

Psychosocial Safety Climate as an Enabler of Teacher Health and Occupational Well-being^{*}

El clima de seguridad psicossocial como facilitador de la salud y el bienestar ocupacional docente

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ABSTRACT

The aim of this quantitative research was to understand the mechanisms that intervene in the relationship between Psychosocial Safety Climate (PSC) and work outcomes through the Job Demands-Resources (JD-R) model in a sample of Portuguese school teachers. 1481 participants, mostly female (78.9 %), completed a research protocol consisting of six self-report questionnaires and one sociodemographic and professional questionnaire. The results indicated that PSC correlates positively with teacher health, work engagement and positive psychological capital (PsyCap); teacher health mediates the relationship between PSC and both work engagement and PsyCap, promoting both; PsyCap is linked to higher job satisfaction and lower stress; and work engagement and PsyCap partially mediate the relationship between PSC and job satisfaction, promoting the latter, and stress, reducing its levels. It would be important that these results would have a driving effect on interventions with teachers to prevent and improve their health and well-being.

Keywords

positive psychological capital; psychosocial safety climate; work engagement; JD-R model; teacher health.

RESUMEN

El objetivo de esta investigación cuantitativa fue comprender los mecanismos que intervienen en la relación entre el Clima de Seguridad Psicosocial (PSC, por sus siglas en inglés) y los resultados laborales a través del modelo de Demandas y Recursos Laborales (JD-R) en una muestra de docentes portugueses. Un total de 1481 participantes, en su mayoría mujeres (78.9 %), completaron un protocolo de investigación compuesto por seis cuestionarios de autoinforme y un cuestionario sociodemográfico y profesional. Los resultados indicaron que

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el PSC se correlaciona positivamente con la salud del profesorado, el engagement laboral y el capital psicológico positivo (PsyCap). La salud del profesorado media la relación entre PSC y tanto el engagement como el PsyCap, promoviendo ambos. El PsyCap se relaciona con mayor satisfacción laboral y menores niveles de estrés. Además, el engagement laboral y el PsyCap median parcialmente la relación entre PSC y la satisfacción laboral —favoreciendo esta última—, y entre PSC y el estrés —reduciendo sus niveles—. Sería importante que estos resultados impulsaran intervenciones con docentes orientadas a prevenir y mejorar su salud y bienestar.

Palabras clave

capital psicológico positivo; clima de seguridad psicosocial; engagement laboral; modelo JD-R; salud del profesorado.

Issues related to identifying factors that promote teachers' well-being and motivation have assumed a relevant role over recent years. In some European countries, e.g., Portugal, there are constraints on teachers' careers and the performance of their tasks (e.g., low status, reduced income, few opportunities for personal and professional development, excessive bureaucratic work) that can negatively influence psychological health and occupational well-being (Flores & Niklasson, 2014). These factors have made the profession less attractive, leading to a future teacher shortage. With the demands imposed on teachers, topics such as psychosocial safety climate, teacher health, work engagement, stress, and job satisfaction, among others, have stimulated the scientific community's interest. It is essential to identify and understand the factors contributing to teachers' occupational health and well-being to ensure that they can perform their tasks appropriately, impacting the results of students and educational establishments.

A study performed in Portugal in 2018 (Varela et al., 2018) found that 76.4 % of teachers suffered from emotional exhaustion. Borralho et al. (2020), in a study with 5009 Portuguese teachers, found that more than half of the participants suffered from occupational ill-being (e.g., musculoskeletal disorders, voice changes, and cognitive impairment). Also, the participants felt less satisfied with their occupation and effective in task performance than Brazilian and Spanish teachers. These

results highlight the importance of performing additional studies on the health and well-being of teachers using models with substantial theoretical and empirical support, such as the Job Demands-Resources Theory [JD-R] (Bakker et al., 2023). The JD-R theory allows the identification of which factors can shape teachers' health and how it relates to desirable (e.g., job satisfaction) and undesirable (e.g., stress) work outcomes through workers' personal resources (e.g., psychological capital) and processes related to work motivation (e.g., work engagement).

Based on the assumptions of the JD-R theory, the present study intended to understand how perceived Psychosocial Safety Climate (PSC) is related to teachers' health (job resource), composed of dimensions of a physical and psychological nature, and how teachers' health is directly related to job satisfaction and stress (work results) and indirectly through psychological capital (PsyCap; personal resource) and work engagement. A sample of primary and upper-secondary level Portuguese teachers was collected to achieve this goal. This study aimed to cement the role of PSC as an antecedent of job resources in the JD-R theory.

PSC integration in the JD-R model remains underexplored. There is an ongoing debate about whether PSC should be viewed as an antecedent, a resource, or a contextual variable shaping workplace stress processes. Although PSC is established as a predictor of job resources, most supporting evidence comes from research outside education, leaving a gap in its application to teachers and its relationship to PsyCap and work engagement (Dollard & Bakker, 2010; Idris et al., 2011).

By addressing Portuguese teachers, this study expands PSC research into an understudied sector, providing empirical support for PSC's upstream role in shaping job resources that promote teacher well-being, engagement, and satisfaction. The findings further demonstrate that positive PSC climates can trigger beneficial outcomes by improving job demands and resources, guiding practical improvements in

school organizational culture and policy (Dollard & Bakker, 2010; Idris et al., 2011).

Job Demands-Resources Theory

Early models of work motivation and job stress, e.g., Herzberg's Two Factor Theory, Job Characteristics Model, Job Demand-Control Model, and Effort-Reward Imbalance, presented limitations regarding their functioning and characteristics (Bakker & Demerouti, 2014; Bakker et al., 2023). The JD-R theory was first introduced in 2001 by Demerouti et al. (2001). Over the years, this model evolved (Bakker & Demerouti, 2017).

The JD-R theory is a key framework in occupational health psychology because it is both flexible and dynamic; it groups all job characteristics into job demands, which contribute to ill-being, and job resources, which promote well-being (Bakker et al., 2023). The model's dynamism lies in its dual processes: job demands lead to exhaustion and health impairment, while job resources foster work engagement and motivation, resulting in positive or negative outcomes (Demerouti & Bakker, 2022)..

Antecedents of the JD-R Theory

Dollard and Bakker (2010) expanded the JD-R theory by linking PSC (the organizational policies and practices for psychological health and safety) to job demands and resources. PSC is conceptualized as a multidimensional construct including management priority, management communication, organizational participation, and management commitment. These dimensions reflect senior management's visible commitment to psychological health, open communication channels, stakeholder involvement, and responsibility for health promotion and risk reduction, all key for fostering a supportive work climate (Hall et al., 2010; Idris et al., 2015). PSC can be variously defined as a job resource; as a contextual/multilevel climate; and, as an antecedent of job resources and demands.

Dollard and Bakker (2010) proposed that PSC serves as an upstream trigger for both JD-R theory pathways, influencing emotional demands, skill discretion, and ultimately, psychological health. Longitudinal evidence supports PSC's role as a fundamental antecedent, shaping demands and resources and exerting protective function in organizations. Idris et al. (2011) empirically expanded the JD-R theory by proposing PSC as an antecedent of both job demands and job resources. Their work highlighted that the climate for psychological safety, shaped by senior management, precedes individual-level experiences of demands or resources and, therefore, burnout and work engagement. Garrick et al. (2014) treated PSC as a climate variable at multiple organizational levels, influencing outcomes through both group and individual perceptions. Their nuanced perspectives invite consideration of PSC's level of analysis and variation.

PSC, job resources, personal resources, and well-being: Direct relationships

For this paper, PSC was selected as an antecedent of job resources within the JD-R theory due to several interrelated theoretical and empirical reasons: (i) upstream organizational influence, as PSC reflects shared perceptions of organizational policies and practices prioritizing psychological health and safety (Dollard & Bakker, 2010). It functions as a higher-level organizational climate shaping how job characteristics are structured and experienced by employees (Idris et al., 2011), operating prior to and independently of individual-level demands and resources; (ii) empirical validation as a predictor, with studies showing PSC predicts reductions in job demands and increases in job resources, influencing burnout and engagement (Dollard & Bakker, 2010; Idris et al., 2011); (iii) multilevel and contextual nature, since PSC is a stable, collective management commitment shaping local climates and individual experiences (Garrick et al., 2014), aligning with JD-R's allowance for contextual variables at higher

levels; (iv) theoretical coherence and practical relevance, as treating PSC as antecedent fits the view that organizational culture is foundational for psychosocial work design, especially in education where leadership's prioritization of PSC affects access to resources like supervisory support, autonomy, and PsyCap which boost engagement and well-being; and (v) fit with study hypotheses and model design, selecting PSC as antecedent enables clear hypothesis formulation and empirical testing consistent with JD-R frameworks, avoiding conceptual overlap and supporting a parsimonious structural model suited for this educational context.

According to Dollard and Bakker (2010), PSC is an antecedent of job resources and is responsible for triggering the motivational process of JD-R theory, which leads to occupational well-being, e.g., work engagement and workers' health (Bakker & Demerouti, 2017). The World Health Organisation (WHO, 1946) defined health as a holistic feeling of well-being, not just the absence of disease. Also, it emphasized that health is an essential condition for human beings. Teachers' health and motivation have been the subject of extensive research, mainly due to the impact of these aspects on student motivation and the quality of teaching (Viseu et al., 2015). This importance is illustrated by the measures created to assess teacher health. Fernández-Puig et al. (2015) developed the Perceived Health Questionnaire for Teachers based on two theoretical models, the dual model of positive and negative spirals of occupational health and Rudow's model, which identify the characteristics of a healthy occupation. Both models consider teacher health as a positive spiral process, which generates motivation, instead of a negative spiral process, which leads to exhaustion and demotivation.

According to Borralho et al. (2020), there has been a deterioration in teachers' health, which affects teachers and the school environment. Several studies (e.g., Yang et al., 2019) have demonstrated that teachers' health has been deteriorating, resulting in professional demotivation, professional dissatisfaction, and an increase in the number of teachers asking for

early retirement. Fernández-Puig et al. (2015) conceptualized teacher health as a positive job resource. Considering the works of Dollard and Bakker (2010) and Idris et al. (2011), e.g., PSC is an antecedent of job resources, relating positively to them, the following research hypothesis was proposed:

H1: PSC establishes a positive association with job resources (teacher health).

Xanthopoulou et al. (2007) expanded the JD-R theory by incorporating personal resources, defined as traits or elements that help workers cope with job demands. They argued that job demands and resources alone do not fully predict exhaustion and work engagement; individual characteristics also play a crucial role. According to Bakker and Demerouti (2014), personal resources can serve as mediators between job resources and engagement, predictors of job resources, and moderators between job demands and strain.

PsyCap is a widely studied personal resource within this framework, composed of four dimensions—efficacy, optimism, resilience, and hope—with strong theoretical and empirical support (Luthans et al., 2015; Newman et al., 2014). These dimensions synergistically foster motivated behavior aimed at achieving work goals, enabling individuals to overcome adversity, maintain a positive outlook, adapt goals when needed, and bounce back from challenges.

The literature has been consensual (e.g., Brunetto et al., 2023; Siami et al., 2023) in demonstrating that PSC and PsyCap are positively related. Thus, it can be stated that:

H2: PSC establishes a positive association with PsyCap.

Work engagement was first proposed by Kahn (1990), who stated that when workers are involved with their work, they use cognitive, physical, mental, and emotional resources to achieve a greater performance. The operationalization proposed by Schaufeli et al. (2002) is the most consensual in the literature. According to this perspective, work engagement is a multidimensional construct composed of the dimension's vigor, dedication, and absorption (Bakker et al., 2014). Different studies have

shown that PSC was positively related to work engagement through job resources (Idris & Dollard, 2011; Idris et al., 2011, 2012; Law et al., 2011). Garrick et al. (2014) found that work engagement increased in teachers working in schools with higher PSC than in schools with lower PSC. Thus, the following hypothesis was defined:

H3: PSC establishes a positive association with work engagement.

PSC, job resources, personal resources, and well-being: Indirect relationships

Job resources, which have a dual motivational nature, e.g., intrinsic and extrinsic, foster work engagement and PsyCap (Bakker & Xanthopoulou, 2013; Bakker et al., 2014). The study by Idris et al. (2011) with Malaysian workers demonstrated that job resources mediated the relationship between PSC and work engagement. In turn, Brunetto et al. (2022), in a study with public sector workers in Australia, also found that job resources, namely innovation behavior, mediated the relationship between PSC and PsyCap. As such, we advance that:

H4a: Job resources (teacher health) mediate the relationship between PSC and PsyCap.

H4b: Job resources (teacher health) mediate the relationship between PSC and work engagement.

Work engagement and PsyCap: Direct relationships with work-related outcomes

According to Schaufeli and Taris (2014), job satisfaction is a positive work-related outcome resulting from favorable assessments of the workplace, tasks, and social environment within the JD-R framework. Research has extensively examined the relationship between Psychological Capital (PsyCap) and job satisfaction, highlighting that individuals with high PsyCap—characterized by confidence, optimism, goal orientation, and resilience—tend to perceive their work context positively

(Luthans et al., 2015; Newman et al., 2014). Studies with teachers have supported this link, demonstrating that higher PsyCap significantly increases job satisfaction (Cheung et al., 2011; Viseu et al., 2015). Accordingly, the following research hypothesis is proposed:

H5a: PsyCap establishes a positive association with job satisfaction.

The systematization by Schaufeli and Taris (2014) also indicated that stress is a work-related outcome, in this case, a negative work-related outcome, in the JD-R theory. This concept is characterized by an imbalance caused by psychophysiological changes that may have internal or external origins (Muniz et al., 2007). Since its development, the literature on PsyCap (e.g., Loghman et al., 2022; Luthans et al., 2015) has highlighted that this concept acts as a buffer against undesirable job attitudes and behaviors (e.g., stress). This means that workers who (a) are confident in their abilities, (b) can create alternative paths to achieve their goals, (c) have a positive outlook on the present and the future, and (d) can recover from adverse situations present lower stress levels. The study by Selcuk (2018) performed with 335 Iranian teachers demonstrated that PsyCap is negatively related to several indicators of occupational ill-being, e.g., anxiety, stress, and burnout. Thus, the following hypothesis was defined:

H5b: PsyCap establishes a negative association with stress.

Work engagement is associated with lower anxiety and greater well-being (Hakanen & Schaufeli, 2012; Innstrand et al., 2012). Engaged workers experience positive emotions, including happiness, enthusiasm, and better physical and mental health (Bakker et al., 2008). Also, positive work-related attitudes, e.g., satisfaction, organizational commitment, and low tendency to change jobs, are positively associated with work engagement (Hallberg & Schaufeli, 2006; Schaufeli & Bakker, 2004a). Durán et al. (2005), in a study with a sample of 265 Spanish teachers, concluded that there is a solid link between work engagement and job satisfaction. Accordingly, the following research hypothesis is proposed:

H5c: Work engagement establishes a positive association with job satisfaction.

Regarding the benefits of work engagement and its relationship with physical and mental health, as it is an intraindividual concept, it impacts attitudes, individuals' intentions, and behaviors (Saks, 2006). Work engagement is associated with good mental health indicators, namely low levels of depression, stress, and psychosomatic complaints (Demerouti et al., 2001; Schaufeli & Bakker, 2004b). As such, we advance that:

H5d: Work engagement establishes a negative association with stress.

Work engagement and PsyCap: Mediating role between psychosocial safety climate and work-related outcomes

PSC moderates the link between work conditions and outcomes, especially the effect of job demands on psychological health (Dollard & Karasek, 2010; Law et al., 2011). When PSC is high, the negative impact of job demands on mental health is reduced, indicating that employees feel safe using available resources to cope with stress. Conversely, low PSC leads to higher psychological health problems under demanding conditions (Law et al., 2011). Moreover, work engagement and PsyCap are expected to partially mediate the relationship between PSC and job satisfaction, as the three factors interact to enhance satisfaction (Hall et al., 2013). These mediators also buffer stress, reducing its intensity in the presence of strong PSC. As such, the following research hypotheses were proposed:

H6a: Work engagement and PsyCap partially mediate the relationship between PSC and job satisfaction.

H6b: Work engagement and PsyCap partially mediate the relationship between PSC and stress.

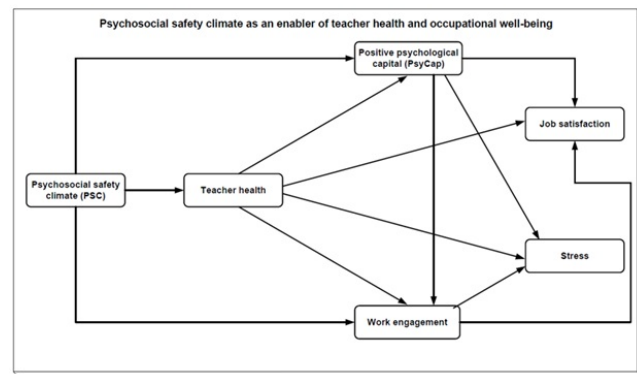


Figure 1.
Theoretical model and research hypotheses proposed.

Method

Participants

Initially, the minimum sample size was calculated using Nunnally's (1967) recommendations, e.g., 10 observations for each item in the research protocol. Considering that the protocol had 63 items, the minimum sample size for this study should be 630 participants. This estimate was exceeded, given that the final sample size was 1481 (Table 1).

Table 1
Sample Characterization (N = 1481)

Characteristic	%
<i>District where you work</i>	
Madeira Island	9.7
Azores Island	3.6
Aveiro	4.6
Beja	2.1
Braga	5.2
Bragança	1.6
Castelo Branco	1.9
Coimbra	5.2
Évora	2.7
Faro	8.4
Guarda	1.4
Leiria	4.8
Lisboa	16.7
Portalegre	0.5
Porto	17.2
Santarém	2.4
Setúbal	5.7
Viana do Castelo	1.8
Vila Real	1.4
Viseu	3.1
<i>Age group (years)</i>	
21-42	10.8
43-49	25.2
50-55	28.7
56-70	35.2
<i>Gender</i>	
Female	78.9
Male	21
Non-binary	0.1
<i>Type of school</i>	
Public	98.4
Private	1.6
<i>Level of education taught</i>	
Pre-school	4.9
1 st cycle	15.1
2 nd cycle	13.2
3 rd cycle	15.4
Secondary	13.2
Special education	4.2
Professional education	4
More than one level taught at the same time	30
<i>Professional status</i>	
Teacher with a place on the school/group board	71.7
Teacher of the pedagogical zone	12.2
Contracted teacher	1.5
Other	1.1
<i>Other tasks performed at school</i>	
No	43.3
Yes	56.7
<i>Years of service</i>	
0-5	4.6
6-10	3.5
11-20	1.5
21 or more	76.9

Note. % = percentage of responses in the category.

Measures

Table 2 presents all the instruments used in this study.

Table 2
Instruments Characterization

Instrument	References	Number of Items	Example Item	Scale Type (Range)	Dimensions / Domains	Population / Adaptation	Purpose / Description
Psychosocial Safety Climate-12 (PSC-12)	Hall et al., 2010; Sousa et al., 2020	12	Workers are encouraged to get involved in safety and psychological health issues	5-point Likert (1 = Strongly disagree; 5 = Strongly agree)	Management commitment, Management priority, Organizational communication, Organizational participation	Portuguese version by Sousa et al. (2020)	Measures the psychosocial safety climate, reflecting organizational policies, practices, and procedures for worker psychological health and safety.
Teacher's Health Questionnaire	Borrallho et al., 2020; Fernández-Piug et al., 2015	21	After a day at work, I feel powerless	5-point Likert (1 = Never; 5 = Always)	Professional well-being, Exhaustion, Voice changes, Musculoskeletal disorders, Cognitive impairment	Adapted to Portuguese teachers by Borrallho et al. (2020)	Assesses teachers' perception of their health as a multidimensional construct.
Compound PsyCap Scale-12 (CPC-12)	Lorenz et al., 2016; Benavido, 2021	12	I can think of many ways to reach my current goals	6-point scale (1 = Strongly disagree; 6 = Strongly agree)	Self-efficacy, Hope, Resilience, Optimism	Portuguese version by Benavido (2021)	Evaluates psychological capital as a positive psychological resource.
Utrecht Work Engagement Scale (UWES)	Schaufeli & Bakker, 2003; Suñal et al., 2018	9	My job inspires me	7-point Likert (0 = Never; 6 = Always)	Vigor, Dedication, Absorption	Portuguese version by Suñal et al. (2018)	Assesses work engagement as a positive, fulfilling state of mind related to work.
Professional Satisfaction Scale	Lima et al., 1994	8	Regarding your prospects for promotion, would you say that you are	7-point Likert (1 = Extremely dissatisfied; 7 = Extremely satisfied)	Not specified	Developed for Portuguese workers	Measures overall job satisfaction.
Depression, Anxiety and Stress Scale (DASS-21)	Lovibond & Lovibond, 1995; Pais-Ribeiro et al., 2004	21 (7 stress items used)	I experienced breathing difficulty	4-point scale (0 = Did not apply at all; 3 = Applied most of the time)	Depression, Anxiety, Stress (only Stress used)	Portuguese version by Pais-Ribeiro et al. (2004)	Assesses symptoms related to depression, anxiety, and stress.
Sociodemographic and Professional Questionnaire	—	—	—	—	—	Developed for this study	Collects contextual information such as school location, age, gender, education level, professional status, tasks, and years of service.

Data collection procedures

A non-probabilistic convenience sampling technique was followed. Initially, the research protocol was submitted to the Directorate-General for Education (DGE), requesting authorization to perform this study in a school context. This organization was responsible for reviewing the informed consent statement and the research protocol to ensure that it was not possible to identify potential participants based on their answers. The research was approved, and as such, its application was authorized in all Portuguese schools. The directors of different educational establishments were contacted so they could be presented with the study's objective and an informed consent statement, which guaranteed the total anonymity of the participants. Upon acceptance by the schools, the research protocol was applied through an online platform [EUSurvey] (European Commission, 2019). An online application was chosen because educational establishments might not have the logistical capacity to apply the research protocol to several teachers simultaneously.

To ensure that the research protocol was solely answered by teachers of the considered

levels of education, the school directors were asked to disclose it only to the target population. Before completing the research protocol, participants were requested to read an informed consent statement, which guaranteed full respect for the standards of anonymity and confidentiality of answers. The collection and processing of personal data complied with the legislation in force in Portugal and the European Union, namely Regulation (EU) 2016/679 (General Data Protection Regulation) and its implementation in the Portuguese legal system through Law No. 58/2019.

Participation in the research was voluntary; each respondent was free to interrupt the protocol completion at any time, with no losses for either party and no monetary or other rewards for participation. Data collection occurred between April 13th, 2022, and June 30th, 2022.

Data analysis procedures

Before the analysis, missing data were examined and replaced with the mean value of each item, following Hill and Hill (2008). Descriptive statistics, including means and standard deviations, were then calculated for the latent constructs and their dimensions. Correlational analysis using Pearson's coefficient and reliability analysis using Cronbach's alpha were also performed. All analyses were conducted with SPSS [Version 20.0] (IBM Corp., 2011b).

The theoretical model was tested using structural equation modeling (SEM) with the Analysis of Moment Structures (AMOS) software [Version 20.0] (IBM Corp., 2011a). According to Curran et al. (1996), the multivariate normal distribution assumption must be respected to use the maximum likelihood estimation (MLE) method. Even though the literature is not consensual regarding the skewness and kurtosis values that respect this assumption, Curran et al. (1996) indicated that skewness values of two ($|sk| \leq 2$) and kurtosis of seven ($|ku| \leq 7$) support the use of the MLE method. After this procedure, a strategy

was defined based on assessing the overall model fit, measurement model fit, and research hypotheses (Marôco, 2021). Overall model fit was tested by three types of fit indices: absolute, incremental, and parsimony (Hair et al., 2013). Before evaluating these indices, the chi-squared goodness-of-fit test (χ^2) value was tested, a *p-value* greater than 0.05 ($p > 0.05$) is expected.

However, it is common to achieve statistically significant values ($p < 0.05$) in large sample sizes (Anderson & Gerbing, 1982). The absolute fit indices defined were the Goodness of Fit Index (GFI; 0.90 – 0.95: good fit; > 0.95 : very good fit), Root Mean Square Error of Approximation (RMSEA; 0.05–0.10: acceptable fit; < 0.05 : very good fit), and Standardized Root Mean Square Residual (SRMR; 0.05 – 0.08: acceptable fit; < 0.05 : good fit) (Byrne, 2010; Hu & Bentler, 1999; Marôco, 2021). The incremental fit indices were the Comparative Fit Index (CFI), Normed Fit Index (NFI), Tucker–Lewis Index (TLI), and Incremental Fit Index (IFI); values of 0.90 – 0.95 highlight a good fit, and values above 0.95 indicate a very good fit (Byrne, 2010; Marôco, 2021). Lastly, the parsimony indices considered were the Parsimony Comparative Fit Index (PCFI) and Parsimony Normed Fit Index (PNFI) (0.60 – 0.80: acceptable fit; > 0.80 : good fit), and χ^2/df (≤ 5 : acceptable fit; ≤ 2 : good fit) (Byrne, 2010; Marôco, 2021).

Measurement model fit is related to validity and reliability. Validity was tested tripartitely: factor validity (standardized factor loadings greater than 0.50), convergent validity (Average Variance Extracted [AVE]; AVE values equal to or greater than 0.50), and discriminant validity (Fornell and Larcker's criterion; comparison between the squared correlation values and the AVE values) (Bagozzi & Yi, 1988; Fornell & Larcker, 1981; Marôco, 2021; Sharma, 1996). Reliability was examined through Cronbach's alpha (α) and Composite Reliability (CR). Both coefficients must present values equal to or greater than 0.70 ($\alpha \geq 0.70$; $CR \geq 0.70$) (Hair et al., 2013). This assessment was performed with the items that remained in the model after the previous fit phases (Fornell & Larcker, 1981).

The research hypotheses were examined through the sign and statistical significance ($p < 0.05$). To test the mediation effect, a bootstrap simulation was employed using 2,000 samples with a 90 % confidence interval, a procedure suggested by Marôco (2021). Considering that the literature has emphasized the need to present effect size measures to quantify the actual relationship between variables, effect size values for the direct effects were presented using Cohen's d s, based on the work of Lakens (2013). The effect size values obtained were classified according to Cohen's (1988) recommendations: $|d_s| \approx 0.20$: small, $|d_s| \approx 0.50$: medium, and $|d_s| \approx 0.80$: large. Lastly, an additional analysis was performed due to the methodological design: an analysis of the common method variance through Harman's single-factor test (Podsakoff et al., 2003).

Results

Descriptive and correlational analysis

Table 3 presents a descriptive, correlational, and reliability analysis of the latent constructs and their dimensions. Except for the PsyCap dimensions of optimism and resilience, the remaining latent constructs and dimensions obtained reliability values greater than 0.70.

Table 3
Descriptive, correlational, and reliability analysis (N = 1481)

Latent constructs and dimensions	M	DP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
1	2.88	1.07	(0.95)																						
2	2.97	1.01	0.37*	(0.95)																					
3	2.71	0.96	0.14*	0.14*	(0.88)																				
4	2.47	0.96	0.37*	0.13*	0.11*	(0.90)																			
5	2.76	0.95	0.36*	0.04*	0.04*	0.88*	(0.87)																		
6	3.80	0.73	0.46*	0.04*	0.04*	0.39*	0.44*	(0.90)																	
7	3.02	0.80	-0.17*	-0.18*	-0.23*	-0.23*	-0.20*	-0.36*	(0.82)																
8	3.52	0.80	-0.16*	-0.04*	-0.11*	-0.11*	-0.10*	-0.04*	0.57*	(0.83)															
9	2.59	0.85	-0.17*	-0.18*	-0.23*	-0.23*	-0.17*	-0.19*	0.08*	0.17*	(0.82)														
10	2.89	0.82	-0.17*	-0.18*	-0.23*	-0.23*	-0.17*	-0.19*	0.08*	0.17*	0.17*	(0.77)													
11	3.03	0.84	-0.16*	-0.16*	-0.20*	-0.20*	-0.16*	-0.16*	0.17*	0.16*	0.16*	0.16*	(0.82)												
12	4.17	0.95	0.37*	0.37*	0.28*	0.28*	0.20*	0.15*	-0.11*	-0.11*	-0.11*	-0.11*	-0.11*	(0.89)											
13	4.39	0.74	0.01	0.02	-0.02	-0.02	0.12*	0.10*	0.02	0.02	-0.08*	-0.11*	-0.09*	0.12*	(0.86)										
14	4.18	0.97	0.37*	0.37*	0.28*	0.28*	0.19*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	0.12*	0.12*	(0.86)									
15	4.13	0.88	0.37*	0.36*	0.36*	0.36*	0.09*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	0.12*	0.12*	0.12*	(0.86)								
16	4.07	0.80	0.37*	0.37*	0.37*	0.37*	0.04*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	0.12*	0.12*	0.12*	0.12*	(0.85)							
17	3.68	1.47	0.47*	0.42*	0.42*	0.42*	0.03*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	0.12*	0.12*	0.12*	0.12*	0.12*	(0.85)						
18	3.69	1.41	0.36*	0.37*	0.37*	0.37*	0.03*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	(0.85)					
19	3.81	1.34	0.20*	0.14*	0.14*	0.14*	0.17*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	(0.87)				
20	3.71	1.33	0.37*	0.36*	0.36*	0.36*	0.04*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	(0.86)			
21	4.71	1.20	0.37*	0.36*	0.36*	0.36*	0.07*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	-0.10*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*	(0.87)		
22	1.10	0.70	-0.30**	-0.11*	-0.11*	-0.11*	-0.11*	-0.11*	0.08*	0.08*	0.08*	0.08*	0.08*	-0.11*	-0.11*	-0.11*	-0.11*	-0.11*	-0.11*	-0.11*	-0.11*	-0.11*	-0.11*	(0.85)	

Note. 1 = Management commitment; 2 = Management priority; 3 = Organizational communication; 4 = Organizational participation; 5 = PSC latent construct; 6 = Well-being; 7 = Musculoskeletal disorders; 8 = Exhaustion; 9 = Voice changes; 10 = Cognitive problems; 11 = Teacher health; 12 = Optimism; 13 = Resilience; 14 = Efficacy; 15 = Hope; 16 = PsyCap; 17 = Vigor; 18 = Dedication; 19 = Absorption; 20 = Work engagement; 21 = Job satisfaction; 22 = Stress; M = mean value; DP = standard deviation value. On the diagonal are the Cronbach's alpha values. ** $p < 0.01$.

Overall model fit

Before this procedure, the skewness and kurtosis values were analyzed to observe whether the multivariate normal distribution assumption was respected. It was concluded that they respected the cut-off values defined. Therefore, the analysis was performed using the MLE method. The chi-squared goodness-of-fit test (χ^2) achieved a statistically significant p -value, contrary to the literature's definition. However, the χ^2 is sensitive to the sample size, so it is possible to obtain statistically significant values in samples with large sample sizes (Table 4).

Table 4
Model fit indices.

Fit indices	Obtained result	Comment
χ^2	4089.563***	NA
<i>Absolute</i>		
GFI	0.901	Good
RMSEA	0.036	Very good
90 % IC RMSEA	[0.035-0.038]	NA
SRMR	0.053	Acceptable
<i>Incremental</i>		
CFI	0.959	Very good
NFI	0.940	Good
TLI	0.956	Very good
IFI	0.959	Very good
<i>Parsimony</i>		
PCFI	0.892	Good
PNFI	0.874	Good
χ^2/df	2.961	Acceptable

Note. *df* = freedom degrees; NA
= Not applicable. *** $p < 0.001$

Measurement model fit

Some items were removed from the theoretical model, as they were undermining its psychometric quality. Table 5 presents the items that integrated the final model. Regarding factor validity, after removing the resilience dimension (PsyCap) because its items obtained factor loadings lower than 0.50, it can be stated that there was evidence of this type of validity. Evidence of convergent validity was also observed. Lastly, considering the reliability assessment, the results for Cronbach's alpha and Composite Reliability coefficients exceeded the threshold of 0.70.

Table 5 and 6 presents the results for discriminant validity; AVE values were higher than the squared correlation values.

Table 5
Factor validity, convergent Validity, and reliability evidence for organizational and health-related constructs

Dimensions and items	Std. factor loadings*	Alpha/CR	AVE
<i>PSC</i>		0.960/0.976	0.803
<i>Management commitment</i>		0.942/0.940	0.887
Item 1	0.935		
Item 2	0.949		
<i>Management priority</i>		0.945/0.946	0.854
Item 4	0.914		
Item 5	0.937		
Item 6	0.921		
<i>Organizational communication</i>		0.829/0.830	0.710
Item 7	0.857		
Item 9	0.828		
<i>Organizational participation</i>		0.903/0.904	0.758
Item 10	0.825		
Item 11	0.921		
Item 12	0.863		
<i>Teacher health</i>		0.919/0.964	0.573
<i>Musculoskeletal disorders</i>		0.816/0.818	0.536
Item 1	0.734		
Item 4	0.670		
Item 13	0.912		
Item 19	0.571		
<i>Well-being</i>		0.895/0.901	0.507
Item 3	0.617		
Item 5	0.655		
Item 9	0.677		
Item 10	0.845		
Item 12	0.683		
Item 14	0.770		
Item 17	0.802		
Item 18	0.755		
Item 20	0.559		
<i>Exhaustion</i>		0.885/0.888	0.725
Item 6	0.854		
Item 11	0.883		
Item 16	0.816		
<i>Voice changes</i>		0.819/0.817	0.690
Item 7	0.822		
Item 15	0.839		
<i>Cognitive problems</i>		0.741/0.753	0.605
Item 8	0.820		
Item 21	0.733		

Note. Alpha = Cronbach's alpha coefficient;
CR = Composite reliability coefficient; AVE
= Average Variance Extracted. * $p < 0.05$

Table 6
Factor validity, convergent validity, and reliability
evidence for psychological and job-related constructs

Dimensions and items	Std. factor loadings*	Alpha/CR	AVE
<i>PsyCap</i>		0.894/0.934	0.631
<i>Hope</i>		0.799/0.795	0.570
Item 1	0.584		
Item 2	0.857		
Item 3	0.797		
<i>Optimism</i>		0.782/0.790	0.654
Item 5	0.874		
Item 6	0.738		
<i>Efficacy</i>		0.799/0.862	0.676
Item 10	0.829		
Item 11	0.805		
Item 12	0.833		
<i>Work engagement</i>		0.953/0.975	0.868
<i>Vigor</i>		0.985/0.985	0.970
Item 1	0.985		
Item 2	0.985		
<i>Dedication</i>		0.948/0.948	0.901
Item 3	0.968		
Item 4	0.930		
<i>Absorption</i>		0.846/0.845	0.732
Item 6	0.916		
Item 9	0.791		
<i>Job satisfaction</i>		0.876/0.869	0.627
Item 2	0.878		
Item 3	0.768		
Item 5	0.840		
Item 7	0.664		
<i>Stress</i>		0.915/0.917	0.615
Item 1	0.753		
Item 2	0.709		
Item 3	0.809		
Item 4	0.868		
Item 5	0.865		
Item 6	0.735		
Item 7	0.732		

Note. Alpha = Cronbach's alpha coefficient;
CR = Composite reliability coefficient; AVE
= Average Variance Extracted. * $p < 0.05$

Table 7
Discriminant validity evidence.

Latent constructs	1	2	3	4	5	6
1. PSC	0.803					
2. Teacher health	0.167	0.573				
3. PsyCap	0.104	0.429	0.631			
4. Work engagement	0.167	0.527	0.429	0.868		
5. Job satisfaction	0.326	0.275	0.204	0.275	0.627	
6. Stress	0.108	0.213	0.249	0.213	0.164	0.615

Note. Bolded are the AVE values.

Common-method bias

After performing the EFA forced on one factor, it was found that the percentage of variance explained by the items was 36.695 %; thus, it can be concluded that the sample collected was not affected by common method variance.

Research hypotheses

Table 8 presents the research hypotheses and the effect size results. Nine of the eleven proposed research hypotheses were corroborated.

Table 8
Research hypotheses results.

Research hypotheses	Direct effect	Indirect effect	Total effect	Cohen's d_i
H1: PSC → Teacher health	0.516***		0.516	0.810
H2: PSC → PsyCap	0.209***		0.209	0.369
H3: PSC → Work engagement	0.100***		0.100	0.253
H4a: PSC → Teacher health → PsyCap	0.209***	0.260*** [0.220;0.304]***	0.469***	See H2
H4b: PSC → Teacher health → Work engagement	0.100***	0.386*** [0.350;0.419]***	0.486***	See H3
H5a: PsyCap → Job satisfaction	0.172***		0.172	0.217
H5b: PsyCap → Stress	-0.258***		-0.258	-0.346
H5c: Work engagement → Job satisfaction	-0.073		-0.073	-0.100
H5d: Work engagement → Stress	0.189***		0.189	0.265
H6a: PSC → Work engagement + PsyCap → Job satisfaction	0.452***	0.161*** [0.133; 0.190]***	0.613***	0.809
H6b: PSC → Work engagement + PsyCap → Stress	0.116***	-0.464*** [-0.516;-0.412]***	-0.348***	0.210

Note. *** $p < 0.001$

Discussion

The general objective of this study was to understand the mechanisms involved in the relationship between PSC and work outcomes (job satisfaction and stress), following the assumptions of the JD-R theory, in a sample of Portuguese basic and upper secondary school teachers. The JD-R theory has become widely recognized among researchers, as it proposes that workers' health and well-being arise from the balance between job resources and job demands (Schaufeli & Taris, 2014). Previous studies have suggested clear associations between job resources, job demands, and teachers' well-being (e.g., Collie & Martin, 2017; Skaalvik & Skaalvik, 2017, 2018).

The theoretical model proposed showed evidence of validity and reliability. However, it should be noted that one PsyCap dimension—resilience—had to be removed from the model

because it did not present adequate psychometric properties. Eleven research hypotheses were proposed, and nine of them were supported by the results. The significant relationships identified between PSC and job resources, PsyCap, and teacher health are consistent with foundational studies such as Dollard and Bakker (2010) and Idris et al. (2011), which highlight PSC's role in strengthening supportive work conditions and psychological capital.

Hypothesis one demonstrated that PSC was positively associated with teacher health (job resource), which aligns with the existing literature. As such, high PSC allows teachers to deal better with emotional demands (Dollard & Bakker, 2010), recover more easily from fatigue levels (Garrick et al., 2014), and reduce psychological health problems (Idris et al., 2011, 2012; Idris & Dollard, 2011; Law et al., 2011), leading to an improvement in their health. Dollard and McTernan (2011) confirmed that PSC reduces the effects of job demands and increases the impact of job resources at the workgroup level, thus reducing mental health problems and sickness absenteeism. Regarding H2, PSC was found to have a positive association with PsyCap. In a work environment with a high PSC, top management is expected to demonstrate commitment to preventing work-related stress and promoting the psychological health of workers, and communication systems are in place so that working conditions are known, and actions are taken to prevent or control psychosocial risks (Hall et al., 2010). This will positively influence PsyCap, as this concept is positively related to the perception of job resources (Grover et al., 2018). The results also confirmed hypothesis three: PSC was positively associated with work engagement. Different studies have shown that PSC, through job demands, leads to a decrease in psychological health problems and, in line with the motivational process of the JD-R theory, predicts an increase in work engagement through its positive relationship with job resources (Idris et al., 2011, 2012; Idris & Dollard, 2011; Law et al., 2011). Garrick et al. (2014) found in their research that work engagement increased

in teachers working in schools with high PSC compared to teachers working in schools with low PSC.

Hypothesis 4a was confirmed, i.e., teacher health partially mediated the relationship between PSC and PsyCap. This means that PSC and teacher health acted synergically to promote PsyCap. Brunetto et al. (2022) showed that workplaces with high PSC, e.g., in which effective occupational health and safety policies are implemented by top management, lead to increased PsyCap and ensure workers' well-being. As for hypothesis 4b, teacher health partially mediated the relationship between PSC and work engagement. PSC and teacher health congregated to promote work engagement, which aligns with the existing literature. In a study with Malaysian workers, Idris et al. (2011) showed that workers in organizations where top management is concerned about their health and provides them with the necessary resources have greater work engagement and, consequently, higher performance. Regarding hypotheses 5a and 5b, PsyCap established a positive relationship with job satisfaction and a negative relationship with stress; this agrees with past works on PsyCap (e.g., Newman et al., 2014) that underlined that this construct predicts (un)desirable job attitudes and behaviors. Hypothesis 5c, work engagement is positively related to job satisfaction, was not confirmed. This was an unexpected result since previous studies confirmed this association (Durán et al., 2005; Hallberg & Schaufeli, 2006; Schaufeli & Bakker, 2004a). Durán et al. (2005) demonstrated, in their research with Spanish teachers, that dedication, one of the three dimensions of work engagement, defined as the identification and involvement of individuals with their work, in which they feel important and valuable, translating into feelings of enthusiasm, inspiration, contributed most to the connection between work engagement and job satisfaction (Schaufeli et al., 2002). In this case, it can be mentioned that perhaps the teachers who participated in this research did not have high levels of dedication, hence the result obtained. As for hypothesis 5d, work engagement established a negative association with stress; it

was also not confirmed. This result is inconsistent with the literature, which associates high levels of work engagement with low levels of stress (Demerouti et al., 2001; Schaufeli & Bakker, 2004a). This could be related to the fact that the energy, dedication, and concentration that teachers put into their tasks can drain their resources and, in this way, increase the level of strain. For both hypothesis 5c and 5 d, possible explanations include contextual factors unique to the Portuguese educational system or specific sample characteristics affecting work engagement's impact, as suggested by localized research on teacher well-being (Amstad et al., 2020). Another reason could be measurement issues or timing of data collection, for example, post-pandemic work changes which may have altered typical engagement-outcome links.

The results also confirmed hypothesis 6a: work engagement and PsyCap partially mediated the relationship between PSC and job satisfaction. Work engagement, PSC, and PsyCap synergistically promoted job satisfaction, a desirable work-related outcome (Hall et al., 2013). Hypothesis 6b was also confirmed: work engagement and PsyCap partially mediated the relationship between PSC and stress. Regarding research hypothesis 6b, work engagement and PsyCap partially mediate the relationship between psychosocial safety climate and stress. Work engagement, PSC, and PsyCap act to decrease the incidence of undesirable work-related outcomes, such as stress. However, one aspect that must be highlighted in the direct effect of PSC on stress is that these variables established a positive association. This aspect may mean that the measures adopted by school establishments to reduce the impact of the COVID-19 pandemic were very demanding on teachers, resulting in increased stress.

Theoretical-practical implications

In practical terms, these findings highlight the importance of designing interventions that promote teachers' health and well-being. Strategies to strengthen PSC may include

workplace physical activity programs, coaching and mentoring, mental health first-aid training, resilience-building initiatives, routine well-being check-ups, and opportunities for teacher participation in decision-making (Becher & Dollard, 2016). At the policy level, educational authorities should prioritize stress-prevention and stress-management programs, vocal health training for professional voice use, and well-being promotion initiatives tailored to different stages of teachers' careers (Borralho et al., 2020).

Regarding PsyCap, fostering a school culture that supports work commitment can enhance teacher well-being and strengthen team motivation (Gruman & Saks, 2011). Research shows that promoting hope, helping teachers identify alternative paths to reach their goals, and reinforcing positive expectations can increase proactive adaptation and strengthen a sense of efficacy and security at work (Lopes & Cunha, 2008). PsyCap can also be developed through brief, targeted interventions delivered in classroom, outdoor, or digital formats (Avey et al., 2010; Luthans et al., 2010). In addition, work engagement may be improved by assessing well-being, strengthening individual resources, optimizing person-organization fit (Bakker et al., 2012), redesigning jobs to enhance meaning and variety, and ensuring rigorous recruitment practices to foster engagement from the onset of employment (Christian et al., 2011).

This study, conducted during the COVID-19 pandemic and with participants from an occupation that presents chronic ill-being levels, e.g., teachers, demonstrated the importance of PSC in promoting health, individual resources (e.g., PsyCap), and motivated behaviors (e.g., work engagement). Furthermore, with PsyCap and work engagement, PSC promoted desirable work-related outcomes (e.g., job satisfaction) and mitigated the detrimental effect of undesirable work-related outcomes (e.g., stress). Thus, theoretically, the importance of PSC as an organizational-level construct, composed of management (communication, priority, and commitment) and organizational (participation) dimensions, being responsible for promoting

psychological health and safety directly and indirectly, is highlighted.

Teacher well-being encompasses multiple interrelated dimensions such as physical and mental health, job satisfaction, work engagement, and stress levels (Skaalvik & Skaalvik, 2018). Recent research on teacher occupational health emphasized this multidimensionality, highlighting that well-being outcomes result from complex interactions between personal resources and organizational contexts (Collie & Martin, 2017). This holistic view situates PSC as a foundational factor that influences not just isolated outcomes but the broader, integrated experience of health and work engagement among educators.

PSC fosters an organizational environment where safety, respect, and psychological support are prioritized – conditions essential for sustaining teacher motivation and reducing the risk of burnout (Idris et al., 2011). Studies show that positive PSC climates encourage open communication, trust in management, and active coping strategies, which enhance teacher resilience and PsyCap (Amstad et al., 2020; Garrick et al., 2014). This upstream climate thus act as a key enabler for favorable health, work engagement, and satisfaction outcomes in educational work environments. The practical operationalization of PSC in schools can involve leadership training to prioritize psychological health, the development of stress management policies, and mechanisms that foster employee voice and autonomy (Day & Gu, 2020). School cultures supportive of PSC may implement routine climate assessments to identify psychosocial risks and tailor wellbeing interventions accordingly. These approaches align with evidence supporting PSC-based interventions' efficacy in reducing absenteeism and improving teaching quality and job satisfaction (Dollard & Bakker, 2010).

This study extends the application of PSC theory from traditional industrial or healthcare contexts to education, reaffirming the value of climate approaches in diverse sectors. It underscores the need for multidimensional, multilevel frameworks in PSC research to

capture sector-specific challenges and resources (Garrick et al., 2014). Theoretically, it advocates for integrating PSC perspectives more deeply into JD-R and teacher well-being models to better support tailored interventions and policy development.

Limitations and suggestions for future studies

The present study has some limitations. The first limitation to consider is related to the fact that the self-report measures were used as the only source of information. The second limitation concerns the methodological design used, which was cross-sectional since the data was collected only once in time; this design does not allow for the observation of cause-effect relationships. The third limitation to be considered concerns the elimination of PsyCap dimensions, which should be seen as a limitation despite already occurring in previous studies (López-Núñez et al., 2018; Viseu et al., 2020). Adopting a longitudinal methodological design is recommended for future studies, as it is more robust and allows the observation of cause-effect relationships. Furthermore, a longitudinal design decreases the probability of common-method variance (Schaller et al., 2014).

Conclusions

This cross-sectional study, with a sample of 1481 primary and upper-secondary level Portuguese teachers, sought to understand how perceived PSC is related to teachers' health and how teachers' health is directly related to job satisfaction and stress and indirectly through PsyCap and work engagement. The results obtained demonstrated that PSC is positively related to teachers' health, PsyCap and work engagement; teacher health mediates the relationship between PSC and PsyCap and between PsyCap and work engagement; and that work engagement and PsyCap mediated the relationship between PSC and work-related outcomes (job satisfaction and stress). Based

on these results, the importance of promoting workers' psychological health and safety was highlighted, based on an organizational-level construct such as the PSC and concepts with an individual nature, such as PsyCap and work engagement.

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Notes

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