Student Burnout: A Prediction Model Through Structural Equations Modeling

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Abstract

Burnout is a significant risk factor that can negatively impact students' academic performance and well-being. Coping, resilience, self-efficacy, and optimism have been studied in previous research as protective factors against burnout, but they have been studied separately, with no models testing for shared variance and potential mediation effects. This study aimed to do so. A total of 330 students completed measures of burnout, coping, self-efficacy, optimism, and resilience. Bivariate correlations were obtained, and a prediction model was tested using Structural Equations Modeling (SEM). This model showed an adequate fit to data and explained 24%, 22%, and 38% of the variance in the burnout dimensions of Exhaustion, Cynicism, and Efficacy, respectively. The model indicates that students who perceive that they usually bounce back in the face of adversities (i.e., are resilient), are usually more optimistic about their future and feel more self-efficacious, tending to make more use of coping strategies such as positive reframing and planning, which in turn prevents them from feeling exhausted and becoming cynical, and increases their levels of efficacy. Thus, Resilience, Optimism, Self-efficacy, Positive Reframing, and Planning appear to have a protective role against burnout. The results contribute to clarifying the association between Resilience, coping strategies, Optimism, and Self-efficacy as influencing variables that prevent Exhaustion and Cynicism while also improving Efficacy levels. In summary, the evidence obtained from the present study suggests that these variables may act as protective factors against stressful situations derived from university studies.

Keywords: burnout, student, coping, resilience, optimism, self-efficacy

Introduction

Burnout is a significant risk factor that can negatively impact students' academic performance and well-being. Student burnout is a syndrome characterized by three components: *exhaustion*, which refers to feeling drained by one's study load; *cynicism*, related to having a cynical and disengaged mindset when it comes to one's academic pursuits; and *efficacy*, which refers to feeling competent in the role of a student (Schaufeli et al., 2002; Sveinsdóttir et al. 2021). To assess burnout, the three components need to be measured, and burnout is present when there are elevated levels of exhaustion and cynicism, coupled with diminished efficacy—if one of those three conditions is not met, burnout cannot be established.

During their academic years, a considerable proportion of higher education students experience stress and burnout (Vizoso Gómez & Arias Gundín, 2016). Burnout is related to low academic motivation (Lyndon et al., 2017) and performance (Schaufeli et al., 2002), slow goal progress (Vasalampi et al., 2009), and a higher intention to drop out (Marôco et al., 2020). Some studies have also found that study-related burnout predicts work-related burnout (Robins et al., 2018).

Burnout, as a chronic stress syndrome, has received special attention during the COVID-19 health crisis, because of its major impact on most aspects of life, including education (Sandoval, 2020). Sveinsdóttir et al. (2021) showed that most Icelandic nursing students were handling their education effectively and did not encounter notable stress levels amidst the COVID-19 pandemic, although the degree of academic engagement predicted burnout levels (Sveinsdóttir et al., 2021; Wang et al., 2021). In contrast, alternative studies have shown that the pandemic impacted both students' well-being and academic performance, increasing their levels of stress, anxiety, overload, and even academic dropout, and lowering their confidence and learning self-regulation (Lovón Cueva & Cisneros Terrones, 2020). In Spain, young people, particularly students, suffered the most during lockdowns compared to other occupations and age groups (Rodríguez-Rey et al., 2020), so burnout may have increased in Spanish education because of the COVID-19 pandemic. Therefore, burnout must be studied in this specific and complex educational context, examining which protective factors can prevent or reduce it. Among these protective factors are coping (Lau et al., 2021; Marôco et al., 2020; Ortega et al., 2014), resilience (Oyoo et al., 2018), self-efficacy (Ortega et al., 2014), and optimism (Vizoso et al., 2019).

Starting with coping, it can be described as the "constant change of cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the

person" (Lazarus & Folkman, 1984, p. 141). Interestingly, burnout (including academic burnout) is negatively associated with adaptive strategies like problem-solving, planning, and positive reframing (Lau et al., 2021), and positively associated with strategies considered maladaptive like social withdrawal, problem avoidance, self-criticism, substance use, and wishful thinking (Marôco et al., 2020; Vizoso et al., 2019). However, given inconsistent findings and limited research, the connection between coping and student burnout remains poorly understood (Lau et al., 2021). Cabanach et al. (2010) found that academic coping was best understood in Spanish University students through the strategies of planning, positive reframing, and seeking support, all of which were considered effective in the academic context (Cabanach et al., 2010). Thus, the three strategies are anticipated to have an association with the dimensions of burnout, specifically being negatively linked to exhaustion and cynicism and a positively to efficacy.

Secondly, resilience can be characterized as the capacity to recover or rebound from stressful or traumatic life events (Smith et al., 2008). It has shown a link to lower levels of burnout, including student burnout (e.g., Oyoo et al., 2018). Indeed, in the demanding circumstances posed by the COVID-19 pandemic, resilience might have influenced burnout levels, hindering positive adaptation (Miyazaki et al., 2023). Windle (2011) identified three essential elements for resilience to occur: substantial adversity or risk, skills or resources to counterbalance the impacts of adversity, and positive adaptation. The previously discussed coping strategies are among the possible resources that resilient individuals can employ—higher psychological resilience can influence the selection and application of more adaptive coping strategies (Wu et al., 2020). Several studies have indicated that coping serves as a mediator between resilience and psychological well-being (Chen, 2016; Garrido-Hernansaiz & Alonso-Tapia, 2020), and we hypothesize that the same could happen with student burnout.
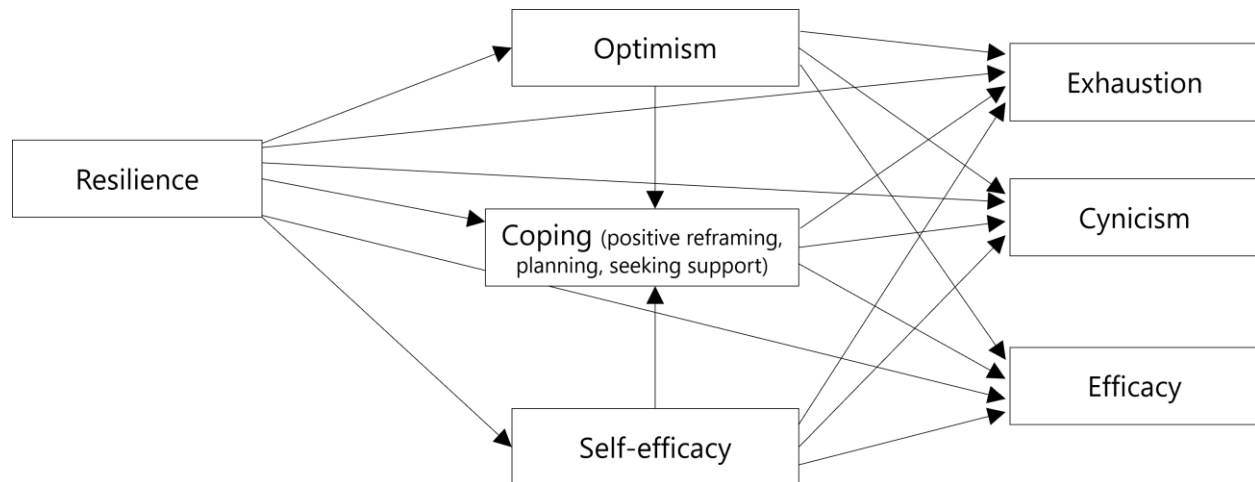
Third, self-efficacy has been linked to burnout in the academic context (Sharififard et al., 2020). Specifically, student burnout in the university context has been associated with low self-efficacy levels (Usán Supervía et al., 2018). Research has found a negative correlation between self-efficacy and the dimensions of cynicism and exhaustion and a positive and more strong association with efficacy (Gil-Monte, 2003; Martos Martínez et al., 2021; Usán Supervía et al., 2018). Furthermore, self-efficacy is also positively related to and can be predicted by resilience (Martínez-Martí & Ruch, 2017; Xu et al., 2022), and it also increases how frequently active coping strategies are used (Doménech Betoret & Gómez Artiga, 2010), specifically the strategies of planning, positive reframing, and seeking help (Freire Rodríguez & Ferradás Canedo, 2020).

Finally, optimism is a personality trait that denotes having generalized positive expectations for the future. Optimists are characterized by their ability to concentrate on the beneficial or constructive aspects of stressful situations, exhibit less anxiety, and face challenges actively and confidently. Pessimists, on the other hand, appear skeptical and hesitant in the same situations. Therefore, optimism may be considered another protective factor against burnout (Fowler et al., 2020; Zeidan & Prentice, 2022) and has been studied as a relevant variable impacting psychological well-being (Carver & Scheier, 2014). Concretely, prior studies have demonstrated that optimism is linked to reduced levels of exhaustion but not to cynicism or efficacy (Vizoso et al., 2019). These optimistic-pessimistic variations in how people deal with adversity have implications for choosing coping strategies (Zeidan & Prentice, 2022), with significant associations between optimism and coping (Gottschling, et al., 2016; Saleh et al., 2017; Zeidan & Prentice, 2022). Resilience has been found to be related to optimism and to be able to predict it in a variety of contexts, including academic settings (Gavín-Chocano et al., 2023; Martínez-Martí & Ruch, 2017; Vizoso et al., 2019).

To summarize the relationships between the protective factors discussed, resilience has an impact on the burnout components (Miyazaki et al., 2023; Oyoo et al., 2018), on the levels of optimism (Gavín-Chocano et al., 2023) and self-efficacy (Xu et al., 2022) that a person shows, and on their choice of coping strategies (Chen, 2016; Garrido-Hernansaiz & Alonso-Tapia, 2020). Moreover, optimism (Gottschling, et al., 2016; Saleh et al., 2017; Zeidan & Prentice, 2022) and self-efficacy (Doménech Betoret & Gómez Artiga, 2010; Freire Rodríguez & Ferradás Canedo, 2020) also impact the choice of coping strategies. Finally, optimism (Fowler et al., 2020; Vizoso et al., 2019; Zeidan & Prentice, 2022), self-efficacy (Martos Martínez et al., 2021; Sharififard et al., 2020; Usán Supervía et al., 2018), and coping strategies (Lau et al., 2021; Marôco et al., 2020; Vizoso et al., 2019) influence the burnout components. These relationships are depicted in Figure 1.

Fig. 1

Initial Model to Be Tested

However, these protective factors have usually been studied separately in relation to each other or to the burnout components, without testing for potential mediation effects and shared variance. Nevertheless, some recent research has considered the complex relationships among these variables through Structural Equation Modelling (SEM). For instance, Marôco et al. (2020) tested a model in which positive and negative coping, along with social support, predicted student burnout, which in turn predicted academic performance and dropout intention. However, burnout was treated as a single variable, which is problematic since, as previously stated, burnout is composed of three dimensions that must all be present for burnout to exist, and thus these dimensions must be reported separately and cannot be summed up in a one-dimensional construct. In their study, Lau et al. (2021) also tested a SEM model in which coping, perfectionism, and self-efficacy predicted student burnout. Nevertheless, burnout was once again reported as a single variable, as was coping—as stated above, different coping strategies show different relationships with each burnout dimension. Another SEM model on this topic is Vizoso et al.'s (2019), in which optimism, adaptive coping, and maladaptive coping predicted the three components of student burnout, and all the variables predicted academic performance. Vizoso et al.'s (2019) study overcame the limitations in the previous models, but in this case, two caveats emerged: 1) the fit to data of the structure of the coping instrument used was poor, which casts doubts over the tested model, and 2) the authors initially argued that optimism influences coping, but this relationship was not later tested in their model. Finally, as can be noted, the models found in the literature fail to bear in mind the role of resilience and to include all the variables at once: resilience, self-efficacy, optimism, coping, and the three burnout dimensions. Moreover, specific coping strategies were not considered separately, which is essential to understand how they relate to burnout.

Therefore, this study aimed to overcome the limitations identified in previous research by examining a SEM model that incorporates resilience, self-efficacy, optimism, and coping at the same time, and testing not only their direct effect on each burnout component but also the indirect effects (i.e., mediational models) that could emerge because of their interrelationships. Figure 1 illustrates the model that will be examined.

Materials and Methods

Participants

The survey received responses from a total of 330 eligible students. The inclusion criteria were met by Spanish-speaking participants over the age of 18 who were enrolled in a university degree program in 2019-2020. Table 1 provides a detailed breakdown of sociodemographic characteristics. The respondents' mean age was 24.81 ($SD = 7.50$), and the majority were women (77.9%), pursuing a university degree (89.1%). Around 20% worked during the lockdown period, most of them online, with no differences in the mean weekly work hours of those who worked on-site ($M = 29.27$, $SD = 12.41$) and those who worked online from home ($M = 25.05$, $SD = 13.77$), $t(63) = 1.27$, $p = .21$. There was a difference of small effect size ($\eta^2 = .04$) in the mean daily hours dedicated to study between the participants who did not work ($M = 5.44$, $SD = 2.77$) and those who did on-site ($M = 3.93$, $SD = 3.11$) or online ($M = 4.00$, $SD = 2.14$), $F(2, 313) = 7.26$, $p < .001$. Similarly, there was a difference of large effect size ($\eta^2 = .17$) in the mean age between the participants who did not work ($M = 23.30$, $SD = 5.41$) and those who did on-site ($M = 30.29$, $SD = 10.90$) or online ($M = 31.47$, $SD = 11.16$), $F(2, 327) = 32.70$, $p < .001$. No significant differences emerged in Exhaustion, $F(2,327) = .01$, $p = .99$, Cynicism, $F(2,327) = 2.54$, $p = .08$, or Efficacy, $F(2,327) = .19$, $p = .83$, by work status.

Table 1

Sociodemographic Characteristics of the Sample

Characteristics	*n*	%
Gender		
Female	257	77.9
Male	70	21.2
Non-binary gender	3	.9
Age range		
18-21	152	46.1

22-24	87	26.4
25-27	38	11.5
>27	53	16.1
19-20 Course		
Upper Secondary Education	2	0.6
University Degree	294	89.1
Master's degree & PhD	34	10.3
Academic Year		
1st	125	37.9
2nd	73	22.1
3rd	58	17.6
4th	31	9.4
5th	6	1.8
Master´s/PhD	25	7.6
Other	12	3.6
Worked during lockdown		
Yes, on-site	28	8.5
Yes, online	37	11.2
No	265	80.3

Instruments

Maslach Burnout Inventory-Student Survey (MBI-SS; Schaufeli et al., 2002). It measures the three

components of academic burnout with 15 items: five for Exhaustion, four for Cynicism, and six for Efficacy.

Responses are given on a Likert-type scale ranging from 0 (*Never*) to 6 (*Every day*). The presence of academic

burnout is determined by elevated scores on Exhaustion and Cynicism, coupled with diminished scores on Efficacy.

The validity and reliability indices from the three components' scores were adequate, with internal consistency

values of $\alpha = .74$ for Exhaustion, .79 for Cynicism, and .76 for Efficacy in Schaufeli's et al.'s (2002) study, and .89,

.88 and .82, in the present study, respectively.

Academic Stress Coping Scale (A-CEA; Cabanach et al., 2010). Its 23 items measure how university students deal with academic stress through three coping strategies: planning, positive reframing, and seeking support. Higher scores indicate greater use of these strategies. Good internal consistency values are reported in both the original study (α = .84 for planning, .86 for positive reframing, .91 for seeking support, and .89 for the whole scale) and the present study (.85, .86, .94, and .92, respectively).

Academic Situations Perceived Self-Efficacy Scale (EAPESA; Palenzuela, 1983). This one-dimensional scale measures academic self-efficacy in adolescents and university students through 10 items, scored on a Likert scale from 1 (*Never*) to 4 (*Always*). A greater score indicates increased levels of academic self-efficacy. The initial study reported excellent internal consistency (α = .91), as did this study (α = .90).

Life Orientation Test-Revised (LOT-R; Scheier et al., 1994). This instrument assesses variations in generalized optimism and pessimism among individuals. The Spanish version consists of a total of 10 items, including three items focusing on optimism, three items targeting pessimism, and four additional filler items to mask the true purpose of the test (Ferrando et al., 2002). For this study, only the 6 items of the original scale related to optimism and pessimism were selected. Items are responded with a Likert-type scale from 0 (*Strongly disagree*) to 4 (*Strongly agree*). In Cano-García et al.'s (2015) study, the LOT-R scores showed adequate internal (α = .73), as they did in the current study (α = .83).

Brief Resilience Scale (Smith et al., 2008). It assesses the capacity to recover from stress using 6 items scored on a Likert scale, ranging from a higher (5) to a lower (1) degree of agreement. The scores demonstrated good internal consistency in the Spanish version (α = .83; Rodríguez-Rey et al., 2016), as they also did in this study (α = .89).

Procedure

The authors' University Ethics Committee granted approval for this cross-sectional study. Data collection took place during the period of June and July 2021. A Microsoft Forms questionnaire was distributed throughout the authors' University via institutional mail, academic platform, and other formal social networks. Participants were also incorporated from different Spanish universities, in collaboration with several university professors. Participants were given information about the study's topic, the voluntary and anonymous nature of their involvement, and the opportunity to discontinue their participation at any point. They received no compensation for their participation in this study. Given the snowball approach followed for participant recruitment, the response rate

could not be computed.

Data Analysis

   The statistical program Mplus (version 7) was used in conjunction with SPSS (version 27) to conduct the analyses. Imputing missing values was unnecessary since answering all items was mandatory. Initially, descriptive analysis and multiple bivariate correlations (Pearson's) were conducted to test the hypothesized relations. To assess the psychometric properties, underlying structure, and goodness-of-fit of the aforementioned instruments, multiple Confirmatory Factor Analyses (CFA) were conducted. Thus, a CFA was conducted for the instrument measuring each of the current paper's main constructs: Resilience, Optimism, Coping Strategies, Self-efficacy, and Burnout. Subsequently, the hypothesized model was examined through Structural Equation Modeling (SEM) with Maximum Likelihood Mean-Variance adjusted (MLMV) as the estimator (Maydeu-Olivares, 2017). Finally, the CFAs' and proposed model's adjustments were evaluated through relative fit and residual indices (CFI, TLI, and RMSEA). CFI and TLI above .90 and RMSEA below .08 denote acceptable fit (Hair, 2014).

Results

Correlations

   The correlations between the variables of this study are presented in Table 2. Considering the burnout dimensions, positive and significant correlations emerged between Exhaustion and Cynicism, and both showed inverse correlations with Efficacy. Exhaustion and Cynicism exhibited negative correlations with all the other variables examined the study (the three coping strategies, Resilience, Self-efficacy, and Optimism), while a positive correlation emerged between those variables and the burnout dimension of Efficacy. The three coping strategies (Positive Reframing, Planning, and Help-Seeking) were positively correlated with each other and showed a positive correlation with Resilience, Self-efficacy, and Optimism, except for Help-Seeking and Resilience, which were not related. Lastly, Resilience, Self-efficacy, and Optimism were positively correlated with each other.

Table 2

Correlations Between Instruments

	2	3	4	5	6	7	8	9
1. Exhaustion	.66***	-.42***	-.39***	-.22***	-.22***	-.35***	-.23***	-.37***
2. Cynicism		-.52***	-.29***	-.20***	-.18***	-.29***	-.22***	-.38***

3. Efficacy	.38***	.37***	.23***	.18***	.45***	.34***
4. Positive Reframing		.66***	.27***	.55***	.44***	.52***
5. Planning			.37***	.25***	.33***	.27***
6. Seeking Help				.07	.21***	.25***
7. Resilience					.32***	.48***
8. Self-efficacy						.27***
9. Optimism						

*$p < .05$. ** $p < .01$. *** $p < .001$.

Confirmatory Factor Analyses of the Instruments Used

As other means of preliminarily assessing the fitness of our data, seven CFA were conducted (see Table 3) to test the reported fit scores of the instruments that were used. Fit indices were adequate for the instruments.

Table 3

CFA's Fit Indices for the Instruments Used

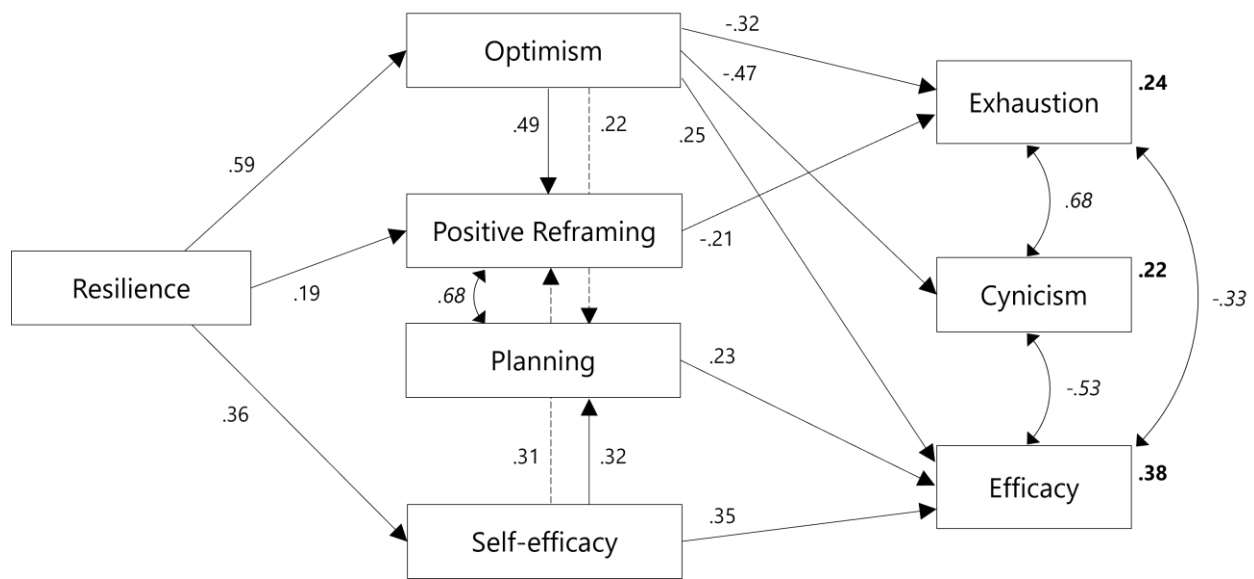| Instruments	CFI	TLI	RMSEA
MBI-SS (Burnout)	.96	.95	.05
A-CEA - Positive Reframing	.97	.95	.06
A-CEA - Planning	.98	.96	.06
A-CEA – Seeking Help	.99	.99	.03
Brief Resilience Scale (Resilience)	.99	.99	.02
EAPESA (Self-efficacy)	.97	.96	.05
LOT-R (Optimism)	.99	.98	.05

SEM Model

The hypothesized model depicted in Figure 1 was tested. Non-significant paths and variables were dropped, along with very low regression weights (i.e., $\lambda \leq .13$). Consequently, the direct paths from Resilience to the three burnout dimensions and the Planning coping strategy were excluded from the model. Moreover, the coping strategy of Seeking Help was removed altogether from the model. The paths from Planning and Self-efficacy to Exhaustion

were also removed, as well as the paths from Positive Reframing, Planning, and Self-efficacy to Cynicism, and the path from Positive Reframing to Efficacy.

Figure 2 shows the final model with the direct effects (i.e., regression weights). This model showed an adequate fit to data (CFI = .91, TLI = .91, RMSEA = .03) and explained 24%, 22%, and 38% of the variance in the burnout dimensions of Exhaustion, Cynicism, and Efficacy, respectively. These three dimensions showed moderate to strong correlations among themselves. Optimism, Positive Reframing, and Self-efficacy were positively predicted by Resilience. Positive Reframing and Planning were also positively predicted by Optimism and Self-efficacy. Exhaustion was negatively predicted by Optimism and Positive Reframing. Cynicism was negatively predicted by Optimism. Lastly, Efficacy positively predicted Optimism, Self-efficacy, and Planning.

Figure 2

Final Model with Regression Weights, Correlations, and Proportion of Explained Variance

Note. Correlations are depicted in italics. Proportions of explained variance are depicted in boldface.

The indirect effects in the model, not depicted in Figure 2 for clarity reasons, are displayed in Table 4. Resilience had a total indirect effect of -.32 on Exhaustion, -.28 on Cynicism, and .34 on Efficacy. Optimism had an indirect effect of -.10 on Exhaustion, along with a direct effect of -.32 depicted in Figure 2, totaling an effect of -.42. Optimism also had an indirect effect of -.05 on Efficacy, along with a direct effect of .25, which totaled .30. Lastly, regarding Self-efficacy, an indirect effect of -.07 on Exhaustion was found. Moreover, it also demostranted an

indirect effect of .08 on Efficacy, which coupled with the direct effect of .35 made a total effect of .43.

Table 4

Indirect and Total Effects in the Final Model

Predictor	Mediator(s)	Burnout dimension (criterion)		
		Exhaustion	Cynicism	Efficacy
Resilience	Optimism	-.19	-.28	.15
	Self-efficacy			.13
	Positive reframing	-.04		
	Self-efficacy → Planning			.03
	Self-efficacy → Positive reframing	-.02		
	Optimism → Positive reframing	-.06		
	Optimism → Planning			.03
	Total indirect	*-.32*	*-.28*	*.34*
Optimism	Positive reframing	-.10		
	Planning			.05
	Total indirect	*-.10*		*.05*
	Total (indirect + direct)	*-.42*	*-.47*	*.30*
Self-efficacy	Positive reframing	-.07		
	Planning			.08
	Total indirect	*-.07*		*.08*
	Total (indirect + direct)	*-.07*		*.43*

Note. Direct effects absent here appear in Figure 2.

Discussion

This study reported the bivariate associations among the main variables and tested a burnout model that considered Resilience, Optimism, Self-efficacy, and Coping, as well as their direct and indirect effects on the three burnout components. Overall, the correlational analysis provided support for the anticipated associations among the three burnout dimensions, revealing a positive correlation between Exhaustion and Cynicism, as well as a negative correlation between Exhaustion and Efficacy, in line with previous studies (Schaufeli et al., 2002). The correlations

between the burnout dimensions, Coping, Resilience, Self-Efficacy, and Optimism also supported the expected

relationships between the study's main variables. Coping strategies, as predicted, were found to be negatively

related to Exhaustion and Cynicism, and positively related to Efficacy (Vizoso et al., 2019). Exhaustion and

Cynicism showed negative correlations with Resilience, Optimism, and Self-efficacy, as well as a positive

correlation emerged between these variables and Efficacy. These findings align with prior literature, suggesting that

coping (Lau et al., 2021; Marôco et al., 2020; Vizoso et al., 2019), resilience (Miyazaki et al., 2023; Oyoo et al.,

2018), self-efficacy (Ortega et al., 2014; Sharififard et al., 2020; Usán Supervía et al., 2018), and optimism (Fowler

et al., 2020; Vizoso et al., 2019) are protective factors against burnout.

Continuing with the correlational analysis, except for Help-Seeking and Resilience, which were not related,

the three coping strategies (Positive Reframing, Planning, and Help-Seeking) were found to be positively correlated

with each other and showed, as expected, a positive correlation with Resilience, Self-efficacy, and Optimism.

According to Freire Rodríguez & Ferradás Canedo (2020), Help-Seeking is a rarely used strategy, which may lead to

a lack of data variability in research when attempting to study its association with other constructs, which may

explain its absence of association with Resilience. Resilience, Self-efficacy, and Optimism, on the other hand, were

found to be positively correlated with each other (Gavín-Chocano et al., 2023; Martínez-Martí & Ruch, 2017;

Vizoso et al., 2019; Xu et al., 2022).

Regarding the tested burnout SEM model, it fitted the data appropriately and received empirical support.

As hypothesized, Optimism was linked to lower Exhaustion and Cynicism, as well as higher Efficacy (Gottschling,

et al., 2016; Saleh et al., 2017; Vizoso et al., 2019; Zeidan & Prentice, 2022), both directly and indirectly through

coping strategies, supporting a mediation effect (Zeidan & Prentice, 2022). Self-efficacy was directly and indirectly

associated with increased Efficacy (Martos Martínez et al., 2021; Usán Supervía et al., 2018). It was also related to

less Exhaustion (Martos Martínez et al., 2021; Usán Supervía et al., 2018), but only indirectly via Positive

Reframing. In this regard, the findings add to previous research indicating that the effect of Self-efficacy on

Exhaustion can be completely mediated by coping strategies. Similarly, despite the significant bivariate correlation,

Self-efficacy was not related to Cynicism in the SEM model, indicating that other factors sharing common variance

with Self-efficacy are better suited to explain Cynicism.

Concerning coping, Positive Reframing was associated with lower Exhaustion, and Planning was linked to

higher Efficacy (Lau et al., 2021). Contrary to expectations and the reported bivariate correlations, Positive

Reframing did not help explain Cynicism or Efficacy in the SEM model. Similarly, Planning did not assist in explaining Cynicism or Exhaustion, and Seeking Help did not explain any of the burnout dimensions. Again, the SEM analysis revealed that, once the shared variance between variables is accounted for, only a subset of them remains as relevant factors with predictive value.

Lastly, Resilience was associated with Optimism (Gavín-Chocano et al., 2023; Martínez-Martí & Ruch, 2017; Vizoso et al., 2019), Positive Reframing (González-Torres & Artuch-Garde, 2014), and Self-efficacy (Martínez-Martí & Ruch, 2017; Xu et al., 2022) in the SEM model. Despite the significant bivariate correlations reported, it was not directly associated with lower burnout, but it did show a significant indirect relation with the burnout dimensions via Optimism, Self-efficacy, Positive Reframing, and Planning. Therefore, the SEM analysis indicated that the relationship between Resilience and burnout is mediated through these variables, as full mediations revealed complex dynamics at work.

In essence, the model indicates that students who perceive themselves to bounce back in the face of adversities (i.e., are resilient) are usually more optimistic about their future and feel more self-efficacious, tending to employ coping strategies like positive reframing and planning more often, which prevents them from becoming exhausted and cynical and increases their levels of efficacy. Thus, Resilience, Optimism, Self-efficacy, Positive Reframing, and Planning appear to have a protective role against burnout.

Limitations

This study presents certain limitations. First, the relatively small size of the sample for the SEM analysis performed. Additionally, more than half of the sample was recruited from the same university center. Therefore, future works should try to access a larger sample, recruiting larger subsets of men and women to be able to make gender comparisons and include participants from diverse geographical university contexts to increase the results generalizability. Even though the ratio of men to women was not balanced and, as such, it could be viewed as a limitation, it has been considered as evidence of sample representativeness, since participants mainly came from degrees related to health and care, theoretical fields where the proportion of women vastly surpasses the proportion of men. Using self-report measures and collecting data online could also lead to biases in participant responses. The study's transversal nature must also be considered, as it precludes any conclusions about causality. Thus, longitudinal and experimental studies should be conducted to further explore the causal links among the variables. Concerning coping, three strategies were measured (positive reappraisal, seeking support, and planning), which

could be expanded in future research, taking into account other strategies not considered in this study. Furthermore, in future research, models should include social support as a distinct and relevant factor, separate from the search for support as a coping strategy. Finally, given that this study was conducted within the specific context of the COVID-19 pandemic, replication of the results is necessary to ascertain if the relationships found in this study (particularly those concerning the SEM model) hold in other samples and moments. For instance, in this study, Seeking Help might have had a limited impact due to the mandatory measures to prevent COVID-19 propagation (in the classrooms and other life areas) that were in place during the data collection period, with restricted access to contact and social support from others. As a result, the Seeking Help strategy might have been less useful than expected in such a context.

Theoretical and Practical Implications

This study overcame several limitations observed in previous SEM studies on burnout prediction, allowing to draw several theoretical and practical implications. Starting with the former, first, future research should always report findings concerning each of the three burnout dimensions separately. Previous SEM models reported burnout as a one-dimensional construct (Marôco et al., 2020; Lau et al., 2021), which as discussed is problematic since certain levels on the three components must be present for burnout to exist and because each component can be influenced differently by the protective factors. Indeed, the results of this study provide support for the notion that different variables play a significant role in explaining each burnout dimension. Second, coping should be researched considering the different possible coping strategies. Previous SEM models failed to consider specific coping strategies, reporting coping as a one-dimensional construct or (in the best case) as a two-dimensional construct referring to adaptive and maladaptive coping (Marôco et al., 2020; Lau et al., 2021; Vizoso et al., 2019). As our study suggests, the role of coping cannot be understood simplistically and thus should not be reported as a single factor, since each strategy shows a different role in the prediction of each burnout dimension. Third, future research should consider Optimism, Self-efficacy, and coping strategies at the same time to maximise burnout prediction. Previous research had considered each of these factors individually but not concurrently (Marôco et al., 2020; Lau et al., 2021; Vizoso et al., 2019) and our study showed that they remained relevant for burnout prediction despite their shared variance. Fourth, Resilience should be included in future research on burnout prediction, along with possible mediators. None of the previous SEM models included Resilience (Marôco et al., 2020; Lau et al., 2021; Vizoso et al., 2019), yet this study identified it as a significant predictor of student burnout, with its effect

occurring through the rest of the variables, ranging from -.28 to .34. Finally, future studies should ascertain that psychometric properties of the instruments' scores are adequate before using them in SEM models. Since this has not always been the case (e.g., see Vizoso et al., 2019), this study made a point about it, and we encourage researchers to do the same.

Continuing with practical implications, we would like to emphasize the significant educational implications of our results not only to prevent student burnout because of its negative impact on academic achievement and university life (Schaufeli et al., 2002), but also to promote the psychological well-being of university (Carver & Scheier, 2014; Chen, 2016). In this sense, it is necessary to promote prevention programs that detect burnout risk and implement preventive measures. To detect those at risk, Universities could routinely assess their students' perceived resilience and their optimism, self-efficacy, and use of coping strategies. Then, workshops and teaching experiences could be carried out to increase students' self-efficacy and their perceived resilience, as well as train them in the use of optimistic thinking and coping strategies like planning and positive reframing. Teachers could also be trained in these matters so that they can promote these skills in their activities design and the feedback they provide.

Conclusions

This study provides new knowledge about the mediating effect of certain psychological variables on academic burnout. In this way, these findings provide valuable insights into the connections among Resilience, coping strategies, Optimism, and Self-efficacy as influencing variables that prevent Exhaustion and Cynicism while also improving Efficacy levels. In conclusion, the evidence obtained from the present study suggests that these variables may act as protective factors against stressful situations derived from university studies.

Data availability

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

References

Cabanach, R. G., Valle, A., Rodríguez, S., Piñeiro, I., & Freire, C. (2010). Escala de afrontamiento del estrés académico (A-CEA). *Revista Iberoamericana de Psicología y Salud, 1*(1), 51-64. http://suips.webs.uvigo.es/index.php?option=com_docman&Itemid=68

Cano-García, F. J., Sanduvete-Chaves, S., Chacon-Moscoso, S., Rodríguez-Franco, L., García-Martínez, J., Antuna-Beller, M. A., & Perez-Gil, J. A. (2015). Factor structure of the Spanish version of the Life Orientation Test-Revised (LOT-R): Testing several models. *International Journal of Clinical and Health Psychology, 15*(2), 139–148. https://doi.org/10.1016/j.ijchp.2015.01.003

Carver, C. S., & Scheier, M. F. (2014). Dispositional optimism. *Trends in Cognitive Sciences, 18*(6), 293-299. https://doi.org/10.1016/j.tics.2014.02.003

Chen, C. (2016). The role of resilience and coping styles in subjective well-being among Chinese University students. *The Asia-Pacific Education Researcher, 25*(3), 377-387. https://doi.org/10.1007/s40299-016-0274-5

Doménech Betoret, F., & Gómez Artiga, A. (2010). Barriers perceived by teachers at work, coping strategies, self-efficacy and burnout. *The Spanish Journal of Psychology*, *13*(2), 637–654. https://doi.org/10.1017/s1138741600002316

Ferrando, P. J., Chico, E., & Tous, J. M. (2002). Propiedades psicométricas del test de optimismo Life Orientation Test. *Psicothema, 14*(3), 673-680. https://www.psicothema.com/pdf/782.pdf

Fowler, J. B., Fiani, B., Kiessling, J. W., Khan, Y., Li, C., Quadri, S., Mahato, D., & Siddiqi, J. (2020). The correlation of burnout and optimism among medical residents. *Cureus, 12*(2), 1-16. https://doi.org/10.7759/cureus.6860

Freire Rodríguez, C., & Ferradás Canedo, M. M. (2020). Afrontamiento del estrés académico y autoeficacia en estudiantes universitarios: un enfoque basado en perfiles. *International Journal of Developmental and Educational Psychology, 1*(1), 133-142. https://doi.org/10.17060/ijodaep.2020.n1.v1.1769

Garrido-Hernansaiz, H., & Alonso-Tapia, J. (2020). Predictors of anxiety and depression among newly diagnosed people living with HIV: A longitudinal study. *Scandinavian Journal of Psychology*, *61*(5), 616–624. https://doi.org/10.1111/sjop.12621

Gavín-Chocano, Ó., García-Martínez, I., Pérez-Navío, E., & Molero, D. (2023). Resilience as a mediating variable

between emotional intelligence and optimism-pessimism among university students in Spanish

    universities. *Journal of Further and Higher Education, 47*(3), 407-420.

    https://doi.org/10.1080/0309877X.2022.2133994

Gil-Monte, P. R. (2003). El síndrome de quemarse por el trabajo (síndrome de burnout) en profesionales de

    enfermería. *Revista Electrônica Interação Psy, 1*(1), 19-33.

González-Torres, M. C., & Artuch-Garde, R. (2014). Resilience and coping strategies profiles at University:

    Contextual and demographic variables. *Electronic Journal of Research in Educational Psychology, 12*(3),

    621-648. http://dx.doi.org/10.14204/ejrep.34.14032

Gottschling, J., Hahn, E., Maas, H., & Spinath, F. M. (2016). Explaining the relationship between personality and

    coping with professional demands: Where and why do optimism, self-regulation, and self-efficacy matter?

    Personality and Individual Differences, 100, 49–55. https://doi.org/10.1016/j.paid.2016.03.085

Hair, J. F. (2014). *A primer on partial least squares structural equations modeling (PLS-SEM).* Sage.

Lau, S. C., Chow, H. J., Wong, S. C., & Lim, C. S. (2021). An empirical study of the influence of individual-related

    factors on undergraduates' academic burnout: Malaysian context. *Journal of Applied Research in Higher*

    Education, *13*(4), 1181-1197. https://doi.org/10.1108/JARHE-02-2020-0037

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.

Lovón Cueva, M. A., y Cisneros Terrones, S. A. (2020). Repercusiones de las clases virtuales en los estudiantes

    universitarios en el contexto de la cuarentena por COVID-19: El caso de la PUCP. *Propósitos y*

    Representaciones Revista de Psicología Educativa, 8(Esp. 3), Article e588.

    http://dx.doi.org/10.20511/pyr2020.v8nSPE3.588

Lyndon, M., Henning, P., Alyami, M. A., Krishna, H., Zeng, S., Yu, I., & Hill, T. C. (2017). Burnout, quality of life,

    motivation and academic achievement among medical students: A person-oriented approach. *Perspectives*

    on Medical Education, 6, 108-114. https://doi.org/10.1007/s40037-017-0340-6

Marôco, J., Assunção, H., Harju-Luukkainen, H., Lin, S. W., Sit, P. S., Cheung, K. C., Maloa, B., Ilic, I. S., Smith,

    T. J., & Campos, J. A. D. B. (2020). Predictors of academic efficacy and dropout intention in university

    students: Can engagement suppress burnout? *PloS ONE*, *15*(10), Article e0239816.

    https://doi.org/10.1371/journal.pone.0239816

Martínez-Martí, M. L., & Ruch, W. (2017). Character strengths predict resilience over and above positive affect,

self-efficacy, optimism, social support, self-esteem, and life satisfaction. *The Journal of Positive Psychology, 12*(2), 110-119. https://doi.org/10.1080/17439760.2016.1163403

Martos Martínez, Á., Molero Jurado, M. M., Pérez-Fuentes, M. C., Barragán Martín, A. B., Simón Márquez, M. M., Tortosa Martínez, B. M., Sisto, M., & Gázquez Linares, J. J. (2021). Self-Efficacy, positive future outlook and school burnout in Spanish adolescents. *Sustainability, 13*(8), Article 4575. https://doi.org/10.3390/su13084575

Maydeu-Olivares, A. (2017). Maximum likelihood estimation of structural equation models for continuous data: Standard errors and goodness of fit. *Structural Equation Modeling: A Multidisciplinary Journal*, *24*(3), 383-394. https://doi.org/10.1080/10705511.2016.1269606

Miyazaki, A., Sankai, T., & Omiya, T. (2023). Experience and Resilience of Japanese Public Health Nurses during the COVID-19 Pandemic and Their Impact on Burnout. *Healthcare, 11*(8), Article 1114. https://doi.org/10.3390/healthcare11081114

Ortega, M. E., Ortiz, G. R., & Martínez, A. J. (2014). Burnout en estudiantes de pregrado de medicina y su relación con variables de personalidad. *Terapia Psicológica*, *32*(3), 235-242. https://dx.doi.org/10.4067/S0718-48082014000300006

Oyoo, S. A., Mwaura, P. M., & Kinai, T. (2018). Academic resilience as a predictor of academic burnout among form four students in Homa-Bay County, Kenya. *International Journal of Education and Research*, *6*(3), 187-200. https://doi.org/10.1155/2020/5347828

Palenzuela, D. L. (1983). Construcción y validación de una escala de autoeficacia percibida específica de situaciones académicas. *Análisis y Modificación de Conducta, 9*(21), 185-219.

Robins, T. G., Roberts, R. M., & Sarris, A. (2018). The role of student burnout in predicting future burnout: exploring the transition from university to the workplace. *Higher Education Research & Development, 37*(1), 115-130. https://doi.org/10.1080/07294360.2017.1344827

Rodríguez-Rey, R., Alonso-Tapia, J., & Hernansaiz-Garrido, H. (2016). Reliability and validity of the Brief Resilience Scale (BRS) Spanish version. *Psychological Assessment, 28*(5), e101-110. https://doi.org/10.1037/pas0000191

Rodríguez-Rey, R., Garrido-Hernansaiz, H., & Collado, S. (2020). Psychological impact and associated factors during the initial stage of the coronavirus (COVID-19) pandemic among the general population in Spain.

Frontiers in Psychology, *11*, Article 1540. https://doi.org/10.3389/fpsyg.2020.01540

Saleh, D., Camart, N., & Romo, L. (2017). Predictors of stress in college students. *Frontiers in Psychology, 8*, Article 19. https://doi.org/10.3389/fpsyg.2017.00019

Sandoval, C. H. (2020). La educación en tiempo del Covid-19 herramientas TIC: El nuevo rol docente en el fortalecimiento del proceso enseñanza aprendizaje de las prácticas educativa innovadoras. *Revista Tecnológica-Educativa Docentes 2.0*, *9*(2), 24–31. https://doi.org/10.37843/rted.v9i2.138

Schaufeli, W. B., Martínez, I. M., Marques Pinto, A., Salanova, M., y Bakker, A. B. (2002). Burnout and engagement in university students: A cross-national study. *Journal of Cross-cultural Psychology, 33*(5), 464-481. https://doi.org/10.1177%2F0022022102033005003

Sharififar, F., Asayesh, H., Hosseini, M. H. M., & Sepahvandi, M. (2020). Motivation, self-efficacy, stress, and academic performance correlation with academic burnout among nursing students. *Journal of Nursing and Midwifery Sciences*, *7*(2), 88-93. https://doi.org/10.4103/JNMS.JNMS_30_19

Scheier, M. F., Carver, C. S. & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 6*7(6), 1063-1078. https://doi.org/10.1037/0022-3514.67.6.1063

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The Brief Resilience Scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine, 15*(3), 194-200. https://doi.org/10.1080/10705500802222972

Sveinsdóttir, H., Flygenring, B. G., Svavarsdóttir, M. H., Thorsteinsson, H. S., Kristófersson, G. K., Bernharðsdóttir, J., & Svavarsdóttir, E. K. (2021). Predictors of university nursing students burnout at the time of the COVID-19 pandemic: A cross-sectional study. *Nurse Education Today*, *106*, Article 105070. https://doi.org/10.1016/j.nedt.2021.105070

Usán Supervía, P., Salavera Bordás, C. & Domper Buil, E. (2018). ¿Cómo se interrelacionan las variables de burnout, engagement y autoeficacia académica? Un estudio con adolescentes escolares. *Revista Electrónica Interuniversitaria de Formación del Profesorado, 21*(2), 141-153. http://dx.doi.org/10.6018/reifop.21.2.311361

Vasalampi, K., Salmela-Aro, K., & Nurmi, J.-E. (2009). Adolescents' self-concordance, school engagement, and burnout predict their educational trajectories. *European Psychologist, 14*(4), 332–341.

https://doi.org/10.1027/1016-9040.14.4.332

Vizoso Gómez, C. M., & Arias Gundín, O. (2016). Engagement, burnout y rendimiento académico en estudiantes universitarios y su relación con la prioridad en la elección de la carrera. *Revista de Psicología y Educación, 11*(1), 45-60. https://dialnet.unirioja.es/servlet/articulo?codigo=5992682

Vizoso, C., Arias-Gundín, O., & Rodríguez, C. (2019). Exploring coping and optimism as predictors of academic burnout and performance among university students. *Educational Psychology*, *39*(6), 768-783. https://doi.org/10.1080/01443410.2018.1545996

Wang, J., Bu, L., Li, Y., Song, J., & Li, N. (2021). The mediating effect of academic engagement between psychological capital and academic burnout among nursing students during the COVID-19 pandemic: A cross-sectional study. *Nurse Education Today, 102*, Article 104938. https://doi.org/10.1016/j.nedt.2021.104938

Windle, G. (2011). What is resilience? A review and concept analysis. *Reviews in Clinical Gerontology, 21*(2), 152–169. https://doi.org/10.1017/S0959259810000420

Wu, Y.; Yu, W., Wu, X., Wan, H., Wang, Y. & Lu, G. (2020). Psychological resilience and positive coping styles among Chinese undergraduate students: A cross-sectional study. *BMC Psychology, 8*, Article 79. https://doi.org/10.1186/s40359-020-00444-y

Xu, Y., Yang, G., Yan, C., Li, J., & Zhang, J. (2022). The predictive effect of resilience on self-efficacy during COVID-19: the moderating role of creativity. *Frontiers in Psychiatry*, *13*, Article 2894. https://doi.org/10.3389/fpsyt.2022.1066759

Zeidan, S., & Prentice, C. (2022). The journey from optimism to cynicism: The mediating and moderating roles of coping and training. *International Journal of Disaster Risk Reduction, 71*, Article 102796. https://doi.org/10.1016/j.ijdrr.2022.102796