positive and negative, provides feedback and encourages them to seek feedback from others, teaches soldiers mindfulness techniques and develops their emotional intelligence skills, such as recognizing and managing their own emotions (MRT Skills Overview, 2014).

As one of the most extensively utilized resilience development program in the military, specifically in the army, MRT program underwent testing in a various setting. Harms et al. (2013) conducted a quasi-experimental longitudinal study involving a large-scale group of participants to assess the impact of MRT instructors on the self-perceived resilience of US Army soldiers within combat units. The findings revealed that the resilience training conducted by the MRT trainers within the units indirectly improved the mental health of the soldiers by promoting greater optimism and adaptability. Moreover, the study identified a negative association between training and psychoactive substance abuse. Another study, conducted by Lester et al. (2011a,b) employed a similar methodology and spanned 15 months. This study demonstrated significantly higher levels of soldier-reported resilience and psychological health in groups with MRT trainers compared to control groups without MRT trainers. The observed difference between the affected and control groups was equal to or greater than observed in other resilience—building programs proven effective in a civilian context. Importantly, the effects of MRT

were analyzed under various conditions, including training and combat deployment contexts. Additionally, this study found that MRT training exhibited greater effectiveness among younger soldiers compared to older ones. These large-scale participant studies conclude that an MRT program, which incorporates mentor deployment and their presence within units, can effectively reduce the incidence of mental health issues among soldiers (Lester et al., 2011a,b; Harms et al., 2013). However, other research has produced less favorable results. A study conducted on soldiers deployed in Afghanistan initially reported a positive correlation between the implementation of this program and self-reported positive resilience thinking and morale; nevertheless, over time, both the resilient mindset and morale exhibited a decline (Carr et al., 2013).

The effectiveness of this program has been assessed in various countries and contexts that extend beyond the military. For instance, when MRT was applied to students, it was observed that the training had a positive impact on anxiety reduction, as measured by the Zung anxiety scale and SCL-90 (Ambrosio and Adiletta, 2021). Additionally, participants demonstrated improved social interactions after training. The discussion on the value of MRT elements, such as optimism, mental agility, and social connections, emphasized their significance in developing resilience among firefighters (Deppa and Saltzberg, 2016b).

Considering the program's several decades of use, multiple proposals have been made to modify it. For instance, during a military medical personnel training research, a suggestion was made to eliminate certain components of the program (Start et al., 2017). The content of the MRT program underwent testing on Army National Guard soldiers, who typically hold full-time jobs in non-military environments. The research results indicate that if the content is adopted in accordance with the principles of adult learning theory, positive outcomes are observed, particularly in terms of perceived resilience, goal setting application, and emotional control (Howard et al., 2022).

Despite the lack of theoretical underpinnings in the MRT construct, its effectiveness has been repeatedly validated by empirical studies (McInerney et al., 2022). However, it is worth considering the possibility of reducing the competencies included in this model, as they may exhibit interdependencies. This trend aligns with other resilience models proposed by academics, who have advocated for a reduction in competencies. For example, during the Covid pandemic, it was found that effective recovery from stress response and positive assessment were the two most influential factors for resilience in different countries, highlighting their significance amidst the specific stressors posed by the pandemic (Veer et al., 2021). Furthermore, most studies that evaluate the effectiveness of MRT have focused on immediate post-training evaluation. Nonetheless, as pointed by van der Meulen et al. (2018) here exists a substantial disparity between short-term and long-term effects of resistance training. It is plausible that only certain competencies remain relevant in the long run.

Given the limited training time for senior soldiers to act as resilience trainers and the challenge of providing personalized attention to younger soldiers during deployment, we recognized the need to streamline the list of competencies. By focusing on the most essential competencies, we can maximize the effectiveness of the training program. For this purpose, we gathered expert survey data from experienced military professionals from Ukraine and Lithuania to identify the critical competencies needed for soldiers to maintain resilience during combat situations of indefinite duration, as well as for timed missions. To analyze the data, we employed the techniques of fuzzy logic, which is designed to obtain accurate results even when the information is imprecise or ambiguous, relying on heuristic methods such as experts' surveys.

The aim of this study is to identify the critical resilience competencies that senior soldiers need to be trained to coach younger soldiers to maintain psychological strength during deployment. To achieve this, we utilized the decision making and trial evaluation laboratory (DEMATEL) method. Using this method, we were able to assess the interrelationships between different competencies and determine which ones have the greatest impact on overall resilience. The DEMATEL method distinguishes complex factors into cause and result groups and generates a visual cause-and-effect relationship diagram, providing an effective way to find countermeasures and make decisions about complex problems (Bekesiene et al., 2022b). The study employs the fuzzy DEMATEL method, utilizing trapezoidal fuzzy numbers to develop a causal diagram of resilience competencies and prioritize them based on their level of importance.

2 Literature review focused on soldiers' resilience competencies training

The literature review enabled us to identify that various training programs have been developed with the aim to enhance soldiers' resilience. These resilience trainings primary concentrate on improving mental health outcomes and aim to promote psychological resilience among service members through implementation of diverse strategies. These trainings can be characterized as preventive interventions. For instance, one such program, the Army Center for Enhanced Performance (ACEP), focuses on building up the mind-body connection through six components grounded in applied sport, health, and social psychology, which have the potential to enhance soldiers' performance (Dibble, 2015). Another prominent military resilience training program, known as Battlemind training (Castro et al., 2006), is designed to provide comprehensive mental training based on a range of psychological theories. Additionally, the well-known mindfulness-based mind fitness training (Stanley, 2014) incorporates targeting the structure and functioning of the soldier's brain, serving as a protective measure for their mental health.

Another extensively researched resilience competence training approach is provided by The U.S. Army Master Resilience Trainer (MRT) program, which was developed by the University of Pennsylvania as a part of Penn resilience program (PRP) (Reivich et al., 2011). The MRT program follows the "train the trainer" methodology and all the trainings lasts 10 days. Teaching process goes on as face-to-face resilience exercise training. MRT comprises of three modules: (1) preparation, (2) sustainment, and (3) enhancement; and is considered as one of the foundational components of the all-inclusive soldier competence program.

During MRT training, sergeants are instructed how to enhance soldiers' key resilience competencies such as: self-awareness (C1); self-regulation (C2); optimism (C3); mental agility (C4); strength of character (C5); and connection (C6):

- Self-awareness (C1) competence aids soldiers in better understand their strengths, weaknesses, and helps in coping with stress and adversity, as well as helps making better decisions in high-pressure situations (Crane et al., 2019; Schrader, 2019; Safran et al., 2022). By developing self-awareness, soldiers can become more effective and resilient improving their ability to handle the demands and challenges of military service. Skills that can enhance soldier's self-awareness include: (1) reflective practice; (2) feedback, (3) mindfulness, (4) emotional intelligence:
- Self-regulation (C2) competence involves effectively managing one's thoughts, emotions, and behaviors effectively in response to different stressful situations (Gün, 2011; Gibbons et al., 2012; Murray and Ehlers, 2021). It is a critical skill for soldier to possess this ability as they face various challenging and stressful situations in their line of duty. Soldiers can enhance self-regulation by rising key skills: (1) identifying triggers; (2) developing coping strategies; (3) practicing self-reflection; (4) setting realistic goals; and (5) seeking support when needed.
- Optimism (C3) competence is an important quality for soldiers to possess, as it helps maintaining a positive attitude and outlook even in challenging situations (Seligman and Csikszentmihalyi et al., 2014; Crabtree-Nelson and DeYoung, 2017). Optimistic soldiers are more likely to persevere and find solutions to problems, believing that things will ultimately work out for the best. Key skills to improve optimism: (1) focus on the mission; (2) develop a positive mindset; (3) seek support; and (4) stay resilient.
- Mental agility (C4) competence is an essential for a soldier's performance in various situations (Ashworth et al., 2020; Smith et al., 2022; Bekesiene et al., 2023b). It refers to the ability to process information, think critically, and make decisions in high-pressure environments quickly and accurately. Soldiers can improve mental agility through (1) practices mindfulness; (2) physical exercise; (3) mental exercises; (4) improving communication skills; and (5) seeking professional help.
- Strengths of character (C5) is a positive personality trait and quality (Heřman et al., 2022). Soldiers of character may have an advantage in performing their duties effectively. Key skills to improve strengths of character includes: (1) courage; (2) perseverance; (3) self-discipline; (4) honesty; (5) teamwork; and (6) compassion.
- Connections (C6) are important for soldiers, as they can provide support, encouragement, and a sense of friendship during the challenges of military life (Bowles et al., 2015; Wang et al., 2015; Williams-Klotz and Gansemer-Topf, 2018). Building strong connections within and outside of the military are essential for soldiers to thrive. Soldiers can build a strong support network that can help them navigate the challenges of military life and achieve their goals by fostering connections with their unit, family and friends, community.

Accordingly, MRT program aims to enhance cognitive and social skills by incorporating empirically confirmed insights from positive psychology (Peterson and Seligman, 2004), and promoting the development of strong relationships (Gable et al., 2004). The enhancement of these six resilience competencies is vital for deployment and life cycles throughout soldiers' careers. The inclusion of these competencies and skills in the training program is supported by existing research literature (see Table 1).

This literature review has revealed that the military resilience training programs primary focuses on enhancing mental health outcomes and foster psychological resilience that is vital for deployment and life cycles throughout soldiers' careers. The aforementioned programs are specially designed to enhance solders' psychological performance and mitigate mental health issues in a preventive manner. However, the effectiveness of completed resilience program is often limited in terms of evaluating actual long-lasting changes in the targeted behavior; instead, the emphasis is often placed on the quantity of training attendance or on sort-term effect rather than evaluation the desired behavioral change (Lester et al., 2011a,b). Furthermore, various resilience competencies training programs for solders tend to focus on improving different aspects of resilience; their effectiveness evaluation typically relies on self-reported questionnaires (Castro et al., 2012). While these evaluations contribute to a better understanding of the significance of resilience competencies, they also pose limitations in terms of comparability of competencies developed. To address this limitation, it is necessary to reevaluate resilience competencies and explore their bidirectional relationship to identify the most valuable ones that yields the greatest benefits.

3 Methodology

3.1 The DEMATEL application to optimize a list of competences

DEMATEL is designed to analyze and visualize the relationships of complex cause-and-effect models using matrices and graphs (Si et al., 2018). This is especially useful in decision-making when deciding which competencies (factors) are essential for growth during training to achieve the desired mental resilience. Graphs and network maps make it easier to understand the relationships between factors and make decisions about which factors to further modify or strengthen (Ullah et al., 2021). Factors are evaluated according to criteria, so in DEMATEL criteria are ranked according to the type and importance of the interrelationships (Cebi, 2013). Criteria that have a greater influence on others are classified in the "cause" group, while those that are influenced by others are classified in the "effect" groups; using these two groups, the interdependence of the criteria is identified and translated into a cause-effect structural model (Ullah et al., 2021).

In our study, the application of the DEMATEL method not only facilitates the categorization of complex factors into cause-and-effect groups, but also addresses the bidirectional relationship among resilience competencies. The DEMATEL method offers a solution to this issue by examining the relationships between selected dimensions and factors. The determination of factors influencing resilience has been extensively examined in psychological theory, and various competence models have been

TABLE 1 Literature supporting the validity of soldier resilience training.

Competence	Description of skills to be developed	Research authors
Self-awareness (C1)	(1) Reflective practice. Encourage soldiers to reflect on their experiences, both positive and negative. This can help them to identify patterns of behavior and thought, and to better understand their reactions to different situations	Reivich et al. (2011) and Crane et al. (2019)
	(2) Feedback. Provide soldiers with feedback on their performance, and encourage them to seek feedback from others. This can help them to identify areas where they need to improve, as well as areas where they excel	Cornum et al. (2011) and Binsch et al. (2017)
	(3) Mindfulness. Teach soldiers mindfulness techniques, such as meditation or deep breathing exercises, to help them stay focused and calm in stressful situations. Mindfulness can also help them to become more self-aware by bringing their attention to their thoughts, emotions, and physical sensations	Reivich et al. (2011) and Safran et al. (2022)
	(4) Emotional intelligence. Help soldiers develop emotional intelligence skills, such as recognizing and managing their own emotions, as well as understanding and empathizing with others. This can help them to better navigate interpersonal relationships, communicate effectively, and make better decisions	Aguilar and George (2019) and Garcia Zea et al. (2019)
Self-regulation (C2)	(1) Identifying triggers. Soldiers need to understand what triggers their emotional responses and behaviors. They can keep a journal or talk to a mental health professional to help them identify their triggers	Murray and Ehlers (2021)
	(2) Developing coping strategies. Once soldiers have identified their triggers, they can develop coping strategies to manage their emotions and behavior. Coping strategies can include deep breathing, visualization, physical exercise, and mindfulness techniques	Reivich et al. (2011) and Delahaij and van Dam (2016)
	(3) Practicing self-reflection. Soldiers can practice self-reflection to identify their strengths and weaknesses in self-regulation. They can take time to reflect on their actions, emotions, and behaviors and make changes where necessary	Gün (2011) and Reivich et al. (2011)
	(4) Setting realistic goals. Setting realistic goals can help soldiers manage their emotions and behavior effectively. They can break down larger goals into smaller, achievable ones and celebrate their progress along the way	Reivich et al. (2011) and Gibbons et al. (2012)
	(5) Seeking support. Soldiers can seek support from their peers, leaders, or mental health professionals when they need it. Talking to someone about their emotions and behaviors can help soldiers manage them effectively	Reivich et al. (2011) and Hom et al. (2017)
Optimism (C3)	(1) Focus on the mission. Soldiers who maintain a strong focus on their mission and the goals they are working towards are more likely to stay motivated and optimistic, even in the face of obstacles	Demetriou and Schmitz-Sciborski (2011)
	(2) Develop a positive mindset. Encouraging positive self-talk, practicing gratitude, and surrounding oneself with positive influences can all help to cultivate a more optimistic mindset	Reivich et al. (2011) and Seligman Csikszentmihalyi et al. (2014)
	(3) Seek support. Soldiers who have a strong support network, both within their unit and outside of it, are better equipped to handle the challenges of military life and maintain a positive outlook	Reivich et al. (2011)
	(4) Stay resilient. Resilience is the ability to bounce back from setbacks and difficult situations. Soldiers who develop strong resilience skills are better able to maintain a positive outlook, even in the face of adversity	Reivich et al. (2011) and Crabtree-Nelson and DeYoung (2017)
Mental agility (C4)	(1) Practice mindfulness. Mindfulness can help soldiers remain focused and present in the moment. It can also help them manage stress and anxiety, which can affect their mental agility. Mindfulness exercises like deep breathing, meditation, and visualization can be helpful	Zimmermann (2015)
	(2) Engage in physical exercise. Physical exercise can help increase blood flow to the brain, which can enhance cognitive function. Soldiers can engage in activities like running, weightlifting, and other forms of physical exercise to improve their mental agility	Ashworth et al. (2020)
	(3) Participate in mental exercises. Mental exercises like puzzles, brain teasers, and memory games can help improve cognitive function and enhance mental agility. Soldiers can also engage in simulation exercises that mimic real-life scenarios to improve their decision-making abilities	Pargament and Sweeney (2011) and Summers (2012)
	(4) Improve communication skills. Communication is an essential aspect of military operations, and soldiers who can communicate effectively can make better decisions in high-pressure situations. Soldiers can improve their communication skills by practicing active listening, speaking clearly and concisely, and giving and receiving feedback	Brathwaite (2018)
	(5) Seek professional help. Soldiers who experience mental health challenges like anxiety, depression, or post-traumatic stress disorder (PTSD) should seek professional help. Mental health professionals can provide soldiers with the support they need to overcome these challenges and improve their mental agility	Schneider et al. (2023)

(Continued)

TABLE 1 (Continued)

Competence	Description of skills to be developed	Research authors
Strength of character (C5)	(1) Courage. Courage allows soldiers to face danger, fear, and uncertainty with bravery and determination	Goud (2005)
	(2) Perseverance. Perseverance allows soldiers to endure and persist through difficult and challenging situations. It helps them maintain focus and determination even in the face of adversity	Sousa and Hagopian (2011)
	(3) Self-discipline. Self-discipline is the ability to control one's behavior, emotions, and impulses. Soldiers who possess self-discipline can follow orders, maintain composure, and avoid distractions that may compromise their performance	Wilson (2014)
	(4) Honesty. Honesty is a vital strength of character for soldiers. It allows them to maintain integrity and uphold their ethical standards even in challenging situations	Gayton and Kehoe (2015) and Dobbs et al. (2019)
	(5) Teamwork. Soldiers need to work together effectively to achieve their goals. Teamwork allows soldiers to collaborate, communicate effectively, and support each other to achieve mission success	McGurk et al. (2006)
	(6) Compassion. Compassion is the ability to understand and empathize with others. Soldiers who possess compassion can provide support and care to their fellow soldiers, even in stressful and challenging situations	Gayton and Kehoe (2015)
Connection (C6)	(1) Connection to UNIT. Soldiers who feel a strong sense of connection and belonging to their unit are more likely to perform well and have a positive experience in the military. This connection can be fostered through team-building activities, training exercises, and shared experiences	McGurk et al. (2006)
	(2) Connection to family and friends. Maintaining connections with family and friends outside of the military can provide soldiers with a sense of support and stability. Regular communication and visits with loved ones can help soldiers stay connected to their civilian lives and maintain a sense of balance	Riggs and Riggs (2011), Hall (2012) and Bowles et al. (2015)
	(3) Connection to community. Soldiers who feel connected to their community, whether it be through volunteer work or participation in local events, may experience a greater sense of purpose and belonging outside of the military	Wang et al. (2015) and Williams-Klotz and Gansemer-Topf (2018)
	(4) Connection to mental health resources. Soldiers who have access to mental health resources and support are better equipped to deal with the unique stresses and challenges of military life	Masten and Obradovic (2008)

proposed. However, the challenge arises from the interconnected nature of resilience competencies. For instance, research by Morosanova et al. (2021) highlights the positive influence of optimism on self-regulation, whereas Wang et al. (2022) suggest that optimism and social support reveal the effects of goal-oriented self-regulatory behavior. Similarly, the relationship between mental agility and strengths of character exhibits reciprocity. Empirical findings indicate that mental agility is influenced by the complexity of cognitive demands (Büchel et al., 2022), which, in turn, are shaped by strengths of character. Conversely, Hosein and Yousefi (2012) investigate the inverse relationship, exploring how self-control impacts agility. Therefore, in the binary relationship between resilience competencies, either factor can influence the other. Given that the MRT instrument comprises six competencies, which are further composed of factors, we were able to bypass the initial step of factor grouping and proceed directly to the second step. The second step involved developing a questionnaire for the paired evaluation of criteria, and Ukrainian and Lithuanian army experts meeting the study's criteria were invited to express their opinions on resilience factors. Moving on to the third step, we employed the fuzzy technique with DEMATEL (Pribićević et al., 2020) to examine and assess the ambiguous and indefinite nature of military psychological resilience. This comprehensive methodology allowed for the study of the multidimensional and interactive nature of military resilience, with fuzzy theory used to convert expert assessments of semantic resilience factors into evaluator's degree value through the membership function utilizing trapezoidal fuzzy numbers. Finally, the modeling results were presented in two diagrams: a cause-and-effect diagram and an influence-relations map. Additionally, for more clarity, the steps of this study are explained in a diagram (see Figure 1).

3.2 The study procedure

Sample. At the core of the research plan was the strategic engagement of experts from diverse military contexts, as the aim of this study was to prioritize competencies for soldiers' mental resilience in diverse military contexts. To achieve this, two groups of experts were engaged during the data collection phase. The first group consisted of eight experts from the Ukrainian Armed Forces (UMF), whose expertise focused on enhancing the resilience of soldiers defending their homeland. These experts were carefully selected on the basis of their professional competence, in particular their experience in mental resilience training for front-line soldiers, as well as their length of service in the military. The second group consisted of eight military experts from the Lithuanian Military Forces (LMF) with extensive experience in resilience of soldiers on international military missions abroad. The selection criteria for these experts included their expertise in resilience building, military service and completion of international missions. Detailed information on the experience of the experts and the missions carried out is not given here due to information constraints.

For the purpose of this research, a cohort of 16 experts was interviewed. The experts selected for this study were from regions with distinct geopolitical situations, specifically Ukraine and Lithuania. Recognizing that these unique circumstances might have influenced

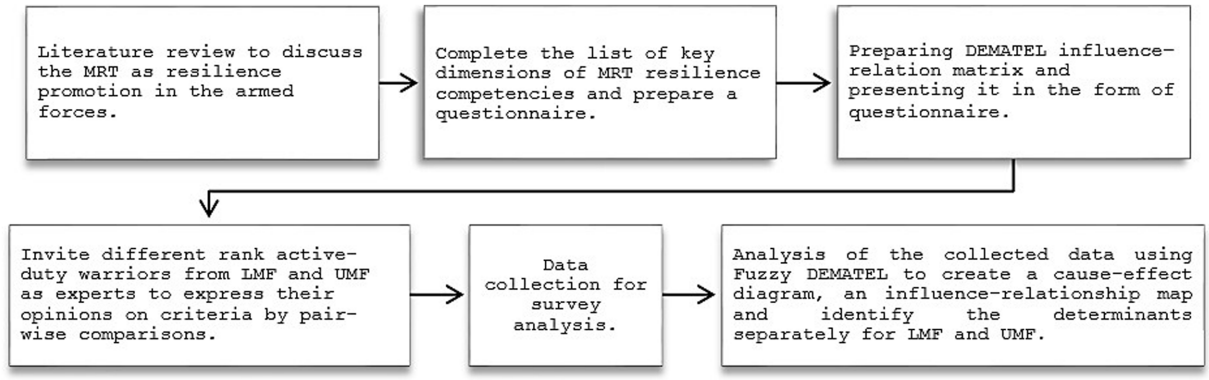

FIGURE 1
The steps of conducted investigations presented by scheme.

the opinions of the study experts, they were divided into two groups. The study employed a pairwise comparison questionnaire to conduct an in-depth analysis and to comprehend the substantial divergence in opinions between Ukrainian and Lithuanian experts. The research instrument consisted of six MRT competencies (Reivich et al., 2011; Griffith and West, 2013; MRT Skills Overview, 2014) with their short description of common cognitive behaviors that soldiers may exhibit:

- Self-awareness (C1). A soldier recognizes unproductive thoughts and emotions, especially in critical situations, and understands that different behaviors are productive in different situations.
- Self-regulation (C2). A soldier maintains emotional control and remains calm in stressful situations. This helps them make rational decisions and avoid impulsive or reckless choices that could put themselves or others in danger.
- Optimism (C3). A soldier maintains rational optimism even in difficult situations, trusting in himself and the team.
- Mental agility (C4). A soldier is able to adapt quickly to changing situations and make decisions under pressure. This requires flexibility and the ability to think on one's feet.
- Character strengths (C5). A soldier performs effectively because he knows his character strengths and the skills and abilities he possesses to overcome challenges and achieve goals.
- Connection (C6). Soldiers often work in teams, and teamwork is essential to accomplishing tasks effectively. Soldiers are trained to communicate effectively, work cooperatively, and support their teammates.

The instrument was translated from English into Lithuanian and Ukrainian. The translation was evaluated by teams of bilingual psychologists. The study was conducted in 2023 by researchers at the Military Academy of Lithuania.

Furthermore, the trapezoidal fuzzy number (TrFN-DEMATEL) method was conducted by eight steps. To perform this analysis, the opinions on six psychological resilience competencies were collected by filling out a pairwise comparison questionnaire from eight Ukrainian and 10 Lithuanian qualified soldiers as military resilience experts on the field. The opinions of the study experts were expressed by linguistic terms that were presented in the set of prepared linguistic terms (see Table 1). Therefore, the pairwise judgement of six resilience competencies was evaluated by scores of nine linguistic terms, such as: S1 = "EXL," S2 = "VLI," S3 = "LI," S4 = "MLI," S5 = "MI," S6 = "MHI," S7 = "HI," S8 = "VHI," S9 = "EXH" which were associated with positive trapezoidal-fuzzy numbers (see Table 1). These two collected data sets (1) Ukrainian experts and (2) Lithuanian experts allow us to conduct eight steps of fuzzy trapezoidal DEMATEL method and identify complex causal relationships among the six soldiers' resilience competencies: C1 (self-awareness), C2 (self-regulation), C3 (optimism), C4 (mental agility), C5 (character strengths), and C6 (connection), for Ukrainian and Lithuanian soldiers in a separate mode.

4 Empirical study results

4.1 Establishing a direct-relation matrix

As a first step, the direct relationship matrix D was prepared for our investigations and the comprehensive evaluation procedure was conducted using the TrFN-DEMATEL investigation steps (see Supplementary material). The two direct relationship matrices D were designed for six main resilience competencies in case to analyze in separate mode the judgements of Ukraine and Lithuanian soldiers, who were chosen as experts for this study. The aggregated experts' opinions on the importance of six soldiers' resilience competencies noted for this study are presented in linguistic terms in Table 2.

To continue with the study procedure, the linguistic terms in direct-relation matrices were changed into trapezoidal fuzzy numbers following the fuzzy semantic measure and its equivalent fuzzy value, the attribution function. Consequently, the guidance recognized by the linguistic variable was changed into a positive trapezoidal fuzzy number taking into account the values represented in Supplementary Table S1. In this way, the initial fuzzy direct-relation matrix D was gained. The initial direct relationship matrix constructed that separately represents the judgments of Ukrainian and Lithuanian experts on six soldiers' resilience competencies are shown in Table 3.

TABLE 2 The averaged expressed experts' decision to show the importance of soldiers' resilience competencies.

	DM1							DM2					
	C1	C2	C3	C4	C5	C6		C1	C2	C3	C4	C5	C6
C1	0	M	H	H	M	M	C1	0	VL	MH	VL	EL	EL
C2	MH	0	H	M	VH	M	C2	VH	0	VH	ML	MH	VH
C3	M	ML	0	L	L	M	C3	VL	VL	0	VL	VL	ML
C4	MH	MH	H	0	MH	H	C4	VH	ML	VH	0	M	VH
C5	H	H	MH	M	0	H	C5	EL	L	M	ML	0	MH
C6	H	M	L	MH	ML	0	C6	EL	VL	M	VL	L	0

DM1 = aggregated Ukraine experts' judgement; DM2 = aggregated Lithuania experts' judgement. C1 = self-awareness, C2 = self-regulation, C3 = optimism, C4 = mental agility, C5 = strengths of character, and C6 = connection. Data expressed in linguistic terms: VL, very low; L, low; M, medium influence; H, high influence; VH, very high influence.

TABLE 3 The initial direct relation matrix representing both Ukrainian and Lithuanian experts' judgement.

DM1	C1	C2	C3	C4	C5	C6
C1	(0, 0, 0, 0)	(4, 5, 6, 7)	(6, 7, 8, 9)	(6, 7, 8, 9)	(4, 5, 6, 7)	(4, 5, 6, 7)
C2	(5, 6, 7, 8)	(0, 0, 0, 0)	(6, 7, 8, 9)	(4, 5, 6, 7)	(7, 8, 9, 10)	(4, 5, 6, 7)
C3	(4, 5, 6, 7)	(1, 2, 3, 4)	(0, 0, 0, 0)	(2, 3, 4, 5)	(2, 3, 4, 5)	(4, 5, 6, 7)
C4	(5, 6, 7, 8)	(5, 6, 7, 8)	(6, 7, 8, 9)	(0, 0, 0, 0)	(5, 6, 7, 8)	(6, 7, 8, 9)
C5	(6, 7, 8, 9)	(6, 7, 8, 9)	(5, 6, 7, 8)	(4, 5, 6, 7)	(0, 0, 0, 0)	(6, 7, 8, 9)
C6	(6, 7, 8, 9)	(4, 5, 6, 7)	(2, 3, 4, 5)	(5, 6, 7, 8)	(3, 4, 5, 6)	(0, 0, 0, 0)

DM2	C1	C2	C3	C4	C5	C6
C1	(0, 0, 0, 0)	(1, 2, 3, 4)	(5, 6, 7, 8)	(1, 2, 3, 4)	(0, 1, 2, 3)	(0, 1, 2, 3)
C2	(7, 8, 9, 10)	(0, 0, 0, 0)	(7, 8, 9, 10)	(3, 4, 5, 6)	(5, 6, 7, 8)	(7, 8, 9, 10)
C3	(2, 3, 4, 5)	(1, 2, 3, 4)	(0, 0, 0, 0)	(1, 2, 3, 4)	(1, 2, 3, 4)	(3, 4, 5, 6)
C4	(7, 8, 9, 10)	(3, 4, 5, 6)	(7, 8, 9, 10)	(0, 0, 0, 0)	(4, 5, 6, 7)	(7, 8, 9, 10)
C5	(0, 1, 2, 3)	(2, 3, 4, 5)	(4, 5, 6, 7)	(3, 4, 5, 6)	(0, 0, 0, 0)	(5, 6, 7, 8)
C6	(0, 1, 2, 3)	(1, 2, 3, 4)	(4, 5, 6, 7)	(1, 2, 3, 4)	(2, 3, 4, 5)	(0, 0, 0, 0)

DM1 = aggregated Ukraine experts' judgement; DM2 = aggregated Lithuania experts' judgement.

4.2 Calculating normalized direct-relation matrix

To continue with the study procedure, the normalized fuzzy directed-relation matrices were built. The transformation was carried out following the equations (8a) to (8d) and equation (9) for the identification of the maximum value and for all values in the calculation of the fuzzy direct-relation matrix (see Supplementary material). The normalized fuzzy direct-relation matrices are presented for Ukrainian and Lithuanian experts in Table 4.

4.3 Calculating total-relation matrix

After obtaining the normalized fuzzy direct-relation matrix and continuing study analysis, the total fuzzy directed-relation matrices $\tilde{G}$ were created following the equations (10), (11) and from (12a) to (12d) (see Supplementary material). Consequently, all fuzzy directed-relation matrices $\tilde{G}$ were defuzzified and all fuzzy values were transformed into crisp numbers as shown in Table 5.

The values in total relation matrices can be used to identify the common connections between six resilience competencies, but to clarify the relationships and eliminate unclear view on the influence-relations map, additionally, the threshold number of defuzzied total-relation matrix must be calculated. These calculations were performed and the threshold value for Ukrainian experts (0.047) and for Lithuanian experts (0.031) was identified individually.

4.4 Computing the centrality (D + R) and causality degree (D – R)

To continue the sequence of these study steps, the uncertain variance and correlation of resilience competencies were individually determined as the sum of each row (Ri) and each column (Ci) of the total relationship matrix using the mathematical equations from (13a) to (13d) (see Supplementary material). The calculation results are presented in Table 6 (see column Ri and Ci).

Finally, the values of causality (Ri – Ci) and centrality (Ri + Ci) are calculated to represent influence-relation facts noticed after the multi-criteria analysis performed (see Table 5). Additionally, calculated

TABLE 4 The normalized fuzzy directed-relation matrix.

DM1	C1	C2	C3
C1	(0.000, 0.000, 0.000, 0.000)	(0.029, 0.036, 0.043, 0.051)	(0.043, 0.051, 0.058, 0.065)
C2	(0.036, 0.043, 0.051, 0.058)	(0.000, 0.000, 0.000, 0.000)	(0.043, 0.051, 0.058, 0.065)
C3	(0.029, 0.036, 0.043, 0.051)	(0.007, 0.014, 0.022, 0.029)	(0.000, 0.000, 0.000, 0.000)
C4	(0.036, 0.043, 0.051, 0.058)	(0.036, 0.043, 0.051, 0.058)	(0.043, 0.051, 0.058, 0.065)
C5	(0.043, 0.051, 0.058, 0.065)	(0.043, 0.051, 0.058, 0.065)	(0.036, 0.043, 0.051, 0.058)
C6	(0.043, 0.051, 0.058, 0.065)	(0.029, 0.036, 0.043, 0.051)	(0.014, 0.022, 0.029, 0.036)
	C4	**C5**	**C6**
C1	(0.043, 0.051, 0.058, 0.065)	(0.029, 0.036, 0.043, 0.051)	(0.029, 0.036, 0.043, 0.051)
C2	(0.029, 0.036, 0.043, 0.051)	(0.051, 0.058, 0.065, 0.072)	(0.029, 0.036, 0.043, 0.051)
C3	(0.014, 0.022, 0.029, 0.036)	(0.014, 0.022, 0.029, 0.036)	(0.029, 0.036, 0.043, 0.051)
C4	(0.000, 0.000, 0.000, 0.000)	(0.036, 0.043, 0.051, 0.058)	(0.043, 0.051, 0.058, 0.065)
C5	(0.029, 0.036, 0.043, 0.051)	(0.000, 0.000, 0.000, 0.000)	(0.043, 0.051, 0.058, 0.065)
C6	(0.036, 0.043, 0.051, 0.058)	(0.022, 0.029, 0.036, 0.043)	(0.000, 0.000, 0.000, 0.000)

DM2	C1	C2	C3
C1	(0.000, 0.000, 0.000, 0.000)	(0.007, 0.014, 0.021, 0.027)	(0.034, 0.041, 0.048, 0.055)
C2	(0.048, 0.055, 0.062, 0.068)	(0.000, 0.000, 0.000, 0.000)	(0.048, 0.055, 0.062, 0.068)
C3	(0.014, 0.021, 0.027, 0.034)	(0.007, 0.014, 0.021, 0.027)	(0.000, 0.000, 0.000, 0.000)
C4	(0.048, 0.055, 0.062, 0.068)	(0.021, 0.027, 0.034, 0.041)	(0.048, 0.055, 0.062, 0.068)
C5	(0.000, 0.007, 0.014, 0.021)	(0.014, 0.021, 0.027, 0.034)	(0.027, 0.034, 0.041, 0.048)
C6	(0.000, 0.007, 0.014, 0.021)	(0.007, 0.014, 0.021, 0.027)	(0.027, 0.034, 0.041, 0.048)
	C4	**C5**	**C6**
C1	(0.007, 0.014, 0.021, 0.027)	(0.000, 0.007, 0.014, 0.021)	(0.000, 0.007, 0.014, 0.021)
C2	(0.021, 0.027, 0.034, 0.041)	(0.034, 0.041, 0.048, 0.055)	(0.048, 0.055, 0.062, 0.068)
C3	(0.007, 0.014, 0.021, 0.027)	(0.007, 0.014, 0.021, 0.027)	(0.021, 0.027, 0.034, 0.041)
C4	(0.000, 0.000, 0.000, 0.000)	(0.027, 0.034, 0.041, 0.048)	(0.048, 0.055, 0.062, 0.068)
C5	(0.021, 0.027, 0.034, 0.041)	(0.000, 0.000, 0.000, 0.000)	(0.034, 0.041, 0.048, 0.055)
C6	(0.007, 0.014, 0.021, 0.027)	(0.014, 0.021, 0.027, 0.034)	(0.000, 0.000, 0.000, 0.000)

DM1 = aggregated Ukraine experts' judgement; DM2 = aggregated Lithuania experts' judgement.

TABLE 5 The defuzzied total-relation matrix into a crisp total-relation matrix.

	DM1							DM2					
	C1	C2	C3	C4	C5	C6		C1	C2	C3	C4	C5	C6
C1	0.013	**0.049**	**0.065**	**0.063**	**0.050**	**0.051**	C1	0.004	0.019	**0.048**	0.019	0.013	0.015
C2	**0.059**	0.012	**0.066**	**0.050**	**0.070**	**0.052**	C2	**0.063**	0.006	**0.068**	**0.036**	**0.050**	**0.066**
C3	**0.047**	0.025	0.008	0.033	0.032	0.047	C3	0.027	0.019	0.006	0.019	0.020	**0.034**
C4	**0.060**	**0.057**	**0.066**	0.013	**0.057**	**0.065**	C4	**0.063**	**0.035**	**0.068**	0.006	**0.043**	**0.065**
C5	**0.066**	**0.064**	**0.059**	**0.051**	0.013	**0.065**	C5	0.015	0.027	**0.044**	**0.034**	0.005	**0.050**
C6	**0.064**	**0.048**	0.037	**0.056**	0.042	0.011	C6	0.014	0.019	**0.042**	0.020	0.027	0.005

DM1 = Ukraine experts' judgement; DM2 = Lithuania experts' judgement. This study applied the mean average as the threshold value: DM1 threshold is 0.047; DM2 threshold is 0.031.

causality (Ri − Ci) values are used to characterize the identity and rank of six resilience competencies for Ukrainian and Lithuanian soldiers.

The centrality results of this study disclosed the dissimilarities between the assessment of Ukrainian and Lithuanian experts. As a result of the evaluation of Ukrainian experts, the highest centrality value (D + R) appears for C1—self-awareness, C4—mental agility, and C5—strengths of character (see DM1, Table 5). The analysis of Lithuanian experts' opinion conducted showed that the greatest value of centrality can be assigned to three resilience competencies, such as C2—self-regulation, C3—optimism, and C4—mental agility (see DM2, Table 5). The positive value in causality (D − R) was calculated for three resilience competencies: C2—self-regulation, C4—mental aversion, and C5—character strengths. But the values calculated to identify negative causality (D − R) let us identify the total similarity

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TABLE 6 The degree of centrality (R + C) and causality (R – C).

DM1 Competence	Ri	Ci	Ri + Ci	Ri – Ci	Identity	Rank
C1	0.291	0.309	0.601	−0.018	Effect	4
C2	0.309	0.256	0.565	0.0539	**Cause**	**2**
C3	0.192	0.300	0.493	−0.108	Effect	6
C4	0.318	0.265	0.583	0.052	**Cause**	**3**
C5	0.318	0.264	0.583	0.0541	**Cause**	**1**
C6	0.258	0.292	0.549	−0.034	Effect	5
Mean			**0.562**	**0.000**		

DM2 Competence	Ri	Ci	Ri + Ci	Ri – Ci	Identity	Rank
C1	0.118	0.187	0.304	−0.069	Effect	4
C2	0.288	0.126	0.414	0.162	**Cause**	**1**
C3	0.126	0.274	0.400	−0.149	Effect	6
C4	0.280	0.134	0.414	0.146	**Cause**	**2**
C5	0.174	0.156	0.331	0.018	**Cause**	**3**
C6	0.126	0.235	0.361	−0.108	Effect	5
Mean			**0.371**	**0.000**		

DM1 = Ukraine experts' assessment; DM2 = Lithuania experts' assessment.

between the evaluation of Ukrainian and Lithuanian experts' because the same resilience competencies were pointed out: C1—self-awareness, C3—optimism, and in this study, let us identify that C2, C4, and C5 are the criteria that play a causal role and influence C1, C3 and C6. Furthermore, the causal relationship analysis showed that according to Ukrainian experts, the C5 competence has the greatest influence on other resilience competencies, but for the opinion of Lithuanian experts, it is C2. Finally, the analysis conducted revealed that C6 is the most affected competence for both experts' groups.

5 Discussion based on DEMATEL calculation results

The current study aimed to optimize a well-established military resilience program by identifying and retaining only the essential resilience competencies. While previous research have examined the importance of resilience competences in various military contexts including training (Sefidan et al., 2021; Bekesiene et al., 2022a), military missions (Carr et al., 2013), and combat operations (Haydabrus et al., 2022), they lacked an analysis of the importance of specific competencies in different stress contexts within the military. Our study filled this gap with a novel approach. Using the DEMATEL method, we conducted expert evaluations to determine the unique value of different competencies across diverse stress contexts.

Our findings reveal distinctive patterns: strengths of character (C5) emerged as most valuable in the context of combat operations, while self-regulation (C2) was vital in training and military missions. Significantly, our research results not only demonstrate that different stress contexts intensify the demand for distinct competencies (Van Wart and Kapucu, 2011), but also delineates these competencies in specific contexts. According to the findings, Ukrainian military experts, whose benchmark is conflicts within their own country, ranked the resilience competencies in the following order of importance: strengths of character (C5), self-regulation (C2), and mental agility (C4). Lithuanian experts, with more experience in performing military missions abroad, ranked resilience competencies in the following order of importance: self-regulation (C2), mental agility (C4), and strengths of character (C5).

These findings require further elaboration. To achieve this, a DEMATEL causal relation diagram was employed to simplify intricate causal relationships into comprehensible graphic structures. Consequently, the diagram was divided into four quadrants based on the center points of the horizontal *X*-axis, which was set as prominence (R + C) and the vertical *Y*-axis, which was set as relation (R – C). These quadrants facilitated the simplification of identifying complex relationships among the six resilience competencies investigated while illustrating the influence of each competency on the others. Figure 2A presents the graphical representation of the designed structural model, depicting the results of the analysis of Ukrainian military experts on the six resilience competencies, while Figure 3A shows the results of the analysis of Lithuanian military experts.

Based on the four quadrants, the levels of mutual influence and causal relationships of the resilience competencies are categorized using prominence (R + C) and relation (R – C) values. This study enables us to identify differences in the assessment of psychological resilience competencies between two groups of experts. Ukrainian military experts, whose benchmark is conflicts within their own country, have a slightly different opinion compared to Lithuanian experts with a different experience (see Figures 2A, 3A). On the basis of the four quadrants, the following relationships were identified:

5.1 High relation and high prominence

Following the opinions of Ukrainian experts, three resilience competencies self-regulation (C2), mental agility (C4), and strengths of character (C5) were identified as crucial resilience

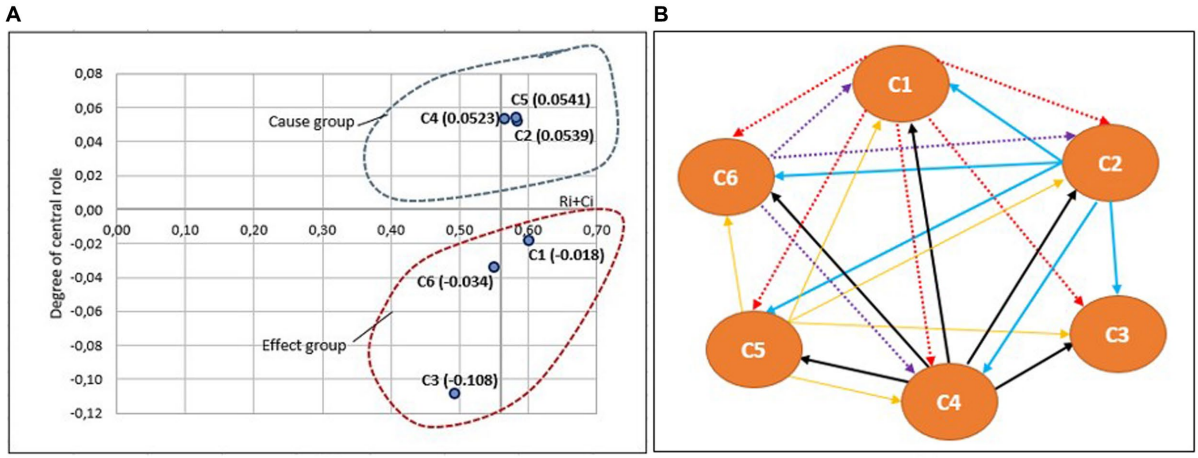

FIGURE 2
Graphical illustration of the structural model results based on Ukrainian soldiers' opinion for six resilience competencies (C1 = self-awareness, C2 = self-regulation, C3 = optimism, C4 = mental agility, C5 = strengths of character, and C6 = connection): **(A)** a cause-and-effect diagram shows that C2, C4 and C5 are considered to be as causal factors, and C1, C3 and C6 are observed as an effect; **(B)** an influence-relation map between six resilience competencies after applied the threshold value =0.047.

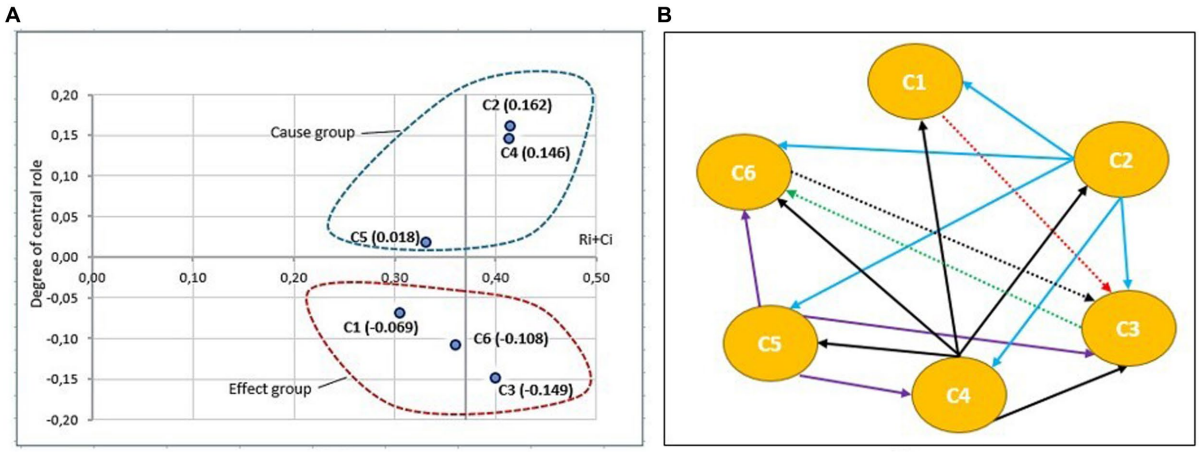

FIGURE 3
Graphical illustration of the structural model results based on Lithuanian soldiers' opinion for six resilience competencies (C1 = self-awareness, C2 = self-regulation, C3 = optimism, C4 = mental agility, C5 = strengths of character, and C6 = connection): **(A)** a cause-and-effect diagram shows that R, M and S are considered to be as causal factors, and A, C and O are observed as an effect; **(B)** an influence-relation map between six resilience competencies an influence-relation map between six resilience competencies after applied the threshold value =0.031.

competencies that influence and affect other resilience competencies. However, for Lithuanian experts, only two competencies, self-regulation (C2) and mental agility (C4), were considered vital for building resilience. These findings are in line with previous studies. Mental agility can be concluded to be a crucial competence of a soldier's ability to perform effectively in stressful situations, involving quick and accurate information processing, critical thinking, and decision-making in high-pressure environments. Additionally, self-regulation is found to be not only a critical skill for soldiers to possess during stressful situations, but also increment the prediction of negative effects (McLarnon et al., 2021). Moreover, strengths of character were particularly important for Ukrainian experts, considering the challenging and often dangerous situations they encounter.

5.2 High relation and low prominence

According to the opinions of Lithuanian experts, the competence of character strengths (C5) in the cause group could influence several other resilience competencies, although not as strongly as indicated by the views of Ukrainian experts.

5.3 Low relation and high prominence

In this quadrant, the resilience competencies influenced by other competencies and not directly developable were identified. According to the opinions of Ukrainian experts, self-awareness (C1) fell into the category of effects, while the opinions of Lithuanian experts

highlighted optimism (C3). Self-awareness is an important skill for soldiers to develop, as it helps them better understand their own strengths and weaknesses, cope with stress and adversity, and make better decisions in high-pressure situations.

5.4 Low relation and low prominence

Resilience competencies that fall into this structure were identified as relatively independent. Moreover, it can be noted that these competencies are influenced by other criteria, although to a lesser extent. The results of the analysis confirmed that for both groups of experts, the connection competence (C6) was relatively independent. However, there were differences regarding the other two resilience competencies: Ukrainian experts identified optimism (C3) as relatively independent, while Lithuanian experts considered self-awareness (C1) as such.

Although resilience is formed by a set of competencies, these competencies are found to be related to each other and not only complement each other, but also influence each other. This was highlighted by Luthar (2015) after an extensive overview of the existing literature on mental resilience. Based on the idea that competences affect each other, an influence-relation map based on the cause-and-effect relationship and mutual influence between the six main dimensions of resilience competencies illustrates the causal relationships between the dimensions of the resilience competencies of soldiers (see Figures 2B, 3B):

1. The influence-relation map based on the analysis of the Ukrainian experts' dataset showed that optimism (C3) is the influencing factor affected by C1 (self-awareness), C2 (self-regulation), C4 (mental agility), and C5 (strengths of character). Additionally, C1 (self-awareness), C2 (self-regulation), C4 (mental agility), C5 (strengths of character), and C6 (connection) are interconnected, with inward-facing and outward-facing arrows indicating their influence and linkages. Furthermore, C2 (self-regulation), C4 (mental agility), and C5 (strengths of character) influence each other and are connect. Taking everything into account, the dominant factors influencing the improvement of resilience competencies to cope with stressful situations are C2 (self-regulation), C4 (mental agility), and C5 (strengths of character).
2. The influence-relation map based on the analysis of the Lithuanian experts' dataset confirms that C1 (self-awareness), C2 (self-regulation), C3 (optimism), C4 (mental agility), C5 (strengths of character), and C6 (connection) are interconnected, with inward-and outward-facing arrows representing their influence and links. C3 (optimism) and C6 (connection) are related to each other. Moreover, C2 (self-regulation) and C4 (mental agility) influence and connect with each other, while C5 (strengths of character) influences C3 (optimism) and C6 (connection) and connects with C4 (mental agility). It appears that C2 (self-regulation) and C4 (mental agility) are the primary resilience competencies that should be included in Lithuanian soldiers' resilience training programs.

Importantly, while the prioritization of competencies varies, the study reveals the consistent significance of three core competencies: strengths of character (C5), self-regulation (C2), and mental agility (C4). Notably, both groups of experts—those with a focus on conflicts within their own country and those experienced in military missions abroad—rated connection (C6) and optimism (C3) as the least important. This contradicts established academic literature (Iacoviello and Charney, 2020) and empirical studies of resilience (Schug et al., 2021), a highlighting the need for further investigation within military contexts.

6 Limitations and future research directions

Several limitations should be noted when interpreting the findings of this study. The first limitation could be related to the research results. Unlike other studies, the results of our study show that optimism and social connections are less significant than other resilience competencies. It may be attributed to the prevailing masculinity culture within the military, characterized by emotional detachment and self-control; resilience is better exemplified through self-regulation rather than social connections. Gueta and Shlichove (2022) research highlights that seeking assistance through social connections is viewed negatively, associated with weakness and femininity. These factors raise a discussion on the subjectivity of expert evaluations, as all evaluators were men, potentially influenced by their own stereotypes and identities (Wedgwood et al., 2022). Another aspect of masculinity, physical strength, as identified by Wedgwood et al. (2022), can be directly linked to our studied self-regulation, which experts may perceive as more "masculine" than optimism. Despite these potential stereotypes, the results of our study provide insight into how the scope of competencies developed for soldiers' resilience can be narrowed in situations with limited time, focusing solely on the most critical competencies.

The second limitation of the study pertains to the country-specific military culture, as it solely focused on Ukrainian and Lithuanian soldiers. Considering that resilience training is deeply influenced by organizational culture, it is important to recognize the impact of country-specific organizational culture within the military as a variable that could have influenced research results. The significance of cultural differences has been widely acknowledged, particularly in the context of international military operations, see for example Yanakiev (2021).

Building on this understanding, the scope for future research becomes evident. First is to explore more deeply the cultural and gender influences on resilience assessments. The stereotypes and cultural norms prevalent among military professionals, as evidenced by the prevailing culture of masculinity identified in the study, raise intriguing questions. Investigating how these factors influence perceptions of resilience may provide a more comprehensive understanding.

Second, the identified competencies provide a basis for the design of targeted training programs. Future research should focus on the implementation and evaluation of these programs, analyzing their effectiveness in real military scenarios. In addition, exploring these competencies in different military branches and international contexts can further enrich the understanding of resilience requirements in different military environments.

7 Conclusion

This study contributed by adopting a reduction approach to identify key resilience competencies under the master resilience training scope, considering the time constraints faced by senior soldiers acting as trainers during deployment. Using the extended DEMATEL method, this study not only analyzed the evaluation perspectives and criteria of resilience training, but also established the cause-and-effect relationships among the competencies.

Research findings emphasize the importance of focusing on three essential resilience competencies: self-regulation, mental agility, and strengths of character. The specific significance of each of these competencies varies depending on the military context. In situations where conflicts persist within one's own country, strengths of character emerge as the most influential competence for soldiers' resilience. Conversely, in military operations conducted abroad, self-regulation plays a predominant role in fostering resilience.

This study stands out from previous scholarship by successfully applying the trapezoidal-fuzzy DEMATEL method to evaluate soldiers' resilience competencies and categorize them into cause-and-effect groups. The results obtained offer valuable information for decision makers in improving the effectiveness of soldiers' resilience training programs.

This study contributes to the theoretical understanding of military resilience competencies in several ways. First, the importance of resilience competencies is contextually differentiated. This study identifies distinct patterns in the demand for resilience competencies in two different stress contexts. Second, although resilience is a complex phenomenon, each resilience competency is attributed to a set of causes or effects. Such a cause-and-effect framework provides a better understanding of the links between competencies and enables researchers and practitioners to grasp the complexity of resilience in a structured way.

The findings of this study have practical implications for enhancing decision-making processes and improving the quality of soldiers' resilience training programs. By focusing on the identified essential competencies, decision makers and trainers can tailor their approaches to effectively enhance the resilience of soldiers in the face of challenging military environments.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The study was approved by the General Jonas Zemaitis Military Academy, Protocol No. PR-1815. Informed consent was obtained from all subjects involved in the study.

Author contributions

RK and SB: conceptualization and methodology. SB: software, formal analysis, resources, visualization, supervision, project administration, and funding acquisition. ON and SB: validation. RS, RV, ON, DB, and SB: writing for original draft preparation. SB, OK, and RS: writing for review and editing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1239481/full#supplementary-material

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Fostering organisational commitment: a resilience framework for private-sector organisations in South Africa

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Introduction: Organisations worldwide encounter three significant and challenging issues related to talent management: intense competition for skilled employees, elevated rates of employee attrition, and the ongoing struggle to attract top-tier talent. This research focused on investigating the interconnected dynamics among factors associated with employee retention, including organisational commitment, job embeddedness, and hardiness, in conjunction with resilience-related behaviours such as resilience and career adaptability.

Methods: A cross-sectional survey design was used to gather quantitative data from a convenience sample of employees within the private sector in South Africa ($N = 293$). The self-assessments of the participants were assessed using a range of well-established and validated instruments. Correlation and regression analyses, followed by structural equation modelling, were utilised to construct a resilience framework designed specifically for private sector organisations in South Africa.

Results: The results reveal significant associations between organisational commitment, job embeddedness, and hardiness (as retention-related attributes) and resilience and career adaptability (as resilience-related behavioural capacities). These relationships served as the basis for the development of a resilience framework for employees in South African private organisations.

Discussion: In South African private-sector organisations, talent retention is crucial due to a talent shortage. The study found that employees have a strong emotional attachment to their organisations, are highly aligned with their jobs and communities, and display resilience. Organisational commitment, job embeddedness, and hardiness are key factors in reducing turnover, forming an effective retention strategy. This research contributes to the development of a resilience framework for South African private sector organisations.

KEYWORDS

organisational commitment, resilience, career adaptability, job embeddedness, hardiness, talent retention, private sector organisations

Introduction

Considering the ongoing global talent shortage, organisations are increasingly seeking effective strategies to retain their top-performing employees. These individuals are essential for driving organisational performance and maintaining a competitive edge (Zhang et al., 2022; Association of Chartered Certified Accountants (ACCA), 2023; Durth et al., 2023).

Unfortunately, the African continent faces significant challenges in retaining its highly skilled workforce due to issues like inadequate compensation, unattractive work environments, socio-economic challenges, and political instability (Ebeye and Lee, 2023; Ombogo, 2023). Moreover, high employee turnover rates continue to pose a significant and persistent challenge for South African private sector organisations, necessitating a focused effort on talent retention (Musakuro and De Klerk, 2021; Maloba and Pillay-Naidoo, 2022; Snyman et al., 2022; Tongchao et al., 2022).

Recent research findings have shed light on the multifaceted reasons that lead employees to consider leaving their workplaces. These reasons encompass various elements, including job stress, levels of job dissatisfaction, perceptions of job security, the quality of the work environment, motivational factors, and the adequacy of wages and rewards (Al-Suraihi et al., 2021). In the context of South African private sector organisations, a persistent issue of high employee turnover rates has been linked to factors such as unfavourable work environments, employee dissatisfaction with their roles, and a deficiency of both intrinsic and extrinsic motivation (Maloba and Pillay-Naidoo, 2022).

Furthermore, results from regression analysis conducted by Snyman (2022) have highlighted the interconnected nature of psychological contract factors, including employer obligations, employee obligations, job satisfaction, and the state of the psychological contract. These psychological contract factors have demonstrated significant associations with critical employee retention elements such as compensation, job characteristics, training and development opportunities, supervisor support, career advancement prospects, and work-life balance. Retaining top talent is not merely a desire but a strategic imperative for private sector organisations as it directly influences their ability to achieve sustainable growth and maintain competitiveness (Ebrahim et al., 2021).

In addressing the pressing issue of high employee turnover rates in South African private sector organisations, a comprehensive range of strategies has been employed. These strategies encompass elements aimed at creating a more conducive and appealing work environment to increase employee retention. These elements include equitable compensation packages, the cultivation of favourable work environments, the provision of attractive benefits, the implementation of incentives to recognise and reward high performance, career development, and the extension of essential support systems (Snyman, 2022; Swanepoel and Saurombe, 2022).

However, retaining top talent is far from one-dimensional. It extends beyond the conventional realms of compensation and rewards. Instead, it encompasses the critical dimensions of creating a satisfied work environment and effectively understanding and addressing employee expectations (Ngobeni et al., 2022). Achieving employee satisfaction and ensuring alignment between their expectations and organisational objectives have emerged as fundamental aspects of the talent retention equation. Moreover, talent retention is not solely about job satisfaction; it is also about retaining and nurturing the knowledge, unique skills, and expertise that employees bring to the organisation. These knowledgeable individuals serve as vital contributors to an organisation's competitiveness and overall success (Mantje et al., 2023). Therefore, retaining them is paramount in the highly competitive South African private sector.

To address these challenges and maintain competitiveness, South African private sector organisations must move beyond traditional retention strategies. They must invest in fostering retention-related dispositions such as organisational commitment, job embeddedness, and hardiness, as well as resilience-related behavioural capacities like resilience and career adaptability. Understanding the interplay between these factors is vital in developing strategies that enable organisations to effectively retain their talented employees in a dynamic and competitive landscape.

While numerous studies have explored the fierce competition for talented employees, high turnover rates, and the global war for talent (Wolfswinkel and Enslin, 2020; Amushila and Bussin, 2021; De Smet et al., 2022; Mazlan and Jambulingam, 2023), there is a notable gap in research specific to South African private sector organisations. This gap pertains to the investigation of the relationship dynamics between retention-related dispositions and resilience-related behavioural capacities, and how these factors can aid private-sector organisations in retaining their talented employees.

Furthermore, there is a lack of in-depth understanding regarding the psychological aspects that contribute to employee retention, which this research aims to address. Additionally, it appears that existing retention models may not be sufficiently effective in the ongoing "war" for talent. This research article seeks to fill these critical gaps and provide valuable insights into talent retention in the South African private sector.

Theory

Organisational commitment

Meyer and Allen (1991) contributed significantly to the study of organisational commitment, defining it through three components: affective, calculative, and normative. Affective commitment involves an emotional connection to the organisation, driven by positive emotions from how the organisation treats its employees. Calculative commitment is based on the perceived cost of leaving, often tied to investments in skills and benefits. Normative commitment stems from a sense of duty to stay, influenced by socialisation experiences and beliefs in the organisation's deserving loyalty. Overall, these three components influence an employee's decision to stay with the organisation, with affective commitment linked to a strong emotional bond with the organisation (Pieters et al., 2020; Schaap and Olckers, 2020; Els et al., 2021). In addition, committed employees tend to share the organisation's objectives and values, resulting in increased dedication and extra effort invested in their work. This heightened commitment is positively associated with various positive outcomes, including reduced absenteeism, increased altruism, and conscientiousness, promoting the organisation externally, higher job satisfaction, improved employee well-being, reduced stress, work–family conflict, and heightened motivation (Blersch et al., 2020).

Job embeddedness

Mitchell et al. (2001) highlighted that job embeddedness stands out as a robust predictor of employee turnover, surpassing conventional attitude variables. It serves as a pivotal factor in shaping

employees' decisions to remain in their roles, bridging the gap between the factors at work and in their personal lives that discourage them from leaving (Wu et al., 2021).

On-the-job embeddedness pertains to an employee's sense of connection and attachment to their organisation, often referred to as organisational embeddedness. In contrast, off-the-job embeddedness relates to an employee's ties within a community that anchor them in that context. According to Peltokorpi and Allen (2023), employees with higher levels of on-the-job embeddedness are less likely to entertain thoughts of quitting. Such employees tend to feel invested in their roles and perceive themselves as integral to the organisation, fostering a commitment to remain, even when completely satisfied with their current job. Moreover, those with strong on-the-job embeddedness might perceive fewer alternative job opportunities, reducing their inclination to consider leaving.

Job embeddedness has proven effective in retaining employees both globally and in the South African labour market. For instance, as noted by Potgieter et al. (2018), deeply engaged employees find it increasingly challenging to contemplate leaving their positions and the organisation. Through the lens of person-environment fit theory (Dawis, 1996), job embeddedness reflects an employee's psychological attachment to valued job characteristics and working conditions, significantly influencing job satisfaction. Strong workplace connections and the alignment of career goals with the organisation reduce the desire to leave, while the prospect of sacrificing perks, career advancement, compensation, and benefits makes departure less appealing (Mitchell et al., 2001; Holtom and O'Neill, 2004; Shibiti et al., 2018; Shibiti, 2019). In summary, higher levels of job embeddedness will foster engagement and ultimately improve employee retention.

Hardiness

Hardiness, a psychological trait applicable in the workplace, signifies an individual's capacity to withstand and excel amidst stress, adversity, and challenging situations (Maddi and Kobasa, 1984). It is characterised by three key components, as suggested by Kobasa (1979): commitment, control and challenge.

This trait bears substantial advantages for both employees and organisations. It empowers employees with the resilience to navigate workplace pressures, nurture commitment, maintain control, and perceive challenges as opportunities for growth (Kobasa, 1979; Oral and Karakurt, 2022; Bartone et al., 2023). The outcome is heightened job satisfaction and overall well-being (Lee and Kim, 2023). In the organisational setting, hardiness curbs turnover rates, augments performance in stressful scenarios, and stimulates innovation, thereby enhancing productivity and creativity. Studies propose that individuals possessing heightened levels of hardiness display a reduced propensity for voluntary turnover (Banda, 2019; Marshall and Stephenson, 2020). Their unwavering commitment to their roles and the organisation, coupled with their capacity to not just endure but thrive in challenging circumstances, curtails their inclination to seek alternative opportunities. They tend to view challenges and job dissatisfaction as issues that can be addressed and ameliorated, rather than as grounds for departure.

Ultimately, hardiness plays a pivotal role in talent retention (Coetzee et al., 2018). As mentioned above, those with elevated hardiness are more likely to sustain their commitment to their roles, even when confronted with adversity. Their elevated job satisfaction diminishes the desire to explore other employment options. Furthermore, their resilience and adaptability render them invaluable assets in high-stress environments, where they can consistently deliver effective performance.

Resilience

Resilience can be defined as the ability to adapt, bounce back, and effectively cope with challenges, setbacks, or adversities, whether they are personal or professional (Southwick et al., 2014). It represents an individual's capacity to maintain their psychological well-being and performance in the face of stress, pressure, or difficult circumstances.

Resilience holds significant importance for both employees and organisations. For employees, it signifies their ability to withstand the pressures of their roles, maintain a positive outlook, and continue to perform at their best, even when confronted with adversity (Shatté et al., 2017; Ferreira and Gomes, 2021; Hanu and Khumalo, 2023). For organisations, resilience plays a pivotal role in reducing voluntary turnover and mitigating intentions to leave (Hidayah and Ardiansyah, 2019; Hartmann et al., 2022). When employees possess a high level of resilience, they are more capable of managing workplace stressors, job dissatisfaction, or other factors that may trigger a desire to leave (Albalá-Genol et al., 2023). Resilient individuals are better equipped to seek solutions and adapt to changing circumstances rather than resorting to the option of quitting. In essence, resilience acts as a buffer against the negative impact of workplace stress and can discourage employees from voluntarily leaving the organisation.

Career adaptability

The modern work landscape, marked by rapid changes in the digital age, is characterised by frequent job transitions, organisational shifts, and evolving career paths. This demands employees to enhance their agility and flexibility to adapt effectively (Rudolph et al., 2017; Du Plessis, 2021). In response to the unprecedented societal, economic, and technological forces reshaping the world of work in the digital era, Johnston (2019) defines career adaptability as the skill to positively regulate psychological and behavioural functions when confronted with new, changing, or uncertain circumstances. Career adaptability encompasses the intra-personal psychological capacities that serve as resources for managing one's career and facilitating proactive adaptation to succeed in the rapidly evolving digital work environment, as noted by Hirschi et al. (2018).

In essence, Savickas (1997) career adaptability model empowers individuals to handle workplace uncertainties and changes, fostering optimism and resilience. It equips individuals with the skills and mindset necessary to navigate their careers effectively, ensuring relevance and resilience in the face of change. This adaptability empowers employees to seize new opportunities and maintain job satisfaction (Chen et al., 2020). In addition, high levels of career adaptability are associated with reduced voluntary turnover and a decreased intention to leave the organisation (Lee et al., 2021; Wang et al., 2021). When employees feel that they can adapt to new challenges, find opportunities for career growth within their current workplace, and continuously enhance their skills, they are less inclined to seek opportunities elsewhere. Career-adaptable employees tend to

perceive their current organisation as a place where they can meet their long-term career aspirations, making them more likely to stay. Career adaptability therefore significantly contributes to employee retention (Lee et al., 2021; Sun et al., 2023). Employees who possess career adaptability are more engaged, committed, and satisfied with their jobs. They are better equipped to navigate potential job-related challenges and adapt to changes within the organisation. As a result, they are less likely to leave, ultimately contributing to improved employee retention rates.

Integration

In conclusion, highly talented individuals are instrumental in the success of South African private sector organisations, making talent retention a top priority. To sustain success, organisations must holistically address talent planning, acquisition, attraction, leadership, development, deployment, rewards, engagement, and retention. Understanding the expectations of talented employees at both individual and collective levels is crucial. The challenge of retaining such individuals is widespread and could intensify as they become scarcer in the future. Organisations that do not strategically retain their top talent risk losing their competitive edge and overall productivity. Research has shown that these sought-after talents are often found in individuals who exhibit commitment, embeddedness, hardiness, adaptability, and resilience as discussed.

Methods

Participants

The study utilised convenience sampling, a method chosen to optimise the collection of usable questionnaires from employees in South African private sector organisations. Convenience sampling selects participants based on practical criteria, such as accessibility, availability, and willingness to participate (Venter et al., 2017). This approach is cost-effective and well-suited for quantitative studies (Stratton, 2021). The sampling frame specifically targeted full-time and part-time employees in South African private sector organisations, creating a sample with shared characteristics to facilitate meaningful conclusions about this group.

The research sample included 293 ($n = 293$) participants, primarily from global digital mindset human resource and financial service organisations, with a predominantly South African representation (70%). Additional participants came from Zimbabwe (15%) and Europe (15%). The gender distribution in the sample was nearly even, with 54% male and 46% female participants. In terms of racial demographics, the majority identified as belonging to Black racial groups (African, Indian, Asian, and Coloured), comprising 63% of the sample, while the remaining 37% identified as part of white racial groups. The composition of the sample is summarised in Table 1.

Measures

The Organisational Commitment Scale (Meyer and Allen, 1997), a 24-item scale, was applied to measure the dimensions of organisational commitment, which includes *affective commitment* (8 items), *continuous commitment* (8 items), and *normative commitment* (8 items). The respondents had to rate each item on a five-point Likert-type scale (1 = "strongly disagree"; 5 = "strongly agree"). Internal consistencies of the OCS dimensions vary.85 for affective commitment, 0.79 for continuance commitment, and.73 for normative commitment (Meyer and Allen, 1997). The validity of the construct is grounded in the expected connections between the three multifaceted constructs (Meyer and Allen, 1997).

The Job Embeddedness Scale (Mitchell et al., 2001), a 17-item scale was used to measure the three dimensions of job embeddedness: *fit*, *links*, and *sacrifice*. The items are rated on a six-point Likert-type scale (1 = "strongly disagree"; 6 = "strongly agree"). The internal consistencies of the JES dimension vary between 0.64 for organisational fit and 0.66 for organisational sacrifice or links, and the Cronbach Alpha values for all the other variables were higher than the recommended.70 (Mitchell et al., 2001).

The *Personal Views Survey* (PVS-III-R; Maddi et al., 2001), an 18-item multi-level scale, measures three features of hardiness: *the commitment* subscale (6 items), the *control* subscale (6 items), and the *challenge* subscale (6 items). The items are rated on a 4-point Likert-type scale (0 = "not true at all"; 3 = "completely true"). Kobasa (1982) found substantial test–retest correlations, with commitment at 0.69, control at 0.69, and challenge at 0.73, aligning with the findings in this study. Moreover, the subscales of the PVS-III-R demonstrated strong internal validity, with commitment at 0.85, control at 0.70, and challenge at 0.71, while the internal consistency reliability estimates (Cronbach Alpha) for all other variables remained consistent at.61.

The *Employee Resilience Scale* (EmpRes; Naswall et al., 2013), is a 9-item one-dimensional measure of employee resilience. The items are rated on a 7-point Likert-type scale (1 = "Almost never"; 7 = "Almost always"). The reliability of the revised scale was.91 (Naswall et al., 2015). Furthermore, the internal consistency reliability, calculated using Cronbach's Alpha, for all the other variables surpassed the recommended threshold and fell within the range of 0.55 to 0.70.

The *Career Adaptability Inventory* (CAI: Savickas, 1997), a 35-item multi-level scale measures 4 dimensions of career adaptability: *concern* (8 items), *control* (9 items), *curiosity* (9 items), and *cooperation* (9 items). The items are rated on a 5-point Likert-type scale (1 = "Not strong"; 5 = "Strongest"). Concerning the internal consistency of the scale, the four subscales exhibited satisfactory values, ranging from 0.74 (Control) to 0.85 (Confidence). Moreover, the reliability estimates for all other variables remained consistently high at 0.88.

Procedure

The researchers obtained ethical clearance from the research institution and gained permission from the participating organisations. Data collection was facilitated through an online survey. Initially, the CEOs of the organisations received an invitation letter containing a URL to the survey, which was disseminated to the HR Managers. These managers, in turn, shared the survey link with their respective employees.

The email communication included details about the research objectives, participant roles, estimated time for survey completion, the researcher's contact information, privacy assurances, information use disclosure, and emphasised the voluntary nature of participation.

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TABLE 1 Sample descriptives.

Age				
	Frequency	Percent	Valid percent	Cumulative percent
18–25 years	22	3.8	3.8	3.8
26–35 years	118	20.6	20.6	24.4
36–45 years	206	**35.9**	**35.9**	**60.3**
46–55 years	130	22.6	22.6	82.9
56–65 years	98	17.1	17.1	100.0
Total	574	100	100	
Gender				
Females	359	**62.5**	62.5	62.5
Males	215	37.5	37.5	100
Total	574	100.0	100.0	
Employment status				
Full time	471	**82.1**	84.7	84.7
Part time	85	14.8	15.3	100.0
Interns/Graduates	18	3.1	100.0	
Total	574	100.0		
Tenure				
Less than 5 years	207	36.1	36.1	36.1
6–10 years	293	**51.0**	51.0	87.1
11–15 years	58	10.1	10.1	97.2
More than 15 years	16	2.8	2.8	100.0
Total	574	100.0	100.0	
Job level				
Staff level	293	**51.0**	51.0	51.0
Supervisory level	91	15.9	15.9	66.9
Middle management level	74	12.9	12.9	79.8
Senior management level	59	10.3	10.3	90.1
Executive level	57	9.9	9.9	100.0
Total	574	100.00	100.0	

The bold values should be the highest values for that group.

Completion of the online survey served as participants' informed consent. Throughout the data collection and analysis phases, strict measures were in place to preserve participant anonymity, with no collection of personal identifiers. Responses were coded to ensure confidentiality, and the collected questionnaires were securely stored through an automated transfer to a web-based platform.

Data analysis

The data analysis was conducted using IBM Corp.'s SPSS Version 27 and SAS/STAT® software Version 9.4 M5© (2017). To understand the relationships between the study variables, bivariate correlation analysis and stepwise regression analysis were performed.

Structural Equation Modelling (SEM) with maximum-likelihood (ML) estimation was employed to assess the fit between retention-related dispositions and resilience-related behavioural capabilities. The model's goodness of fit was evaluated using various absolute goodness-of-fit indices, including the Chi-square test, Root Mean Square Error of Approximation (RMSEA), Standardised Mean Square Residual (SRMR), as well as the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI). Based on Garson's (2008) guidelines, the structural model is considered to have a satisfactory fit to the measurement data when the following criteria are achieved: CFI and TLI values of 0.90 or greater, an RMSEA value of 0.08 or lower, and an SRMR value of 0.05 or lower.

Results

Descriptive statistics and correlations

Table 2 provides an overview of descriptive statistics, including means, standard deviations, and internal consistency reliabilities, along with correlations between study variables.

TABLE 2 Descriptive statistics and bi-variate correlations.

	Variable	α	CR	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Affective Commitment	0.88	0.88	5.92 (0.95)	-																	
2	Normative Commitment	0.87	0.94	5.60 (0.96)	0.30**	-																
3	Continuance Commitment	0.87	0.87	5.52 (1.00)	0.40**	0.32**	-															
4	Overall OCS	0.94	0.96	5.69 (0.85)	0.39**	−0.30**	0.30**	-														
5	Fit	0.85	0.82	5.37 (0.64)	0.16**	0.25**	−0.32**	0.05	-													
6	Sacrifice/ Links	0.96	0.95	4.08 (1.16)	0.08	−0.24**	0.07	0.06	0.43**	-												
7	Overall JES	0.94	0.92	4.62 (0.86)	−0.23**	0.34**	0.20**	0.12**	0.34**	−0.00	-											
8	Commitment	0.77	0.74	3.59 (0.59)	0.15**	0.04	−0.01	0.09*	−0.03	−0.07	0.27**	-										
9	Control	0.58	0.66	3.53 (0.35)	0.11**	0.05	0.03	0.11*	0.33**	−0.04	−0.13**	0.27**	-									
10	Challenge	0.83	0.84	3.11 (0.76)	0.17**	0.14**	0.04	0.33**	0.03	0.21**	0.05	0.47**	0.45**	-								
11	Overall PSV-R-III	0.85	0.84	3.37 (0.50)	0.11**	0.12**	−0.02	0.11*	0.15**	0.26**	−0.04	0.14**	0.39**	−0.26**	-							
12	Resilience	0.67	0.58	6.18 (0.43)	0.37**	0.04	0.04	0.19**	0.18**	−0.17**	0.34**	−0.15**	0.36**	0.02	−0.07	-						
13	Concern	0.84	0.85	4.47 (0.52)	0.40**	0.27**	0.10*	0.56**	−0.10**	0.32**	0.12**	0.31**	0.35**	−0.31**	0.08	−0.14**	-					
14	Control	0.81	0.80	3.94 (0.53)	0.57**	0.13**	0.42**	0.55**	0.27**	−0.35**	−0.03	0.22**	0.34**	−0.16**	−0.23**	0.32**	0.33**	-				
15	Curiosity	0.94	0.93	3.57 (0.83)	0.49**	0.47**	0.46**	0.91**	0.15**	0.04	−0.22**	−0.06	0.45**	0.16**	0.92**	0.35**	0.51**	0.58**	-			
16	Confidence	0.81	0.83	4.62 (0.54)	0.72**	0.54**	0.48**	0.87**	0.01	−0.10*	0.97**	0.49*	0.18**	−0.05	0.33**	0.13**	0.37**	0.21**	0.13**	-		
17	Cooperation	0.88	0.88	4.02 (0.50)	0.64**	0.54**	0.73**	0.87**	0.54**	−0.28**	0.72**	0.36*	0.11**	−0.31**	0.73**	0.37**	0.30**	0.30**	0.11**	0.39**	-	
18	Overall CAAS	0.92	0.95	3.97 (0.42)	0.22**	0.08	0.20**	0.47**	0.30**	−0.01	−0.31**	0.07	0.23**	0.28**	0.24**	0.36**	0.61**	0.48**	0.69**	0.65**	0.68**	-

**Cronbach alpha value.

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The results revealed significant positive correlations among the three subscales of OCS, ranging from small to large practical effect sizes ($r \geq 0.03 \leq 0.73$; $p \leq 0.05$; $p \leq 0.01$). These subscales also correlated positively and significantly with overall JES, PVS-III-R, EmpRes, and CAS scales ($r \geq 0.10 \leq 0.98$; small to large practical effect size; $p \leq 0.05$; $p \leq 0.01$), demonstrating the construct validity of organisational commitment.

Concerning JES, significant positive correlations were observed between its two subscales, with small to large practical effect sizes ($r \geq 0.15 \leq 0.54$; $p \leq 0.05$; $p \leq 0.01$). These dimensions of JES also correlated positively and significantly with overall EmpRes and CAS scales ($r \geq 0.18 \leq 0.32$; small to medium practical effect size; $p \leq 0.05$; $p \leq 0.01$), confirming the construct validity of job embeddedness.

Regarding PVS-III-R, significant positive correlations existed among its three subscale dimensions, with small to medium practical effect sizes ($r \geq 0.18 \leq 0.49$; $p \leq 0.05$; $p \leq 0.01$). Commitment and control, the two subscale dimensions of PVS-III-R, also positively correlated with the overall CAS scale ($r \geq 0.22 \leq 0.45$; small to medium practical effect size; $p \leq 0.05$; $p \leq 0.01$), establishing the construct validity of hardiness.

As shown in Table 2, significant correlations were found between the one-dimensional measure of employee resilience and the EmpRes, with high reliability ($r \geq 0.13 \leq 0.37$; small to medium practical effect size; $p \leq 0.05$; $p \leq 0.01$). This measure also exhibited positive and significant correlations with CAS's four subscales (concern, control, curiosity, and cooperation; $r \geq 0.13 \leq 0.36$; small to medium practical effect size; $p \leq 0.05$; $p \leq 0.01$) and the overall CAS scale ($r \geq 0.37$; medium practical effect size; $p \leq 0.05$), indicating the construct validity of resilience.

In summary, the findings indicated positive and significant correlation variables related to OCS, JES, PVS-III-R, EmpRes, and CAS, with scores ranging from small to large practical effect sizes.

Stepwise regressions analysis

Model 1, which considered socio-demographic variables alone, yielded the following results: $F = 9.99$; $p = 0.000$; Adjusted $R^2 = 0.89$ (small to large practical effect size). Model 2 incorporated socio-demographic variables, job embeddedness, and hardiness, with these results: $F = 20.83$; $p = 0.000$; Adjusted $R^2 = 0.15$ (small practical effect size). Model 3 included socio-demographics, job embeddedness, hardiness, and organisational commitment as independent variables, and its results were as follows: $F = 1.14$; $p = 0.000$; Adjusted $R^2 = 0.15$ (small practical effect size). Model 4 encompassed socio-demographics, the independent variables (organisational commitment, job embeddedness, and hardiness), and their interactions in predicting the dependent variables (resilience and career adaptability). The results were as follows: $F = 26.31$; $p = 0.000$; Adjusted $R^2 = 0.22$ (small practical effect size).

In Model 2, job embeddedness played the most significant role in explaining the variance in resilience and career adaptability ($\beta = 0.15$; t-value = 6.26), while hardiness contributed to a lesser extent in explaining the variance in resilience ($\beta = -0.03$; t-value = −0.86). Job embeddedness also predicted a significant and positive relationship between the dependent variables (resilience and career adaptability) and socio-demographic variables.

In Model 3, job embeddedness was the most substantial contributor in explaining the variance in resilience and career adaptability ($\beta = 0.17$; t-value = 5.88). Organisational commitment ($\beta = -0.03$; t-value = −1.07) and hardiness ($\beta = -0.02$; t-value = −0.43) had a comparatively smaller impact on explaining the variance in the resilience and career adaptability constructs. Additionally, all tolerance scores were high (OC = 0.54; JE = 0.49; hardiness = 0.72).

In Model 4, job embeddedness continued to be the most significant factor in explaining the variance in resilience and career adaptability ($\beta = 0.18$; t-value = 5.97). Organisational commitment ($\beta = -0.05$; t-value = −1.82) and hardiness ($\beta = -0.04$; t-value = −1.01) had a relatively minor role in explaining the variance in these constructs. There was a positive interaction effect between cJE*cOC ($\beta = 0.08$; t-value = 4.32) in predicting resilience and career adaptability, and conversely, a negative interaction between cHardiness*cOC ($\beta = -28$; t-value = −6.79). Furthermore, the tolerance scores for all independent concepts and socio-demographic variables were high, except for race = 0.14. Thus, the results indicated that all socio-demographic variables (except race and employment status) positively and significantly predicted the relationship between organisational commitment, job embeddedness, hardiness, resilience, and career adaptability (Table 3).

In summary, the findings revealed that the independent factors (organisational commitment, job embeddedness, and hardiness) and six socio-demographic variables (age, gender, race, marital status, job level, and employment status) significantly predicted both resilience and career adaptability. Specifically, all dimensions of organisational commitment (affective commitment, continuance commitment, and normative commitment) positively and significantly predicted resilience and career adaptability. In the case of job embeddedness, both its dimensions (fit and sacrifices/links) played significant roles in explaining resilience and career adaptability. Conversely, the dimensions of PVS-III-R had a negative relationship with the dependent variables (resilience and career adaptability).

Structural equation model

Expanding upon the correlation analysis, structural equation modelling was employed to assess the overall fit of the structural model. The fit statistics indicated that the model tested fits the data satisfactorily, and thus, the model is acceptable: Chi-square (30.90), RMSEA (Root Mean Square Error of Approximation) = 0.060, SRMR (Standardised Root Mean Square Residual) = 0.13, CFI (Comparative Fit Index) = 0.82, TLI (Tucker-Lewis Index) = 0.81. The goodness-of-fit statistics further validate that the attribute of agility and adaptability significantly predicts the construct of value-oriented psychological contract ($\beta = 0.60$; $p = 0.000$; Table 4).

Considering the model's goodness of fit, the proposed resilience framework is recommended for private-sector organisations in South Africa.

Discussion

In a world grappling with a talent shortage, organisations focus on retaining top-performing employees for their competitive edge. This challenge is amplified in Africa and more specifically South African

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TABLE 3 Final step: stepwise regression analysis.

Variables	Estimate(β)	Standard error	t-value	*p*	Tolerance
Constant	6.09	0.05	14.78	0.00	–
Age	0.01	0.03	0.23	0.82	0.68
Gender	−0.01	0.04	−0.36	0.72	0.87
Race	−0.07	0.04	−0.1.60	0.11	0.89
Marital status	0.15	0.04	4.29	0.00	0.93
Job level	0.16	0.04	3.72	0.00	0.76
Employment status	−0.14	0.05	−0.2.88	0.00	0.92
Model 1 summary					
F	9.99				
P	0.000				
Adjusted R^2	0.89				
Constant	5.58	0.17	32.80	0.00	–
Age	−0.03	0.03	−0.1.05	0.29	0.62
Gender	0.02	0.04	0.06	0.95	0.86
Race	−0.08	0.04	−1.78	0.77	0.87
Marital status	−0.12	0.04	3.26	0.01	0.88
Job level	0.06	0.04	1.35	0.77	0.65
Employment status	−0.10	0.05	−2.02	0.04	0.65
Job embeddedness	0.06	0.04	1.35	0.18	0.68
Hardiness	−0.03	0.04	−0.86	0.38	0.81
Model 2 summary					
F	20.83				
P	0.000				
Adjusted R^2	0.15				
Constant	5.61	0.17	32.39	0.00	–
Age	−0.03	0.03	−0.85	0.40	0.60
Gender	2.5	0.04	0.00	0.99	0.86
Race	−0.08	0.04	−0.1.80	0.07	0.87
Marital status	0.11	0.04	3.21	0.00	0.88
Job level	0.06	0.04	1.37	0.17	0.65
Employment status	−0.10	0.05	−2.08	0.04	0.90
Job embeddedness	0.16	0.03	5.88	0.00	0.49
Hardiness	−0.02	0.04	−0.43	0.67	0.71
Organisational commitment	−0.03	0.03	−1.07	0.29	0.54
Model 3 summary					
F	1.14				
P	0.29				
Adjusted R^2	0.15				
Constant	5.72	0.19	30.34	0.00	–
Age	−0.01	0.03	0.17	0.87	0.57
Gender	0.01	0.04	0.24	0.81	0.85
Race	−0.06	0.04	−1.49	0.14	−0.14
Marital status	0.09	0.03	2.77	0.01	0.87
Job level	0.03	0.04	0.79	0.43	0.62
Employment status	−0.12	0.05	−2.53	0.01	0.89
Job embeddedness	0.18	0.03	5.97	0.00	0.41
Organisational commitment	−0.05	0.03	−1.82	0.07	0.53
cJE*cOC	0.08	0.02	4.32	0.00	0.71
cHardiness*cOC	−0.28	0.04	−6.79	0.00	0.77
Model 4 summary					
F	26.31				
P	0.000				
Adjusted R^2	0.22				

N = 574; OC; organisational commitment; dependent variables: Resilience and career adaptability; cJE*cOC, cHardiness*cOC: interaction effect between the concepts; c: means that the variables are mean centred.

TABLE 4 Model fit statistics: competing structural models.

Model	Chi-square	*p*	RMSEA	SRMR	CFI	TLI	AIC	BIC
1	30.90	0.000	0.06	0.13	0.82	0.81	95110.33	96115.79
2	0.33	0.000	0.00	0.00	1.00	1.00	3782.85	3952.60

private-sector organisations. While various retention strategies have been employed, retaining top talent goes beyond rewards; it entails creating satisfying work environments and aligning employee expectations with organisational goals. To address this, South African private sector organisations must move beyond traditional retention strategies by investing in organisational commitment, job embeddedness, hardiness, resilience, and career adaptability. This study explores the relationship dynamics between retention-related dispositions and resilience-related behaviours, offering insights into talent retention in South African private sector organisations and addressing research gaps.

Summary of findings

The analysis of construct descriptives highlights participants' profound emotional attachment to the organisation, extending well beyond their job roles. This deep connection fosters a strong sense of belonging and loyalty, which deeply influences their behaviour and performance. Furthermore, above-average scores on the Job Embeddedness Scale (JES) underscore participants' strong alignment with their jobs, community and organisation. While the Personal Views Survey (PVS-III-R) shows moderate satisfaction with commitment and control, there is room for improvement in addressing the marginal satisfaction with challenge. Employees' desire for more growth and challenges in their roles can enhance job satisfaction and overall well-being. Moreover, positive scores on the Employee Resilience Scale (EmpRes) reveal participants' resilience, empowering them to adapt and recover effectively from challenges, contributing to their ongoing engagement and productivity. Lastly, the Career Adaptability Scale (CAS) reflects average scores across most subscales, with a distinct high confidence in participants regarding their careers. This self-assuredness can lead to increased career mobility, encouraging employees to explore new opportunities, embrace challenges, and take an active role in their career development.

The results further show that positive perceptions of organisational commitment, job embeddedness, and hardiness are the most influential factors in predicting resilience-related behavioural capacities and career adaptability. A strong sense of organisational commitment fosters a positive and supportive work environment, nurturing a psychological attachment to the organisation (Moeng et al., 2023). This, in turn, leads to increased job satisfaction and influences various aspects of employee behaviour and experiences. These findings align with research conducted by Sharma et al. (2021) and Moeng et al. (2023), supporting the idea that employees with higher organisational commitment are better equipped to cope with stress and adversity.

Moreover, employees who feel deeply embedded in their roles and organisation experience a profound sense of belonging, which enhances their job satisfaction. Mitchell and Lee (2001) define "fit" as the alignment between an individual and the organisation's culture. This alignment fosters a sense of belonging and is associated with increased employee retention (Pillay, 2020). High levels of job embeddedness are also linked to greater job satisfaction and reduced turnover intentions (Potgieter and Ferreira, 2018).

In addition to organisational commitment and job embeddedness, hardiness plays a pivotal role in equipping employees with the psychological strength to overcome adversity and facilitate career growth. High-hardi individuals tend to fully commit to their tasks, believe in their ability to influence their life events and view change as an opportunity for personal development and growth (Ferreira, 2012). This perspective on challenge and change positively influences affective and continuance commitment. Employees who embrace challenging experiences as opportunities for personal growth are more likely to remain committed to the organisation. Furthermore, these employees are often motivated to act as change agents in their environment and are less inclined to leave the organisation, as they perceive the costs of departure to be prohibitively high.

In summary, high levels of organisational commitment, job embeddedness, and hardiness have been shown to reduce turnover. When employees are committed to their organisation and deeply embedded in their roles, they are more likely to stay, fostering a stable workforce. Hardiness contributes to this by enabling employees to persevere in the face of challenges, making them more committed and less inclined to seek opportunities elsewhere.

The cumulative impact of these constructs on talent retention is substantial, as they collectively form comprehensive and effective strategies for retaining highly talented individuals. In conclusion, this discussion informs the development of an integrated theoretical resilience framework for South African private sector organisations, emphasising the significance of considering these constructs in the formulation of effective retention strategies. Figure 1 below visually represents the empirically established resilience framework. This distinctive framework can serve as a valuable guide when designing talent retention management strategies and practices tailored to South African private sector organisations.

Theoretical implications

This study developed a theoretical resilience framework to inform talent retention practices in South African private sector organisations. It emphasised the dynamic relationships between retention-related dispositions (organisational commitment, job embeddedness, and hardiness) and resilience-related behavioural capacities (resilience and career adaptability), and how these variables relate to contemporary talent retention initiatives. The insights gained from this study, particularly regarding the interplay between the identified variables, have several practical implications for South African private-sector organisations.

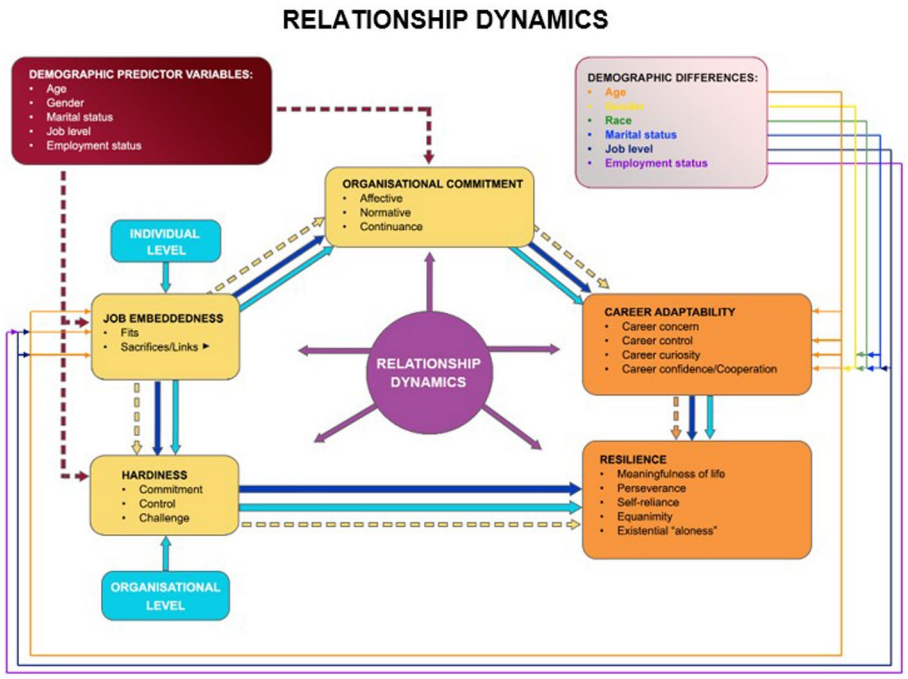

FIGURE 1
Empirically manifested resilience framework for South African private sector organisations. Source: authors own work.

Practical implications

The proposed resilience framework offers a holistic approach to talent retention in private sector organisations. It aids in designing unique strategies to keep top talent and stay competitive. The implications for HR and management are as follows:

First, prioritise strong relationships between employees and their organisations. Recognising the importance of organisational commitment in reducing employee turnover, management should strive to create a positive work environment that fosters a sense of belonging, autonomy and loyalty. This can be achieved through employee engagement programmes, job design and crafting, recognition, rewards, and career development (Dutta et al., 2023; Jay, 2023).

Second, promote job embeddedness by creating a sense of community, offering flexible work arrangements, and providing support and resources such as employee support groups and mentorship programmes. In addition, management should ensure that their employees are satisfied with their compensation, training and development and career development opportunities (Shibiti, 2019).

Third, identify and nurture employees with hardiness, a valuable trait. Develop hardiness in employees by providing training on stress management, resilience building, promote a growth mindset, and create a supportive and collaborative work environment.

Fourth, emphasise the importance of resilience, particularly in high-positive affectivity individuals, as a psychological resource against job demands. Dedicate resources to enhance coping skills and well-being through initiatives like stress management, mental health support and maintaining a healthy work-life balance (Rodríguez-Sánchez, 2021).

Lastly, support employees in developing and enhancing their career adaptability through training, mentorship, and career development initiatives (Gama Jobs, 2023). Encourage a culture of continuous learning and adaptability within the organisation to ensure employees are better prepared to navigate transitions and embrace new opportunities.

These suggestions offer management the means to enhance talent retention, reduce turnover intention, and create a more engaged and adaptable workforce. Prioritising organisational commitment, promoting job embeddedness, nurturing hardiness, emphasising resilience, and supporting career adaptability all contribute to improved employee well-being and a competitive advantage in the dynamic business landscape.

Limitations and future research

The study's conclusions need to be considered considering the limitations stemming from its cross-sectional research design. To enhance the generalisability of the findings, future research should aim to replicate the study in a more extensive range of industry contexts with larger participant samples. Conducting longitudinal studies may also prove beneficial in investigating agile adaptable attributes and value-oriented commitments across various settings and diverse population groups. Future research could further explore the moderating role of socio-demographic variables as these variables can significantly influence how retention practices are perceived and applied.

Conclusion

In a world facing a talent shortage, South African private sector organisations grapple with retaining skilled employees (Van Zyl et al., 2017). This study underscores the need for a holistic approach to talent retention by accentuating the interconnected nature between various retention-related attributes and resilience-related behavioural capacities. The study found that positive perceptions of organisational

commitment, job embeddedness, and hardiness were influential in predicting resilience and career adaptability, leading to increased job satisfaction and reduced turnover intentions.

In conclusion, this study offers a theoretical framework for talent retention in South African private-sector organisations. Prioritising them enhances talent retention and fosters an engaged and adaptable workforce. Nonetheless, the study has limitations, and future research should explore these constructs in different industries, larger samples, and longitudinal studies. Examining the impact of socio-demographic variables on talent retention is also crucial.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving humans were approved by Ethical clearance to conduct the research was obtained from the University of South Africa (ERC Ref#: 2019_CEMS/HRM_010). Participants' anonymity, privacy, and voluntary participation were respected. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

NF: Conceptualization, Supervision, Writing – original draft. EM: Conceptualization, Data curation, Formal analysis, Writing – review & editing. MP: Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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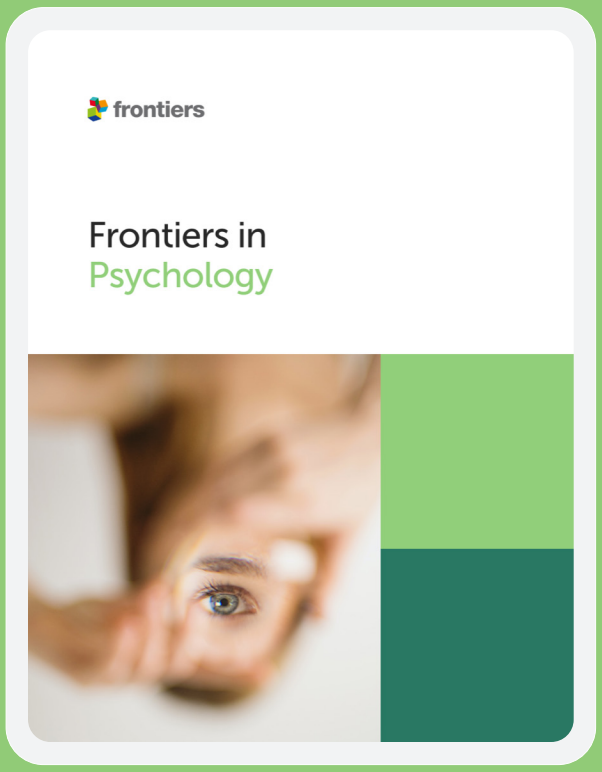

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