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ROLE OF RESOURCES IN DETERMINING BURNOUT, ENGAGEMENT, AND MENTAL HEALTH AMONG DOCTORAL STUDENTS IN INDIA: A CONSERVATION OF RESOURCES PERSPECTIVE

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ABSTRACT

Aim/Purpose	This study examines the combined impact of contextual and personal resources on mitigating mental health problems in doctoral education.
Background	As global concern about the mental health of doctoral students continues to intensify, higher education institutions need to identify support mechanisms. These mental health challenges can also have broader academic consequences, including reduced research productivity, increased program attrition, and delayed doctoral completion. Grounded in the Conservation of Resources (COR) theory, this study highlights the importance of accumulating, protecting, and utilizing resources to mitigate burnout and promote overall wellbeing.
Methodology	The present study employed a cross-sectional survey of 365 doctoral students in the social sciences across four types of universities in India. A parallel mediation analysis was conducted to assess the roles of engagement and burnout in the association between resources and mental health problems.
Contribution	The results of the study advance the assumptions of COR theory by suggesting that contextual and personal resources initiate resource gain, which triggers the accumulation of subsequent resources and leads to engagement. The loss of resources due to intensive academic demands prompts burnout and causes mental health problems.

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Findings	The study found that contextual resources, such as institutional support, supervisory guidance, social support, and personal resources, such as intrinsic motivation and self-efficacy, were negatively associated with mental health problems. This effect occurred through reduced burnout and enhanced engagement, highlighting the multifaceted role of resources in doctoral programs.
Recommendations for Practitioners	Higher education institutions should foster supportive supervisory practices, inclusive institutional policies, and peer networks while also equipping students with skills to build and sustain personal resources. The findings offer a resource-based framework for developing targeted doctoral support practices that address both burnout prevention and engagement enhancement.
Recommendations for Researchers	Future research should explore longitudinal designs to capture dynamic changes in resource acquisition and mental health over time, and investigate additional personal resources, such as resilience and adaptability, across diverse cultural and disciplinary contexts.
Impact on Society	By identifying effective ways to buffer mental health challenges, the study contributes to creating healthier doctoral ecosystems, ultimately supporting the development of more resilient researchers and future academics.
Future Research	Future studies could employ longitudinal or experimental methodologies to test causal relationships, explore cross-country comparisons, and evaluate targeted interventions that enhance resource provision and utilization among doctoral students.

Keywords	mental health problems, PhD, doctoral education, Conservation of Resources theory, resources

INTRODUCTION

General Background

Mental health is a state of psychological wellbeing that enables individuals to manage stress, work effectively, and pursue personal growth. In the context of doctoral education, the term "mental health problems" serves as a multidimensional construct that captures psychological distress, ranging from strain and anxiety to depressive symptoms, burnout, and emotional exhaustion among doctoral students. Mental health concerns are receiving increasing attention, as doctoral programs are increasingly viewed as highly demanding and resource-intensive environments (Kulikowski et al., 2019). Prior studies reported that doctoral students experience moderate-to-severe anxiety and an almost six times greater prevalence of depression than the general population does (Hazell et al., 2020; Levecque et al., 2017). Approximately one-quarter experience mild to severe anxiety, and approximately one-third exhibit depressive symptoms and suicidal ideation (Estupina et al., 2024; Levecque et al., 2017). Extended studies across countries have revealed variations in anxiety, depression, and burnout among doctoral students. Indeed, 40% of the doctoral students from Brazil experience burnout (Mayer et al., 2016), and approximately 19% and 34% in France exhibit at least mild anxiety and depressive symptoms, respectively (Ahalli et al., 2022). Similarly, a substantial number of Indian doctoral students demonstrated depressive symptoms, ranging between 41.7% mild and 17.9% moderate (LT et al., 2022), 20% students confirmed extremely severe anxiety problems (Sunny et al., 2019).

Mental health problems were associated with adverse academic outcomes, including reduced research focus and research productivity, a decline in the quality of academic output, higher attrition rates, and extended time to complete the course (Levecque et al., 2017). These challenges also have long-term effects on doctoral students' psychological and cognitive wellbeing, including their creative thinking,

motivation, mental health, and continued engagement in their journeys (Asrifan et al., 2025; FitzPatrick et al., 2025). These mental health problems subsequently arise because of an increase in doctoral program demands and inadequate resources (Kulikowski et al., 2019). Doctoral program demands include ineffective supervision, pressure to publish in high-ranking journals, academic pressure, unclear program structures, teaching and administrative workloads, institutional environment, work-home conflict, and uncertain career paths (Byrom et al., 2022; Solms et al., 2025; Waaijer et al., 2018). Similar factors, including insufficient mentorship, lengthy thesis evaluation procedures, inadequate supervisory practices, limited access to resources, reduced motivation, minimal peer engagement, financial instability, and psychological health outcomes, have been reported in India (Parveen et al., 2025). To meet competitive rankings in the global market, reducing academic demands in the program is inevitable; instead, institutions can focus on strengthening resources through actionable strategies to safeguard students' mental health.

Resources strengthen the long-term capacity building of doctoral students, extending beyond situational support or an immediate solution to demands (Sufyan & Ali Ghouri, 2020). Resources comprise multiple components that enhance individuals' ability to achieve their goals, reduce burnout, and increase wellbeing (Hobfoll et al., 2018). Doctoral programs are resource-intensive, encompassing peer support, transparency in institutional governance, supervisor mentoring, motivation, psychological capital, and the emotional stability of doctoral students (Solms et al., 2025). Contextual and personal resources significantly affect the mental health of doctoral students throughout their journeys (Solms et al., 2025).

Problem statement

External support accessible to doctoral students is considered a contextual resource that helps doctoral scholars manage academic and research-related demands (Ayoobzadeh, 2023; Caesens et al., 2014). Conversely, personal resources represent individual-level psychological strengths that help scholars sustain perseverance, engagement, and resilience during the doctoral journey (Ganesh et al., 2024; Hazell et al., 2021). Such personal resources equip doctoral students to manage academic, research, and emotional demands (Ganesh et al., 2024).

The experiences of doctoral students are driven by the combined effects of personal and contextual resources (Sverdlik et al., 2018). A lack of contextual resources can undermine the protective effects of personal resources, thereby contributing to student burnout. Additionally, the supportive environment fails to promote doctoral student engagement in personal resource-constrained settings (Nori et al., 2025). Nevertheless, the literature has examined the impact of personal and contextual resources in isolation rather than considering their interdependence within a comprehensive framework. Empirical research that collectively investigated the influence of both contextual and personal resources on mental health problems among doctoral students is missing in the literature (Kulikowski et al., 2019; Nori et al., 2025).

Grounded on the Conservation of Resources (COR) theory, when an individual strengthens existing resources or acquires new ones, they experience resource gains. They perceive a loss of resources when their existing resources are being drained (Hobfoll et al., 2018). The resource-gain process contributes to engagement, whereas resource loss leads to burnout. Prior studies recommended empirically validating the mechanisms underlying burnout and engagement rather than solely investigating the direct association between resources and mental health problems (Byrom et al., 2022; Zhang et al., 2022). Building on the assumptions of COR theory, the present study proposed an integrated, resource-based model to understand mental health among doctoral students in India. In particular, the study examines the pathways through which contextual and personal resources affect mental health outcomes, with burnout (resource loss) and engagement (resource gain) acting as mediators. Based on the literature, the research question is: "To what extent do personal and contextual resources in doctoral programs influence mental health problems through engagement and burnout processes?"

The remainder of the paper reviews the theoretical foundations and develops the hypotheses, followed by the methodology and results. The subsequent sections discuss the findings, practical implications, limitations, and conclusions.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

CHALLENGES EXPERIENCED BY DOCTORAL STUDENTS

Doctoral students experience multiple academic and psychosocial challenges, including demanding research workloads, publication pressure, inadequate supervision, limited institutional and peer support, financial constraints, and uncertain career prospects. These challenges can deplete available resources, contributing to burnout and mental health problems, whereas access to supportive contextual and personal resources may facilitate engagement and protect mental health. Accordingly, examining the roles of contextual and personal resources provides a basis for understanding their direct and indirect associations with doctoral students' mental health.

CONSERVATION OF RESOURCES THEORY

Conservation of Resources (COR) theory proposes that individuals seek to acquire, preserve, and protect resources that support their ability to manage demands (Hobfoll et al., 2018). Resource gain occurs when existing resources facilitate the acquisition or strengthening of additional resources, whereas resource loss occurs when demands threaten or deplete available resources. In doctoral education, institutional, supervisory, peer, and family support constitute contextual resources, whereas intrinsic motivation and self-efficacy constitute personal resources. The present study interprets engagement as a resource-gain process through which available resources are sustained and mobilized, whereas burnout reflects a resource-loss process resulting from continued resource depletion. Accordingly, COR theory is deployed in this study to explain how contextual and personal resources are associated with doctoral students' mental health through the contrasting pathways of enhanced engagement and reduced burnout.

ROLE OF CONTEXTUAL RESOURCES

Contextual resources are supporting mechanisms available in a particular setting and can serve various purposes to accomplish a specific objective. In doctoral education, contextual resources conceptualized as higher-order resource constructs based on the COR theory include support from institutions, supervisors, peers, and family (Ayoobzadeh, 2023; Cao et al., 2024). From a COR perspective, these forms of support constitute external resource reservoirs that help doctoral students preserve existing resources and limit resource depletion when managing academic demands. Facilitating a learning environment, access to academic databases, well-defined program structures, and training sessions aimed at enhancing research methodology constitute key institutional resources. (Li et al., 2022). Institutions can also protect students from resource depletion by providing sufficient scholarship assistance and mental health services (Skopek et al., 2022). Institutional counseling services are more acceptable when counsellors demonstrate empathy, understanding, and awareness among students. Barriers such as long waiting times, limited counseling sessions, and a lack of doctor-specific support reduce the effectiveness and utilization of counseling services, contributing to burnout (Ghaffar et al., 2025).

Supervisory support strengthens the doctoral experience through constructive feedback, emotional mentorship, opportunities to collaborate with experts, and persistent guidance (Bearman et al., 2024). High-quality supervision, consistency of supervision, length of supervisory experience, supervisory workload, and interactions help doctoral students manage their academic stress throughout their journeys (Tikkanen et al., 2025). When students perceive strong supervision and support from the research community, they exhibit greater motivation, confidence, and psychological security in their research activities (Ronkkonen et al., 2024). Contextual resources may also facilitate the development of personal resources. For instance, constructive supervisory feedback and consistent guidance can

strengthen doctoral students' confidence in conducting research tasks, thereby supporting research self-efficacy. In contrast, supportive research environments may help sustain intrinsic motivation.

Among management doctoral students, social support from friends and peers is negatively correlated with psychological distress symptoms (Park et al., 2021). Peer support networks nurture a sense of belongingness and emotional companionship, contributing to resource preservation and leading to high levels of autonomous motivation and opportunities for collaboration (Ayoobzadeh, 2023). Family resources, such as financial aid, emotional support, and the ability to share routine household responsibilities, can encourage doctoral students and provide a safety net that reduces their mental health burden (Cao et al., 2024). Positive relationships with parents, congenial family and friends environment are the protective resources against depression, anxiety, and stress among Indian doctoral students (Sunny et al., 2019). Supervisory support, financial security, and peer collaboration substantially reduce burnout and enhance engagement, whereas inadequate peer support fosters anxiety and disengagement among Indian doctoral students (Parveen et al., 2025). Thus, contextual resources not only provide external support but may also strengthen personal resources by fostering confidence, motivation, and the capacity to manage the demands of doctoral study. Hence, this study posits that contextual resources play a protective role in mitigating mental health problems.

H1: Contextual resources are negatively associated with mental health problems.

H1a: Contextual resources are positively associated with engagement.

H1b: Contextual resources are negatively associated with burnout.

H1c: Engagement is negatively associated with mental health problems.

These challenges suggest that access to contextual resources may protect doctoral students from resource depletion while supporting engagement and mental health.

Role of Personal Resources

Personal resources facilitate individuals' ability to manage academic challenges and maintain mental health. In a doctoral context, personal resources include self-care practices, intrinsic motivation, resilience, research efficiency, the fulfillment of psychological needs, harmonious passion, grit, and psychological capital (Ganesh et al., 2024; Hazell et al., 2021). These resources represent individual psychological capacities that help doctoral students manage academic challenges and maintain wellbeing. Intrinsic motivation and self-efficacy are key personal resources conceptualized as dimensions of the higher-order construct of personal resources (Guo et al., 2024; Litalien et al., 2015; Matheka et al., 2020). Intrinsically motivated doctoral students engage in programs driven by curiosity in discovering new associations and a desire to acquire knowledge (Ganesh et al., 2024). High-level intrinsic motivation is associated with greater academic competence and a lower inclination toward burnout (Shin et al., 2022; X.-C. Wang et al., 2024). Intrinsic motivation is typically more prevalent during the coursework phase than during the preliminary or thesis writing phase (Sin et al., 2021; Sverdlik et al., 2018). Doctoral students demonstrate greater intrinsic motivation when their basic psychological needs are satisfied. This internal drive results in engagement as well as wellbeing (Litalien et al., 2015; Matheka et al., 2020).

Self-efficacy is operationalized as the successful execution of a given task by individuals who believe in their own capacity to perform it (Bandura, 1997). Self-efficacy is among the key internal resources that help individuals complete the program demands of a doctoral program (Haider & Dasti, 2022). In STEM disciplines, academic self-efficacy positively affects doctoral students' performance (Litson et al., 2021). High self-efficacy enhances psychological wellbeing and leads to research outcomes that more effectively mitigate stress and emotional exhaustion (Haider & Dasti, 2022; Liu et al., 2019). When doctoral students encounter challenges in their studies, self-efficacy acts as a mediator, enhancing academic performance (Guo et al., 2024). Academic self-efficacy significantly mitigates burnout among doctoral students by mediating the effects of intrinsic motivation and engagement (X.-C.

Wang et al., 2024). Although prior studies have independently established the substantial roles of intrinsic motivation and self-efficacy as personal resources (Matheka et al., 2020), they have not examined their interactive effects on mental health problems. Considering this association, the following hypotheses are proposed:

H2: Personal resources are negatively associated with mental health problems.

H2a: Personal resources are positively associated with engagement.

H2b: Personal resources are negatively associated with burnout.

H2c: Burnout is positively associated with mental health problems.

Mediating Role of Engagement and Burnout

According to COR theory, engagement serves as a resource-gain mediator, and burnout as a resource-loss mediator. Within the proposed model, contextual and personal resources represent the resources available to doctoral students for managing academic and research demands. When these resources are preserved or strengthened, they facilitate a resource-gain pathway reflected in greater engagement. Conversely, when doctoral demands progressively consume available resources, a resource-loss pathway may emerge through burnout. Engagement and burnout, therefore, represent contrasting mechanisms by which COR theory links resource availability to mental health problems.

When individuals accumulate and manage both contextual and personal resources, they gain resources that, in turn, further strengthen wellbeing (Hobfoll et al., 2018). The presence and accumulation of resources, particularly self-efficacy and intrinsic motivation, promote research engagement, whereas perceived supervisory threat, inadequate peer support, and a lack of institutional research infrastructure increase burnout (Matheka et al., 2020).

Within the doctoral context, burnout reflects emotional exhaustion arising from sustained academic demands and resource depletion (Bakker & Demerouti, 2017). Engagement is defined as a pleasurable, rewarding, emotion-driven motivational state of mind linked to work that enhances motivation and overall mental health. It addresses the degree to which a doctoral student is fully committed to their study, has a strong passion for their work, and is fully engaged in the journey (Byrom et al., 2022; Jackman et al., 2022). Excessive study demands and insufficient resources contribute to academic burnout, which in turn leads to poor mental health outcomes (Lesener et al., 2020). Contextual and personal resources enhance engagement (Mazzetti et al., 2023). Personal resources such as self-efficacy, resilience, and hope enhance individuals' ability to remain motivated despite academic challenges (Asheghi et al., 2026).

Students who reported greater levels of engagement reported greater satisfaction with their studies, reduced dropout intentions, and better study progress. Burnout is associated with academic strain and an increased risk of dropout among South African and Finnish doctoral students, highlighting the role of contextual doctoral environments in shaping wellbeing (Pyhältö et al., 2023). Engagement often mediates the association between personal resources and burnout or wellbeing outcomes (J. Wang et al., 2021). Robins et al. (2015) reported that higher study demands increase burnout, whereas study resources promote engagement among health profession students. Psychological flexibility, as a personal resource, significantly mediates the relationship between doctoral program demands and resources and mental health. The study results underscore the significance of both contextual and personal resources in preventing burnout and enhancing student engagement. These contrasting resource-gain and resource-loss processes provide the theoretical basis for examining engagement and burnout as parallel mediating mechanisms. Within the COR framework, contextual and personal resources are interpreted as interconnected resource domains that can protect against resource depletion and facilitate further resource accumulation. Thus, the proposed model integrates COR theory by positioning engagement as a resource-gain pathway and burnout as a resource-loss pathway linking available resources with doctoral students' mental health problems. Accordingly, the study posits parallel mediation (Figure 1).

H3a: Engagement mediates the relationship between contextual resources and mental health problems.

H3b: Burnout mediates the relationship between contextual resources and mental health problems.

H4a: Engagement mediates the relationship between personal resources and mental health problems.

H4b: Burnout mediates the relationship between personal resources and mental health problems.

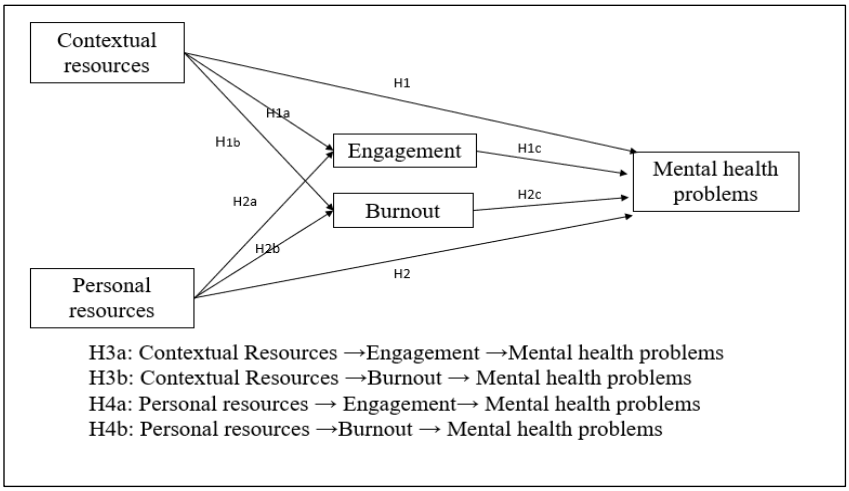


Figure 1. Conceptual framework

METHOD

DOCTORAL PROGRAMS IN INDIA

Doctoral programs are offered at any of the four types of universities in India: central, state, private, or deemed-to-be universities. Each of these universities is characterized by substantial structural diversity in financial support, course completion time, rigor of coursework, research publication requirements, and administrative and teaching workloads (Jayaram, 2023). The number of stipends and the length of the financial research scholarship period can vary widely across universities. Central universities often offer fully funded doctoral programs with a maximum of five years of research assistance that cover tuition fees and stipends, and provide contingent funds for conference and research workshop participation. Other institutions may not provide extensive scholarships that cover students' cost of living, requiring them to secure their own financial support (Jayaram, 2023).

The duration for completing a doctoral program in India ranges from a minimum of three years, including coursework, to a maximum of six years from the date of admission (University Grants Commission [UGC], 2022). This tenure is extended because of various factors, including the need for extensive coursework, the administrative process, and inadequate supervisory support. The extensive, structured, and compulsory coursework is offered at central and deemed-to-be universities, whereas state and private universities provide non-residential programs with varying levels of coursework requirements. Central and deemed-to-be universities stipulate that students publish their research findings in top-indexed journals, whereas other universities are less rigid regarding academic publication when submitting theses (Jayaram, 2023). This program's variation may further shape mental health experiences.

PROCEDURE AND SAMPLE

The study employed a four-stage approach to select full-time doctoral students from universities. In the first stage, stratified sampling was used to select an equal number of universities from each statutory classification, such as private, central, state, and deemed-to-be universities. In the second stage, the study was restricted to institutions affiliated with these four universities that are ranked among the top 100 by the National Assessment and Accreditation Council. These top institutions are widely recognized for their ability to develop structured doctoral programs and maintain higher academic standards (Jayaram, 2023). In the third stage, students from the selected top social science institutions were considered. The social science discipline includes management, commerce, psychology, and education, according to the Organization for Economic Co-operation and Development (OECD) guidelines. Social science doctoral students were selected because their doctoral experience may involve limited research funding, relatively independent research practices, and reduced access to dedicated mentorship and research communities. These conditions make this group particularly relevant for examining how contextual and personal resources are associated with burnout, engagement, and mental health problems (Zhu, 2025). Finally, a simple random sampling technique was applied to ensure that individual doctoral students from the selected institutions had an equal opportunity to be selected (Figure 2).

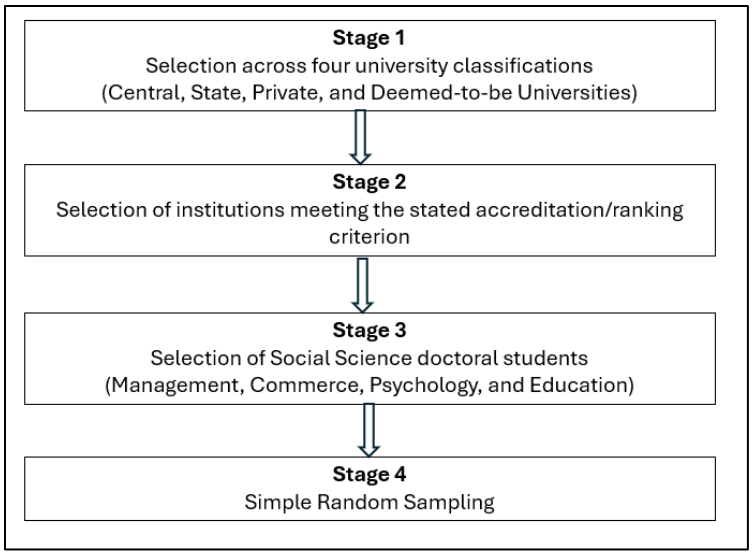


Figure 2. Four-stage sample selection process

The study adhered to ethical standards that safeguard volunteer participation, and written informed consent was obtained during data collection. The study was conducted at a private deemed-to-be university in Karnataka, India. In the survey, students were provided with details about the study's objectives and purpose and given the option to withdraw at any point if they experienced psychological discomfort. Additionally, all the responses remained anonymous and were not disclosed to institutional authorities, thereby safeguarding confidentiality. The demographic data of the participants, including gender, discipline, age, doctoral program phase, and type of university, were collected because these factors are closely associated with resource availability and experience. The questionnaire was administered online to eligible doctoral students.

Participants were provided with information about the study purpose, voluntary participation, confidentiality, and instructions for completing the questionnaire before accessing the survey items. The instrument included demographic questions followed by the validated scales measuring contextual resources, personal resources, engagement, burnout, and mental health problems. The survey included two sections: (1) demographic information, and (2) validated scales measuring contextual and personal resources, burnout, engagement, and mental health problems. All questionnaires were set as

mandatory, thereby minimizing missing responses. Owing to the availability of contact information, data could ultimately be collected from 47 institutions, with questionnaires distributed to up to 1600 doctoral students. A total of 386 students participated, for a response rate of 24%. Once ineligible responses were removed, a final sample of 365 doctoral students was included in the analysis. Participants who did not satisfy the predefined four-stage selection criteria were classified as ineligible, and their responses were excluded from the final analysis. The demographic information of the sample is given in Table 1. While this approach ensured the inclusion of institutions meeting established quality benchmarks, restricting the sample to the top 100 institutions may introduce selection bias and limit the generalizability of the findings to doctoral students from institutions with different levels of resources, infrastructure, and institutional support.

Table 1. Demographic characteristics

Number of participants		**365**
Gender	Female	192
	Male	173
Discipline under Social science	Management	166
	Education	98
	Commerce	57
	Psychology	44
Age range	21-25	77
	26-30	98
	31-35	144
	36-40	46
Phases of doctoral education	Enrolment	53
	Registration	77
	Synopsis submission	55
	Thesis submission	98
	Viva-voce examination	82

MEASURES

The study used a standard measurement scale suitable for a doctoral context. Here, contextual and personal resources, burnout, and engagement are assessed on a 5-point Likert scale, except for mental health problems, which are measured on a 4-point Likert scale. Table 2 summarizes the measurement scales, number of items, sources, and response formats used in this study.

Table 2. Measurement scale used for the study

Measures	SU scale	No. of items	Scale and author	Response scale
Contextual resources	Supervisor	4	Perceived Supervisor Support (PSS) (Eisenberger et al., 2002)	5-point Likert scale
	Institution	4	Perceived Organizational Support (POS) (Shanock & Eisenberger, 2006)	
	Peers and family	4	Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1988)	
Personal resources	Autonomous motivation	6	Motivation for PhD studies scale (Litalien et al., 2015)	5-point Likert scale
	Research self-efficacy	9	Research self-efficacy (Holden et al., 1999)	
Engagement	Vigor	6	Utrecht Work Engagement Scale (UWES)	5-point Likert scale
	Absorption			
Burnout	Emotional Exhaustion (EE)	6	Maslach Burnout Inventory (MBI) (Maslach & Jackson, 1981)	5-point Likert scale
Mental health problems	Social dysfunction	8	General Health Questionnaire (GHQ) (Goldberg & Hillier, 1979)	4-point Likert scale 0 (less than usual) to 4 (much more than usual
	Anxiety/ depression			

Contextual resources

This is a multidimensional concept. In the context of doctoral study, it is categorized into supervisor, institution, peers, and family (Pyhältö et al., 2017). Hence, the researcher would rather elaborate on three scales for defining contextual resources. The short form of the Perceived Organizational Support (POS) scale, consisting of 4 items, was developed by Shanock and Eisenberger (2006) and used. The following is a sample item: "The institution strongly considers my goals and values." As with POS, Eisenberger et al. (2002) developed Perceived Supervisor Support (PSS) by replacing the term "organization" with "supervisor." The study considered these 4 items with $\alpha = 0.92$. Sample item: "My supervisor cares about my opinions." The Multidimensional Perceived Social Support (MPSS) scale, developed by Zimet et al. (1988), was used to measure perceived social support in the context of doctoral education. This scale includes subscales for family and friends/peer support, each consisting of 4 items measuring the social support in the doctoral context. Sample items include "I get the emotional help & support I need from my family."

Personal resources

The 'motivation for PhD studies' scale designed by Litalien et al. (2015), which measures the intrinsic motivation of PhD students, was employed in this study. In the current study, the researcher adopted

autonomous motivation, using 6 items from this motivation scale (α = 0.91). Research self-efficacy has been described more precisely as "one's confidence in successfully performing tasks associated with conducting research." The 9-item scale validated by Holden et al. (1999) was adopted to measure academics' confidence. One of the items is "Formulate a clear research question/testable hypothesis."

Engagement

To assess engagement, the researcher used the Utrecht Work Engagement Scale (UWES), a second-order construct of vigor and absorption, each of which comprises 6 items. One of the sample items is "I feel bursting with energy when I am working on my PhD."

Burnout

The Maslach Burnout Inventory (MBI), developed by Maslach and Jackson (1981), was used to measure burnout levels. Here, the MBI-SS (student survey) scale, with an emotional exhaustion (EE) second-order dimension of 6 items measuring burnout, was used. A minor contextual modification was made by replacing the term 'studies' with 'PhD' to make the items directly relevant to the doctoral education context. The modification was restricted to contextual terminology and was intended to preserve the original meaning and underlying construct measured by the scale. One of the items is "feeling of being overextended and exhausted by the emotional demands of one's work."

Mental health problems

A two-factor model of the General Health Questionnaire (GHQ), validated by the World Health Organization (WHO) for assessing mental health problems, was adopted in this study. Developed by Goldberg and Hillier (1979), the model comprises two factors: "social dysfunction" and "anxiety/depression". Items are measured on a four-point scale ranging from 0 (less than usual) to 4 (much more than usual). Here, the four items are positively toned, and the other four are negatively toned. The items were "I am feeling unhappy or depressed" for "Anxiety/Depression."

Control Variables

The effects of gender, age, doctoral discipline, year of participation in the doctoral phase, and type of university were considered control variables that influence the study and mental health problems (Litson et al., 2021). To understand the association in the presence and absence of the control variable, the study adopted the approach of Bernerth et al. (2018).

Data Analysis

Parallel mediation analysis was conducted using covariance-based SEM in AMOS to estimate the direct and indirect effects of contextual and personal resources on mental health problems through engagement and burnout. The significance of indirect effects was evaluated using 5,000 bootstrap samples with 95% confidence intervals. Confirmatory Factor Analysis (CFA) was performed using AMOS to assess the measurement model. Reliability, convergent validity, discriminant validity, and model fit indices were assessed to validate the measurement model prior to testing the structural model. The convergent validity and internal consistency of the scales were measured using Cronbach's alpha (α), average variance extracted (AVE), and composite reliability (CR) (Hair et al., 2019). The Fornell–Larcker criterion was used to evaluate discriminant validity. The proposed hypotheses and direct effects were tested using structural equation modeling in SPSS AMOS, which assesses both measurement and structural models. SEM was suitable because the study involved multiple latent constructs and tested direct and indirect associations among the variables.

RESULT

PRELIMINARY RESULTS

Measurement models were tested to assess how well the observed variables reflected the inherent latent constructs. While the four-factor model included contextual and personal resources as one element, the three-factor model combined two resources and job engagement, and the two-factor model combined two resources and engagement and burnout. The findings suggested that, among all the models, the five-factor model fit the data best ($\chi 2 = 412.35$, df = 360, CFI = 0.90, RMSEA = 0.08, TLI = 0.92).

Composite scores were generated for each variable and treated as observed variables in subsequent analyses. Table 3 presents descriptive statistics, and the results of the Cronbach's alpha (α), AVE, and CR tests above the threshold values (α >0.77; AVE >0.5; CR >0.8) confirm convergent validity, whereas each construct's AVE square root is greater than the correlation coefficients with the other factors, confirming the discriminant validity of the scale items. The obtained values satisfy the recommended threshold levels, supporting the psychometric appropriateness of the adopted international measurement scales in the Indian doctoral education context. As contextual resources and personal resources are modeled as higher-order constructs, CFA indicated that the first-order dimensions of both resources loaded satisfactorily onto their respective second-order constructs, thereby supporting the adequacy of the higher-order measurement structure. Since the single component accounted for only 25.28% of the variance, Harman's single-factor test indicated limited common-method bias.

Table 3. Descriptive statistics, internal consistency indices and bivariate correlations of the variables

Variable	Mean	SD	α	CR	AVE	1	2	3	4	5
Contextual resources	2.74	0.53	0.830	0.90	0.49					
Personal resources	3.00	1.26	0.805	0.94	0.75	0.475***	*0.69*			
Engagement	3.31	0.95	0.88	0.89	0.46	0.453**	0.533***	*0.86*		
Burnout	2.98	0.87	0.849	0.91	0.55	−0.277***	−0.139**	-0.250***	*0.67*	
Mental health problems	2.01	0.46	0.775	0.86	0.65	−0.379***	−0.292***	-0.302***	0.534***	*0.74*

Note. N = 365; ** p < .01; *** p < .001

DESCRIPTIVE ANALYSES

Contextual resources were positively correlated with personal (r = 0.475) and engagement (r = 0.453). Similarly, contextual resources were negatively correlated with burnout (r = -0.277) and mental health problems (r = -0.379). Similarly, personal resources were positively associated with engagement (r = 0.533) and negatively associated with burnout (r = -0.139) and mental health problems (r = -0.292). Engagement and burnout are inversely correlated (r = -0.250), and burnout is directly associated with mental health problems (r = 0.534).

This study confirmed the significance of burnout and mental health problems at various phases of the doctoral process. The present study's findings align with Cornwall et al. (2019), who reported that doctoral students experience high levels of stress in the initial phase of their programs. In contrast, Park et al. (2021) reported that students experienced poor health and emotional exhaustion during

the third and fourth years. Other control variables indicate that mental health problems are not significant among doctoral students.

HYPOTHESES TEST RESULTS

For hypothesis testing, the direct associations among contextual resources, personal resources, engagement, burnout, and mental health problems were examined along with the control variables (Table 4). The direct influence was tested by regressing mental health problems on both contextual and personal resources. Consistent with the anticipated inverse relationship between contextual resources and mental health problems, the two variables showed a negative association ($\beta = -0.30$; $p = 0.001$). An inverse relationship involving personal resources and mental health problems was also confirmed ($\beta = -0.28$; $p < 0.001$). These findings support the direct path model for H1 and H2.

The key associations between (a) the predictor variable and the mediator, and between (b) the mediator and the criterion variable, were assessed. First, the influence of contextual resources on engagement was examined, followed by an examination of the association between engagement and mental health problems. A positive association between contextual resources and engagement was confirmed ($\beta = 0.446$; $p < 0.001$; H1a). Additionally, a negative association was found ($\beta = -0.244$; $p < 0.001$; H1c) between engagement and mental health problems. Later, burnout was regressed on contextual resources. The findings revealed a negative association between burnout and contextual resources ($\beta = -0.354$; $p < 0.001$; H1b).

Similar analyses were employed for personal resources, mediators, and mental health problems. A strong positive association was confirmed when personal resources were regressed on engagement ($\beta = 0.639$; $p < 0.001$; H2a). When burnout was regressed on personal resources, an inverse association was confirmed ($\beta = -0.220$; $p < 0.001$; H2b). A positive association between burnout and mental health problems was confirmed ($\beta = 0.331$; $p < 0.001$; H2c).

Table 4. Direct relationship among study variables and control variables

Variables	**Engagement (mediator)**				**Burnout (mediator)**				**Mental health problems (dependent variable)**			
Control variable	**β**	**SE**	**t-value**	**p-value**	**β**	**SE**	**t-value**	**p-value**	**β**	**SE**	**t-value**	**p-value**
Gender	-0.020	0.084	-2.40	0.841	0.114	0.110	1.04	0.300	0.119	0.068	1.75	0.081
Type of university	-0.018	0.032	-0.58	0.558	0.088	0.041	2.14	0.033	0.032	0.026	1.25	0.213
Stage of PhD	-0.038	0.028	-1.33	0.183	0.123	0.037	3.31	0.001	0.049	0.023	1.92	0.048
Independent variables												
Contextual resource	0.446 (H1a)	0.044	10.10	<0.001	-0.354 (H1b)	0.062	-5.72	<0.001	-.306 (H1)	0.037	-8.18	<0.001
Personal resources	0.639 (H2a)	0.054	12.44	<0.001	-0.220 (H2b)	0.078	-2.81	<0.001	-0.287 (H2)	0.046	-6.12	<0.001
Engagement									-0.244 (H1c)	0.039	-6.24	<0.001
Burnout									0.3311 (H2c)	0.026	12.39	<0.001

Variables	Engagement (mediator)				Burnout (mediator)				Mental health problems (dependent variable)			
Adjusted R2	0.26	0.65	0.42	0.55	0.76	0.23	0.51	0.17	0.81	0.28	0.18	0.47
⊿*R2*	0.03	0.56	0.07	0.12	0.63	0.17	0.34	0.09	0.75	0.19	0.08	0.37
F	12.65	65.89	92.12	56.32	43.87	19.54	86.23	76.33	77.56	33.67	63.84	84.39
df	359				359				359			

The direct-effect analysis established the associations among contextual resources, personal resources, engagement, burnout, and mental health problems. However, these direct relationships do not explain the mechanisms through which resources are associated with mental health problems. Therefore, SEM-based parallel mediation analysis was subsequently performed to estimate the indirect effects of contextual and personal resources through engagement and burnout within the proposed model.

MEDIATION ANALYSIS

Parallel mediation analysis was performed using covariance-based SEM in AMOS to examine the direct and indirect effects of contextual and personal resources on mental health problems through engagement and burnout. A nonparametric bootstrap test was applied to calculate a confidence interval using the percentile method and a standard error obtained from 5000 samplings. The indirect effects of contextual resources ($\beta = -0.059$; $p < 0.001$) and personal resources ($\beta = -0.106$; $p < 0.001$) on mental health problems were mediated by engagement. Furthermore, the direct effects of contextual ($\beta = -0.245$, $p < .001$) and personal resources ($\beta = -0.178$, $p < .001$) remained significant after accounting for engagement. The significant indirect effects provided support for H3a and H4a. These results suggest that greater amounts of contextual and personal resources are associated with lower levels of mental health problems, which is partially mediated by increased engagement. Similarly, the findings suggest substantial indirect effects of contextual and personal resources on mental health problems via burnout ($\beta = -0.103$, $p < 0.001$; $\beta = -0.215$, $p < 0.001$). There was also a substantial direct effect of contextual and personal resources on mental health problems ($\beta = -0.201$, $p < 0.001$; $\beta = -0.068$, $p < 0.001$). These findings supported H3b and H4b, suggesting that greater contextual and personal resources are associated with lower levels of mental health problems, which is partially mediated by reduced burnout (Table 5). Figure 3 presents the standardized path coefficients for the parallel mediation model, providing a visual representation of the relationships among contextual resources, personal resources, engagement, burnout, and mental health problems.

Table 5. Mediation analysis of resources on mental health problems through engagement and burnout

Relationship paths	Direct effect	Indirect effect	Total effects	Confidence interval	t-value	Boot SE	p-value	Decision
H3a: Contextual Resources→ Engagement→ Mental health problem	-0.245	-0.059	-0.303	[-0.394, -0.209]	-6.49	0.049	<0.001	Significant
H3b: Contextual Resources→ burnout→	-0.201	-0.103	-0.304	[-0.395, -0.216]	-6.68	0.0455	<0.001	Significant

Relationship paths	Direct effect	Indirect effect	Total effects	Confidence interval	t-value	Boot SE	p-value	Decision
Mental health problem								
H4a: Personal resources→ Engagement→ Mental health problem	-0.178	-0.106	-0.284	[-0.399, -0.175]	-4.83	0.0588	<0.001	Significant
H4b: Personal resources→ Burnout→ Mental health problem	-0.068	-0.215	-0.284	[-0.394, -0.168]	-4.87	0.0583	<0.001	Significant

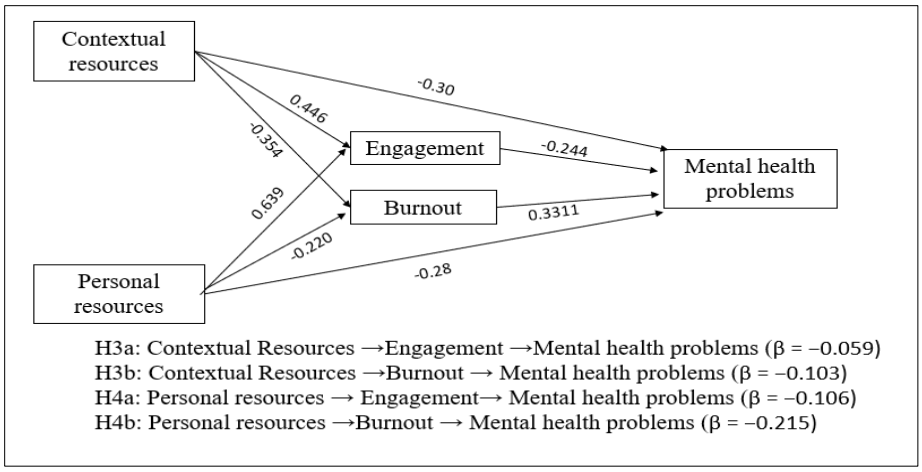


Figure 3. Standardized path coefficients of the parallel mediation model

DISCUSSION

Drawing on COR theory, this study aimed to expand the literature by examining the relationship between personal and contextual resources and mental health problems among doctoral students. This study revealed a negative relationship between resources and mental health problems (H1). These findings confirm that mental health problems can be reduced in the presence of resources. The study confirmed that contextual resources exhibited a slightly stronger protective association with mental health problems (β = −0.306) than personal resources (β = −0.287). Doctoral students operate within institutional and supervisory environments that directly shape access to academic guidance, research infrastructure, financial support, and social support. Although personal resources such as intrinsic motivation and self-efficacy help students manage academic demands, their protective capacity may be constrained when essential contextual resources are insufficient. From a COR perspective, supportive contextual conditions may therefore protect existing personal resources from depletion while simultaneously facilitating further gains in resources. The results of this study align with Haider and Dasti's (2022) findings, demonstrating that institutions, supervisors, and social resources are crucial contextual resources that prevent the depletion of engagement. The study confirmed that

intrinsic motivation and self-efficacy are key personal resources (H2), consistent with Sverdlik et al. (2018).

Contextual and personal resources were positively associated with engagement (H1a, H2a). Thus, both contextual and personal resources are instrumental in promoting engagement. The interactive effect of both resources significantly enhances engagement in a continuous and high-demand doctoral environment. The adverse association between contextual and personal resources and burnout confirms H1b and H2b. This evidence confirms the core tenet of COR theory: burnout results from actual or potential resource loss in the doctoral program (Hobfoll et al., 2018). The results for H1c align with Robins et al. (2015), indicating that engaged doctoral students perceive their studies as resource-enhancing, which, in turn, reduces their mental health problems. The positive association between burnout and mental health problems was supported (H2c).

The study findings confirm the assumptions of the COR theory regarding the principle of resource loss. The continuous depletion of contextual or personal resources during doctoral study results in burnout, and further resource loss intensifies mental health problems (Hobfoll et al., 2018). Doctoral students invest significantly in personal and contextual resources throughout their journeys, and when stringent academic demands are continually imposed, these resources begin to deplete, leading to burnout. These further drains of the competencies of doctoral students include emotional regulation and concentration that result in a loss of resources, leading to increases in anxiety, depression, and mental health problems. From a COR perspective, resource gain and resource loss may operate as interconnected processes throughout the doctoral journey. Supportive supervision, institutional assistance, peer support, self-efficacy, and intrinsic motivation can help students preserve existing resources and develop additional resources that sustain engagement. Conversely, persistent academic demands combined with insufficient support may progressively deplete these resources, increasing burnout and further reducing students' capacity to invest resources in their doctoral work. Thus, the doctoral ecosystem may involve ongoing cycles of resource preservation, accumulation, and depletion rather than isolated effects on resources.

The mediating effect of engagement between resources and mental health (H3a, H4a) functions as a resource gain that also protects against mental health problems. The inclusion of engagement diminishes the association between both types of resources and mental health problems. The presence of contextual resources has an indirect effect ($\beta = –0.059$) and a weaker direct effect ($\beta = –0.245$) via engagement. The presence of personal resources reduced the indirect effect ($\beta = –0.106$) and direct effect ($\beta = –0.178$) through engagement. These findings suggest that a decrease in effect size indicates a partial mediating role for engagement, resource type, and mental health problems. Engagement may therefore reflect more than just an outcome of resource availability; it may represent a process through which students continue to invest available resources in their doctoral activities. In contrast, burnout may indicate progressive resource depletion that restricts students' capacity to sustain such investment.

The mediating effect of burnout between resources and mental health (H3b, H4b) functions as a resource-loss pathway associated with greater mental health problems. The inclusion of burnout diminishes the association between both types of resources and mental health problems. The presence of contextual resources has an indirect effect ($\beta = -0.103$) through burnout. The indirect effect of personal resources through burnout was $\beta = -0.215$. Hence, the resource loss pathway through burnout serves as a key mediator between the two types of resources and mental health outcomes (H3b, H4b). The comparatively stronger indirect effects through burnout may indicate that resource depletion is particularly consequential for doctoral students' mental health. Doctoral study involves sustained academic and research demands, and continued resource loss may produce emotional exhaustion that is more immediately associated with mental health problems than the positive resource gains generated through engagement. This pattern is consistent with the COR perspective that resource loss may have particularly salient consequences when individuals face continuing demands. In the doctoral context, prolonged research demands, publication expectations, financial pressures, and

supervisory challenges may make preventing resource loss particularly important for protecting mental health.

Despite the empirical evidence from the Indian context, the study's findings are applicable and relevant across cultures. Studies from the U.S., the UK, China, and Belgium reported consistent patterns of doctoral students' stress and burnout, indicating the defensive role of personal and contextual resources in buffering mental health problems. However, the availability and distribution of resources may vary across higher education contexts. In India, differences in institutional funding, scholarship availability, research infrastructure, and doctoral program structures may create context-specific variations in how doctoral students access and preserve resources.

IMPLICATIONS

The findings of the present study emphasize the pivotal role of both resources in mitigating burnout, nurturing engagement, and promoting mental health. This study offers practical implications for institutions, supervisors, and doctoral students, grounded in COR theory. These theoretical insights outline a framework for doctoral educators and policymakers to allocate program resources to reduce burnout strategically. A major practical contribution of this study is the development of a resource-based framework that integrates institutional-level, supervisory-level, and individual-level actions to protect existing resources, facilitate resource gains, and reduce resource depletion throughout the doctoral journey.

INSTITUTIONAL-LEVEL IMPLICATIONS

Higher education institutions can enhance contextual resources by organizing psychosocial interventions, investing in early research capital, and protecting research structures. Increasing access to counseling, institutionalizing peer mentoring systems, and delivering multiphase resilience and stress-management interventions for doctoral students can reinforce social and emotional support. Financial assistance for attending research conferences, providing funding for pilot studies, and installing and updating access to research-related software and databases also play a critical role. Recognizing and incentivizing scholarly publications, providing early-stage travel grants, opening access to publication funds, and restructuring the stipend to account for rising living costs can ease financial burdens and promote interconnected resource caravans that enhance study, financial, social, and emotional resources. Clearly, the program's academic and research milestones should be defined, protected research time should be guaranteed, unambiguous doctoral program regulations should be established, and adaptable leave policies should be implemented to safeguard the personal resources of doctoral students.

SUPERVISION IMPLICATIONS

Supervisor support is a pivotal contextual resource in doctoral program success. The competencies of the supervisor, namely, strong subject-matter knowledge, active listening, clear and constructive feedback, publication and peer-review experience, promote the doctoral students' resource gain process. Facilitating the development of interpersonal and research-related expertise reinforces key personal resources, particularly motivation, resilience, and confidence. Timely recognition of distress among doctoral students and appropriate support from a supervisor prevent the escalation of the resource-loss process, thereby promoting work–life balance. Supervisors are encouraged and trained to foster psychologically safe student–supervisor relationships that protect doctoral students' mental health.

INDIVIDUAL-LEVEL IMPLICATIONS

This study confirmed the importance of personal resources in reducing burnout, thereby enhancing engagement, suggesting that doctoral students consciously initiate, cultivate, and sustain their resource gain. Participating in research and self-regulation workshops enhances doctoral students' self-

efficacy, intrinsic motivation, and resilience in meeting the program's academic demands. Engaging in self-regulatory strategies, connecting with peer networks, and relying on institutional support mechanisms when appropriate provides a platform for enhancing personal resources. Doctoral students are encouraged to select their research topics based on their interests rather than relying on supervisors or experts, thereby enhancing their basic psychological needs that underpin their intrinsic motivation. By prioritizing both small and major research achievements, doctoral students can develop the confidence that sustains their intrinsic motivation.

Earlier studies independently focused on either resource; however, this study empirically evidenced concurrent resource gain and resource loss within a single analytical framework. By conceptualizing burnout and engagement as mediating variables, this study examines how resources mitigate mental health problems among doctoral students.

Limitations of the Study

The findings of this study need to be considered in view of several limitations. First, the study considered only Indian doctoral students across the top 100 universities. This method may introduce bias and restrict the generalizability of the findings to the university-wide doctoral student population. Second, the final sample of 365 participants was slightly below the minimum sample size of 385 estimated using Cochran's formula for a large population. Although the difference is relatively small, it may modestly limit the sample's representativeness and the generalizability of the findings to the broader doctoral student population. Third, resources were assessed using a general scale rather than a scale explicitly targeting research-related resources. Consequently, detailed measurement support offered by institutions, supervisors, and peers may have been hindered. Fourth, this cross-sectional study facilitates the examination of associations among variables but fails to reflect temporal changes and the dynamic nature of resources. It is recommended to extend and validate the current results by employing longitudinal or experimental designs in a multi-wave context. Fifth, the study did not incorporate social group-based analyses, such as caste and socio-economic status, which are particularly important in the Indian higher education context. These socio-cultural and structural factors are critical in determining access to resources and stress-related vulnerability in India. This omission limits explanatory depth, and subsequent research should integrate these factors to explain disparities among doctoral students better.

Conclusion

The study extends existing evidence by demonstrating that contextual and personal resources operate concurrently in relation to doctoral students' mental health, with engagement and burnout representing distinct resource-gain and resource-loss pathways. The findings further indicate that contextual resources show a slightly stronger protective association with mental health problems, while the comparatively larger indirect effects through burnout emphasize the importance of preventing resource depletion. Supportive supervision and institutional resources, in addition to robust internal resources such as intrinsic motivation and self-efficacy, are associated with enhanced engagement and reduced burnout. By incorporating both resource-loss and resource-gain mechanisms into a single model, the study elucidates how resources operate concurrently across institutional and personal contexts. In doing so, the study extends the application of COR theory to doctoral education by showing how external contextual resources and internal personal resources can be interpreted as occurring simultaneously within resource-gain and resource-loss processes.

Engagement reflects the gain pathway, whereby available resources are associated with more positive doctoral functioning, whereas burnout reflects the loss pathway, whereby resource depletion is associated with poorer mental health. The mental health challenges of doctoral students may not be mitigated through isolated interventions; rather, they require coordinated approaches that strengthen multiple levels of the doctoral setting. Higher education institutions should shift their emphasis from tangible resources to systems that cultivate autonomy, resilience, and enduring engagement. For the

academic community, these findings emphasize that doctoral mental health should not be viewed solely as an individual-level concern. Universities, doctoral educators, and supervisors form part of the resource environment that can preserve or deplete students' resources. Strengthening supportive doctoral environments alongside students' personal resources may therefore contribute to sustained engagement, reduced burnout, and healthier doctoral experiences.

Disclosure Statement

No potential conflicts of interest were reported by the author(s).

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Ethics Approval and Consent to Participate

Informed consent to participate was obtained from all the individual participants included in the study.

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Data Availability Statement

The data supporting the findings of this study are available upon reasonable request from the corresponding author.

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