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Research Article

From metacognition to academic burnout in university students: The mediating role of mindfulness

Ahmet Sapancı

Duzce University, Faculty of Education, Türkiye (ORCID: 0000-0003-4688-6890)

This study explores the mediating role of mindfulness in the relationship between metacognition and academic burnout, a prevalent issue in higher education affecting students' well-being and academic performance. Utilizing a structural equation modeling approach, the study examined the hypothesized pathways grounded on the Self-regulatory Executive Function (S-REF) model in a sample of university students. Results corroborated all hypothesized relationships, denoting a positive prediction of academic burnout through dysfunctional metacognitions, a decrease in which was observed with heightened mindfulness. The bootstrap analysis confirmed mindfulness's partial mediation between metacognition and academic burnout, establishing a significant indirect effect. The study highlights mindfulness's mitigating role against the adverse impacts of dysfunctional metacognitions on academic burnout, advocating for mindfulness-based interventions in educational settings to foster student resilience and well-being. Future research should further delve into this nuanced relationship to foster effective educational strategies.

Keywords: Dysfunctional metacognitions; Mindfulness; Academic burnout; Structural equation modeling

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1. Introduction

1.1. Academic Burnout

Academic burnout, initially examined in work and professional environments (Maslach et al., 2001), has gradually encompassed students' experiences navigating the academic process (Parker & Salmela-Aro, 2011; Salmela-Aro et al., 2009). This extension arises from perceiving the students' education-related endeavors as "work" given their pressures to achieve specific performance milestones such as passing courses and earning degrees (Schaufeli et al., 2002). This phenomenon manifests as a chronic stress response due to a mismatch between available resources and the expectations placed upon students, inducing consequences on their physical and mental well-being (Aguayo et al., 2019; Frydenberg & Lewis, 2004). This chronic condition delineates into three pivotal dimensions: emotional exhaustion, cynicism, and diminished personal achievement, each

leading to a distinct set of adverse outcomes (Maslach et al., 2001; Salmela-Aro et al., 2009). Emotional exhaustion, characterized by fatigue and a reduced capacity to adapt to the educational environment, results in subpar engagement with academic responsibilities (Edu-Valsania et al., 2022). Meanwhile, cynicism manifests as indifference and a withdrawal from educational engagements, harboring negative attitudes toward fellow students and the educational setup (Edu-Valsania et al., 2022). Lastly, diminished personal accomplishment engenders a negative self-perception of one's abilities, diminishing morale and productivity (Edu-Valsania et al., 2022).

Research consistently reveals a negative correlation between academic burnout and academic achievement. An extensive meta-analysis involving over 100,000 students authenticated that all burnout dimensions are inversely related to academic success (Madigan & Curran, 2022). This hindrance to academic achievements is not confined to higher education but prevails at all educational levels, with students indulging in avoidance behaviors, thereby missing vital educational opportunities (Kutsal, 2009; Madigan & Curran, 2022). Reviewing the available literature underscores a higher incidence of burnout among university students, evidenced in various studies with prevalence rates showcasing substantial academic burnout (Aguayo et al., 2019; Balkıs et al., 2011; Dyrbye et al., 2006; Yang et al., 2013). This heightened occurrence in higher education can be attributed to the multifaceted demands university students grapple with, inclusive of the exam-centric nature of the Turkish education system, high expectations from parents, and financial pressures.

Given the adverse implications of academic burnout, identifying relevant variables for its mitigation becomes imperative. Dysfunctional metacognitions have been spotlighted as significant contributors to emotional problems, presenting a pertinent avenue for exploring the genesis and persistence of academic burnout (Holeva et al., 2001; Morrison & Wells, 2003; Papageorgiou & Wells, 2003; Wells and Cartwright-Hatton 2004).

In conclusion, academic burnout, initially defined within work and professional contexts, has proven to be a substantial concern within the academic sphere, predominantly among university students. This phenomenon, characterized by emotional exhaustion, cynicism, and reduced personal accomplishment, has been linked to both diminished academic performance and adverse personal outcomes. The prevalence of academic burnout is particularly notable in higher education settings, highlighting a pressing need to address this issue comprehensively. Given the intricate connection between dysfunctional metacognitions and emotional complications, understanding the role of metacognitive processes could shed new light on the mechanisms underlying academic burnout, paving the way for informed interventions to alleviate this chronic condition and foster a healthier educational environment for students (Aguayo et al., 2019; Dyrbye et al., 2006; Edu-Valsania et al., 2022; Frydenberg & Lewis, 2004; Holeva et al., 2001; Madigan & Curran, 2022; Maslach et al., 2001; Morrison & Wells, 2003; Papageorgiou & Wells, 2003; Salmela-Aro et al., 2009; Schaufeli et al., 2002; Wells & Cartwright-Hatton 2004).

1.2. Metacognition

Metacognition, a term first coined by Flavell (1979), refers to an individual's knowledge and cognition about their own cognitive phenomena. It encompasses the psychological frameworks, events, and processes that regulate, modify, and appraise cognitive functions, acting as a high-level cognitive structure that organizes and evaluates these cognitions (Crick, 2000; Dienes & Perner, 1999; Wells & Cartwright-Hatton, 2004). This meta-system facilitates awareness and the intentional direction of one's mental events and functions. However, when maladaptive, it can foster increased self-focus, reduced cognitive efficacy, and repetitive ruminations, potentially leading to various psychopathologies (Wells & Cartwright-Hatton 2004).

The Self-regulatory Executive Function (S-REF) model delves into the metacognitive components implicated in the inception and sustenance of psychological distress, outlining how metacognitive beliefs guide thinking and coping mechanisms, potentially leading to maladaptive responses (Wells, 2000; Wells & Matthews, 1994, 1996). These beliefs can steer individuals toward

disorder-consistent information, fostering ineffective worry/rumination coping strategies and a reliance on failed coping tactics like thought suppression (Wells & Cartwright-Hatton, 2004).

Dysfunctional metacognitive beliefs have been associated with a range of psychological disorders, including generalized anxiety disorder, obsessions, PTSD, psychosis, and depression, illustrating a positive correlation between these disorders and dysfunctional metacognitions (Holeva et al., 2001; Morrison, 2001; Morrison et al., 2000; Morrison & Wells, 2003; Papageorgiou & Wells, 2003; Sellers et al., 2016; Wells & Carter, 2001; Wells & Papageorgiou, 1998). These beliefs, whether positive or negative, can influence the severity and frequency of symptoms, highlighting a crucial role in the onset and persistence of psychological conditions (Morrison, 2001; Morrison et al., 2015).

Excessive self-focus can drain the mental resources necessary for processing incompatible information, exacerbating sensitivity to information aligned with existing beliefs and promoting similar dysfunctional cognitive beliefs (Cotter et al., 2017). This cycle can diminish an individual's coping resources, paving the way for burnout. Conversely, mindfulness can foster present-moment awareness and attentiveness, mitigating the stress response and promoting well-being (Creswell, 2014). In academic settings, students practicing mindfulness may perceive lower levels of academic burnout due to a heightened awareness and a non-judgmental approach to stressful experiences. Therefore, it becomes imperative to examine the mediating role of mindfulness in the relationship between dysfunctional metacognitions and burnout.

In conclusion, metacognition, introduced by Flavell (1979), plays a pivotal role in shaping individuals' cognitive processes and their approach to psychological distress. It involves a deep understanding and awareness of one's own cognitive functions, allowing for a self-regulated control over thoughts and behaviors. However, maladaptive metacognitions can foster self-preoccupation and ruminative thoughts, laying a foundation for psychological disorders and increasing vulnerability to burnout. The S-REF model offers a conceptual framework, illustrating how metacognitive beliefs can govern individuals' response styles, potentially steering them towards maladaptive coping strategies (Wells, 2000; Wells & Matthews, 1994, 1996). Recognizing the interconnectedness of dysfunctional metacognitive beliefs with various psychological disorders underscores the necessity for a careful exploration of metacognitive components in psychological assessments and interventions. Meanwhile, promoting mindfulness stands as a promising approach, potentially serving as a moderator in the relationship between dysfunctional metacognitions and burnout, encouraging a focused and non-judgmental awareness that can foster mental well-being and reduce academic burnout (Creswell, 2014). Future work should consider the nuanced role of mindfulness in breaking the cycle of maladaptive metacognitive processes and fostering resilience in the face of stressors.

1.3. Mindfullness

Mindfulness, delineated as "the awareness arising from intentionally focusing on the present moment in a non-judgmental manner" (Kabat-Zinn, 2003, p. 145), fosters an individual's curiosity about instantaneous experiences and promotes an ability to attentively navigate the present, contrary to functioning on "autopilot" guided by routine thoughts and emotions (Brown & Ryan, 2003). This concept accentuates an immersive involvement with the ongoing sensory inputs, offering a proactive approach to circumventing emotional disorders through enhanced awareness skills (Solem et al., 2015).

Research substantiates mindfulness as a robust positive skill facilitating mental health, with pronounced implications for psychological well-being in academic spheres (Huang et al., 2018; Khoury et al., 2015; Shiralkar et al., 2013; Tomlinson et al., 2018). Notably, studies underscore its potency in diminishing anxiety and depression stemming from perceived academic stress, thereby fostering superior psychological adjustment (Bergin & Pakenham, 2016; Martínez-Rubio et al., 2020).

Central to the efficacy of mindfulness are the components of awareness and acceptance, which conjointly enable a finer appraisal of daily experiences and attenuate adverse emotional reactions, presenting a mitigative approach to academic burnout (Lindsay & Creswell, 2017). Consistent research findings echo the inverse relationship between mindfulness and academic burnout, illustrating mindfulness as a vital internal asset that shields individuals from the detrimental ramifications of academic stress by amplifying coping resources (An et al., 2018; Arias et al., 2010; Bränström et al., 2011; Harrington et al., 2014; Martínez-Rubio et al., 2020; Nyklícek & Kuijpers, 2008; Salmon et al., 2004; Yuan et al., 2018).

In conclusion, the discourse elucidates the pressing issue of academic burnout among university students, delineating its adverse repercussions and emphasizing the pivotal role of metacognition in this context. The existing literature highlights the multifaceted nature of metacognitive processes, suggesting that dysfunctional metacognitive beliefs could potentially exacerbate academic burnout. Consequently, understanding the mediating role of mindfulness, a tool that fosters present-moment awareness and enhances coping mechanisms, appears critically pertinent. The current study thereby seeks to explore this mediation role further, fostering a deeper understanding that could pave the way for targeted interventions to mitigate academic burnout through fostering mindfulness and a better understanding of metacognitive processes. The endeavor embarks with the hypotheses that posit potential relationships between maladaptive metacognitive beliefs, mindfulness, and academic burnout, aiming to unravel the intricate dynamics that govern these relationships.

In synthesis, the discourse suggests a potential exacerbating role of dysfunctional metacognitions in the emergence of academic burnout symptoms, while positioning mindfulness as a protective agent fostering reduced burnout symptoms. In light of this, the current study endeavors to examine the following hypotheses:

H1: There is a positive association between maladaptive metacognitive beliefs and academic burnout.

H2: Maladaptive metacognitive beliefs are inversely associated with mindfulness.

H3: Mindfulness demonstrates an inverse relationship with academic burnout.

H4: Mindfulness mediates the relationship between metacognition and academic burnout.

2. Method

2.1. Research Design

In the present research, we employed structural equation modeling to ascertain the mediating function of mindfulness in linking metacognition and academic burnout among university attendees. The theoretical framework under scrutiny is depicted in Figure 1.

2.2. Participants

The participant selection for this research utilized a convenience sampling strategy. The participants included a majority of female participants, constituting 57.5% (n = 173), while males represented 42.5% (n = 128). Participants' age ranged from 18 to 32 years, with a mean age of 22.61 (SD = 3.02). Analyzing the sample based on their academic affiliations, we found that a substantial portion, 47.5% (n = 143), were enrolled in the education faculty. This was followed by 31.6% (n = 95) from the engineering faculty, and 20.9% (n = 63) pursuing studies at the medicine faculty. Regarding academic year, 20.3% (n = 61) were in their first year, 22.9% (n = 69) in their second, 23.3 % (n = 70) in their third, and 25.2% (n = 76) in their fourth year of studies. The remaining participants were distributed between the fifth (5.0%, n = 15) and sixth (3.3%, n = 10) years.

Figure 1
Hypothetical Model
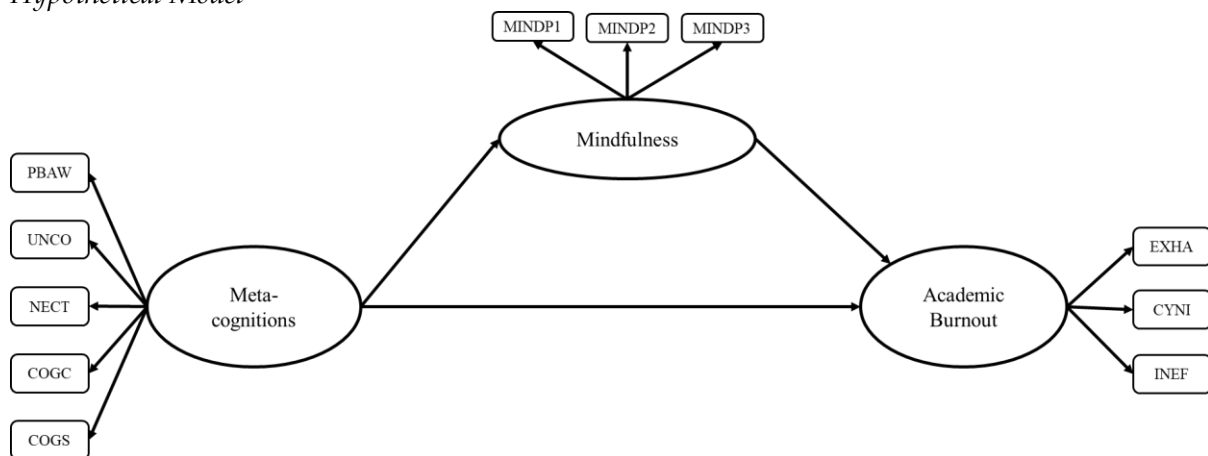
Note. PBAW: Metacognitions Questionnaire-30 Scale (MCQ-30) - Positive Beliefs About Worry subscale total score; UNCO: MCQ-30 - Uncontrollability and Danger subscale total score; NECT: MCQ-30 - Need to Control Thoughts subscale total score; COGC: MCQ-30 - Cognitive Confidence subscale total score; COGS: MCQ-30 - Cognitive Self-Consciousness subscale total score; MINDP1-3: Three parcels from the Mindful Attention Awareness Scale items; EXHA: Maslach Burnout Inventory – Student Scale (MBI-SS) - Exhaustion subscale total score; CYNI: MBI-SS - Cynicism subscale total score; INEF: MBI-SS - Inefficacy subscale total score.

2.3. Data Collection Tools

2.3.1. Personal information form

In the researcher-designed personal information questionnaire, queries regarding the participants' age, gender, faculty affiliation, and class level are included.

2.3.2. Maslach burnout inventory – student scale (MBI-SS)

The Turkish version of the scale created by Schaufeli et al. (2002) to evaluate student burnout was adapted by Çapri et al. (2011). This version maintains the Likert-type grading system with 13 items, ranging from 1 (Never) to 5 (Always), and encompasses three subscales: Exhaustion, Cynicism, and Efficacy. While the statements associated with the burnout and cynicism subscales are formulated negatively, the efficacy subscale consists of positive statements. When scoring, the efficacy dimension is reverse-scored, meaning high scores on the scale denote increased levels of academic burnout. In the Turkish adaptation, the internal consistency coefficients, denoted by Cronbach's alpha, were established as .76 for the exhaustion subscale, .74 for cynicism, and .70 for efficacy. In the current research, these reliability values were reassessed, yielding results of .79 for exhaustion, .70 for cynicism, and .71 for efficacy.

2.3.3. Metacognitions questionnaire 30 (MCQ-30)

The MCQ-30, formulated by Wells & Cartwright-Hatton (2004), serves to assess dysfunctional and maladaptive metacognitions utilizing a 4-point Likert scale, ranging from 1 (do not agree) to 4 (agree very much). Elevated scores on the MCQ refers to a greater presence of dysfunctional metacognitions. The instrument includes five subscales: positive beliefs about worry, uncontrollability and danger, necessity to control thoughts, cognitive assurance, and cognitive self-awareness. Yılmaz et al. (2008, pp. 424-439) adapted the scale into Turkish. Based on the data acquired from their study, the Cronbach's alpha coefficient for the comprehensive scale stood at .87. In the current investigation, the reliability metrics were revisited, establishing a coefficient of .93 for the entire scale.

2.3.4. Mindful attention awareness scale (MAAS)

The MAAS, a tool conceived by Brown & Ryan (2003) for gauging respondents' mindfulness levels, encompasses 15 items. It employs a 6-point Likert-style response grid, which extends from 1 (almost always) to 6 (almost never). This instrument relies on a singular factor construct, with elevated scores refering a heightened conscious awareness. The Turkish form by Özyeşil et al. (2011), the scale exhibited a Cronbach Alpha reliability coefficient of .80. In the current study, a reevaluation determined the Cronbach Alpha value to be .87.

2.4. Data Collection and Analysis

Before proceeding with the mediation analysis to test the research hypothesis, ensuring that the gathered data satisfied the required prerequisites for the analysis was essential. Initially, the responses of 310 students who participated willingly in the study were scrutinized. The inputs from 9 individuals, who either left the majority of the questions unanswered or appeared to respond indiscriminately, were discarded from the study. Following this, an inspection of the data's skewness and kurtosis values was undertaken. The analysis revealed that the skewness values oscillated between .19 and −.59, while the kurtosis values were in the range of .08 to .55, affirming that the data adhered to the norms of a regular distribution. The analysis leveraged IBM SPSS 25 and Lisrel 8.8 software packages for a detailed exploration.

3. Results

Two-stage structural equation modeling was used to test the mediation hypothesis in the study. In the first stage, the measurement model was tested using confirmatory factor analysis. In the second stage, a structural model was created and tested.

3.1. Findings Related to the Measurement Model

Upon reviewing the conceptual model designed for validation in this research (refer to Figure 1), it is evident that there are three latent variables: metacognition, mindfulness, and academic burnout. Given that the Mindful Attention Awareness Scale (MAAS), utilized to gauge the mindfulness levels of the participants, follows a unidimensional structure, three parcels derived through the item parcellation method were allocated as the observed variable.

The correlations between the observed variables present in the structural model are delineated in Table 1.

Table 1

Pearson correlation analysis results for the relationships between observed variables in the structural model

|	1	2	3	4	5	6	7	8	9	10	11
1. PBAW	1										
2. UNCO	.788**	1									
3. NECT	.667**	.792**	1								
4. COGC	.707**	.801**	.831**	1							
5. COGS	.788**	.826**	.790**	.838**	1						
6. MINDP1	−.467**	−.468**	−.393**	−.409**	−.463**	1					
7. MINDP2	−.484**	−.494**	−.397**	−.415**	−.491**	.742**	1				
8. MINDP3	−.566**	−.532**	−.452**	−.473**	−.553**	.662**	.680**	1			
9. EXHA	.417**	.437**	.339**	.381**	.472**	−.488**	−.504**	−.485**	1		
10. CYNI	.445**	.412**	.334**	.362**	.427**	−.460**	−.444**	−.423**	.793**	1	
11. INEF	.479**	.489**	.383**	.425**	.488**	−.504**	−.490**	−.458**	.796**	.755**	1

Note. $**\, p < .01$, PBAW: Metacognitions Questionnaire-30 Scale (MCQ-30) - Positive Beliefs About Worry subscale total score; UNCO: MCQ-30 - Uncontrollability and Danger subscale total score; NECT: MCQ-30 - Need to Control Thoughts subscale total score; COGC: MCQ-30 - Cognitive Confidence subscale total score; COGS: MCQ-30 - Cognitive Self-Consciousness subscale total score; MINDP1-3: Three parcels from the Mindful Attention Awareness Scale items; EXHA: Maslach Burnout Inventory – Student Scale (MBI-SS) - Exhaustion subscale total score; CYNI: MBI-SS - Cynicism subscale total score; INEF: MBI-SS - Inefficacy subscale total score.

Upon reviewing the correlation coefficients delineated in Table 1, it becomes evident that all the values are statistically significant.

The standardized path coefficients pertaining to the measurement model are delineated in Figure 2.

Figure 2
Standardized path coefficients for measurement model
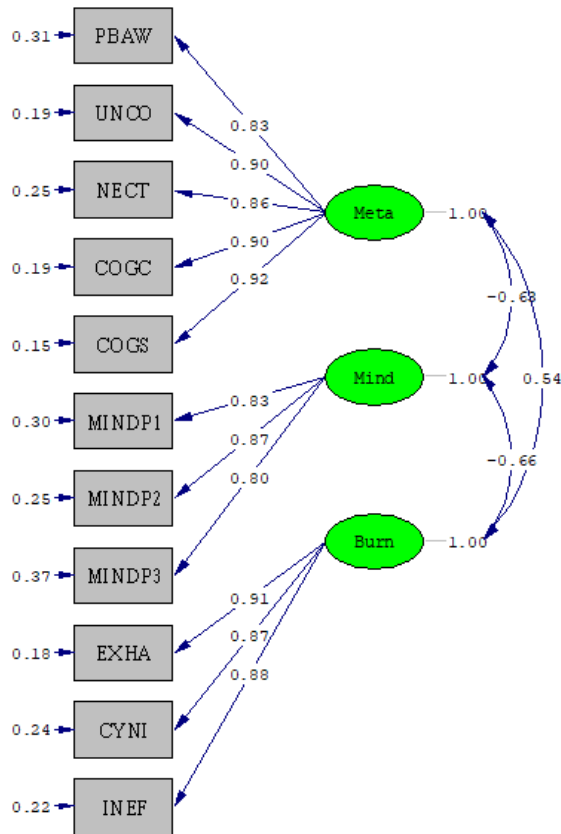
Chi-Square=98.27, df=41, P-value=0.00000, RMSEA=0.068

Note. PBAW: Metacognitions Questionnaire-30 Scale (MCQ-30) - Positive Beliefs About Worry subscale total score; UNCO: MCQ-30 - Uncontrollability and Danger subscale total score; NECT: MCQ-30 - Need to Control Thoughts subscale total score; COGC: MCQ-30 - Cognitive Confidence subscale total score; COGS: MCQ-30 - Cognitive Self-Consciousness subscale total score; MINDP1-3: Three parcels from the Mindful Attention Awareness Scale items; EXHA: Maslach Burnout Inventory – Student Scale (MBI-SS) - Exhaustion subscale total score; CYNI: MBI-SS - Cynicism subscale total score; INEF: MBI-SS - Inefficacy subscale total score.

The goodness-of-fit indices for the measurement model exhibit satisfactory levels. The chi-square to degrees of freedom ratio (χ^2/df) is 2.39, falling within the acceptable range. The Root Mean Square Error of Approximation (RMSEA) is .06, with a 90 percent confidence interval ranging from .05 to .08, indicating a good fit. The Normed Fit Index (NFI) and the Non-Normed Fit Index (NNFI) are extremely high, with values of .98 and .99 respectively, suggesting an excellent fit of the model. Similarly, the Comparative Fit Index (CFI) and Incremental Fit Index (IFI) both scored .99, representing a near-perfect fit. The Standardized Root Mean Residual (SRMR) is .03, showcasing a good fit. Lastly, the Goodness-of-Fit Index (GFI) and Adjusted Goodness-of-Fit Index (AGFI) are found to be .94 and .91 respectively, indicating a well-fitting model. Overall, these statistical outcomes demonstrate a strong validation of the measurement model.

The correlation values of the latent variables in the measurement model are reported in Table 2.

Table 2

Correlations regarding the latent variables in the structural model

Latent variable	1	2	3
1. Metacognition	–		
2. Academic burnout	.54**	–	
3. Mindfulness	−.68**	−.66**	–

*Note. **p < .01*

Upon reviewing the correlation values displayed in Table 2, it is observed that there exists a positive correlation between metacognition and academic burnout, substantiated with a correlation coefficient of $r = .54$, $t = 11.88$, and a significance level of $p < .05$. This suggests that an upsurge in dysfunctional metacognitions is paralleled by an increment in academic burnout.

Conversely, a negative correlation is seen between metacognition and mindfulness, demonstrated with a correlation coefficient of $r = −.68$, $t = −15.48$, and a significance level of $p < .05$, indicating that the amplification of dysfunctional metacognitions corresponds with a reduction in mindfulness levels.

Moreover, a negative correlation is noted between mindfulness and academic burnout, documented with a correlation value of $r = −.66$, $t = −16.89$, and a significance level of $p < .05$. This finding supports the assertion that an increase in mindfulness is associated with a decrease in the propensity for academic burnout.

3.2. Findings Related to the Structural Model

In the initial phase of the two-step structural equation methodology employed in the investigation, a highly satisfactory measurement model was established based on the goodness-of-fit statistics. Subsequently, the second phase entailed the formulation and evaluation of a structural model delineating the intrinsic relationships amongst the latent variables present in the model. The standardized path coefficients pertaining to the structural model are shown in Figure 3.

Figure 3

Standardized path coefficients for structural model
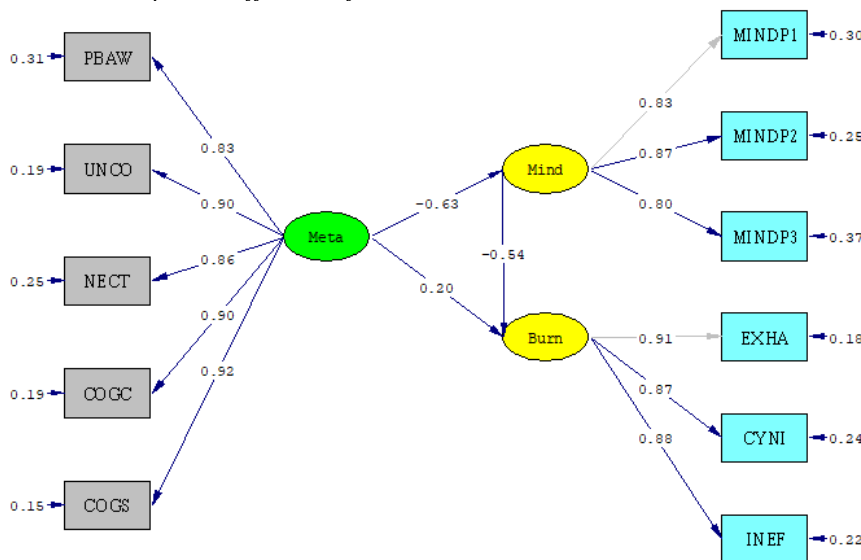
Chi-Square=98.27, df=41, P-value=0.00000, RMSEA=0.068

Note. PBAW: Metacognitions Questionnaire-30 Scale (MCQ-30) - Positive Beliefs About Worry subscale total score; UNCO: MCQ-30 - Uncontrollability and Danger subscale total score; NECT: MCQ-30 - Need to Control Thoughts subscale total score; COGC: MCQ-30 - Cognitive Confidence subscale total score; COGS: MCQ-30 - Cognitive Self-Consciousness subscale total score; MINDP1-3: Three parcels from the Mindful Attention Awareness Scale items; EXHA: Maslach Burnout Inventory – Student Scale (MBI-SS) - Exhaustion subscale total score; CYNI: MBI-SS - Cynicism subscale total score; INEF: MBI-SS - Inefficacy subscale total score.

The standardized path coefficients depicted in Figure 3 reveal that metacognition negatively predicts mindfulness (β= −.63, $t = 10.23$, $p < .05$) and positively predicts academic burnout (β = .20, $t = 2.95$, $p < .05$). Conversely, mindfulness serves as a negative predictor for academic burnout (β = −.54, $t = −7.42$, $p < .05$).

The goodness-of-fit indices for the structured model were as follows: χ^2/df = 2.39, RMSEA = .06 (90% CI: .05-.08), NFI = .98, NNFI = .99, CFI = .99, IFI = .99, SRMR = .03, GFI = .94, and AGFI = .91. These values indicate a satisfactory fit of the model to the data.

3.3. Significance of Indirect Effects for the Structural Model

The validity of the indirect effects within the model was assessed utilizing the Bootstrap method. Details pertaining to the significance of these effects in the structural model are shown in Table 3.

Table 3
Bootstrap analysis results for the significance of indirect effects

Independent Variable	Mediator Variable	Dependent variable	Path Coefficient (β)	%95 CI – Bias Corrected
Metacognition	Mindfulness	Academic burnout	.20* (.54*)	[.220, .425]

Note. Bootstrap was conducted on a sample of 5000 observations. β =Standardized. *p < .05

As delineated in Table 3, the path coefficient connecting metacognition to academic burnout registered at β = .54 in the absence of the mediating variable's influence; this value diminished to β = .20 when the mediator was entered into the model. Bootstrap analysis validated the statistical significance of the identified indirect effects at the .05. This substantiates that mindfulness functions as a partial mediator in the relationship between metacognition and academic burnout, thereby supporting the research hypothesis.

4. Discussion and Conclusion

This research investigated the intermediary role of mindfulness in mediating the relationship between dysfunctional metacognitions and academic burnout among university students. The constructed structural equation model revealed a positive predictive relationship between metacognition and academic burnout, confirming the initial hypothesis of the study and illustrating the detrimental impact of dysfunctional metacognitions on student well-being.

Drawing upon the Self-regulatory Executive Function (S-REF) Model (Wells, 2000; Wells & Matthews, 1994, 1996), which delineates the foundational role of dysfunctional metacognitive beliefs in psychological disorders, it can be inferred that such beliefs foster a propensity for maladaptive coping responses and emotional challenges. These theories were substantiated through the research's findings, endorsing the assertion that the increase in dysfunctional metacognitions precipitates a decline in mindfulness, affirming the study's second hypothesis (Cotter et al., 2017; Hatton, 2004; Wells & Cartwright).

Moreover, the research identified a significant negative pathway from mindfulness to academic burnout, corroborating the third hypothesis and highlighting the potential of heightened mindfulness in alleviating experiences of academic burnout. This can be ascribed to the augmented awareness and acceptance facilitated by mindfulness, enabling individuals to mitigate emotional responses to stressors and maintain a non-judgmental perspective towards daily experiences, consequently reducing the perception of academic burnout (Lindsay & Creswell, 2017). Numerous studies substantiate this perspective, indicating a reciprocal relationship between increased mindfulness and reduced academic burnout (An et al., 2018; Arias et al., 2010; Martínez-Rubio et al., 2020; Yuan et al., 2018).

Utilizing bootstrap technique for confidence intervals, the study demonstrated mindfulness's significant partial mediating role in the connection between metacognition and academic burnout, thus affirming the fourth research hypothesis. This pivotal role of mindfulness offers a counterbalance to the adverse effects of dysfunctional metacognitions, promoting a grounded,

present-moment awareness as opposed to autopilot responses characterized by habitual, unexamined reactions (Solem et al., 2015).

This research substantiated the pivotal role of mindfulness as a mediator in the relationship between dysfunctional metacognitions and academic burnout among university students, drawing evidence from a meticulously crafted structural equation model. Confirming the study's foundational hypothesis, it underscored the detrimental role dysfunctional metacognitions play in fostering academic burnout, a phenomenon grounded in the Self-regulatory Executive Function (S-REF) Model developed by Wells and colleagues. The findings delineated a pronounced decline in mindfulness with escalating dysfunctional metacognitions, a notion buttressed by existing theoretical frameworks, and validated the negative trajectory from mindfulness to academic burnout, corroborating the potential of mindfulness in alleviating the stressors contributing to burnout. This is attributed to the augmentative role of mindfulness in nurturing an enhanced awareness and acceptance of one's experiences, thereby establishing a shield against the repercussions of stress and burnout.

As underscored by the bootstrap technique utilized in verifying the research hypotheses, mindfulness emerged as a significant partial mediator in the pathway between metacognition and academic burnout, echoing the sentiments echoed in existing literature and asserting the urgency for interventions rooted in mindfulness to counterbalance the impacts of dysfunctional metacognitions. This study, therefore, not only confirms the protective role of mindfulness but also paves the way for future research avenues to further explore this multifaceted relationship, anchored in a deeper understanding and appreciation of the present moment, steering clear from unexamined, habitual reactions that characterize an "autopilot" mode of response. It lends a powerful voice to the call for integrated mindfulness practices in the academic milieu, advocating for a proactive approach to nurturing mental well-being in university students.

In light of the findings from this research, several recommendations and limitations can be delineated. It is advised to undertake the development of mindfulness-based interventions, considering the pivotal role mindfulness plays in mediating the relationship between metacognition and academic burnout. Initiatives to construct and launch psychological counseling and psychoeducational programs tailored for students with high levels of burnout could potentially bear fruitful outcomes. Concurrently, crafting awareness initiatives can effectively counteract the detrimental effects of dysfunctional metacognitions on an individual's cognitive apparatus, thus fostering a nourishing mental environment.

Turning our attention to the limitations of the current endeavor, it is notable that the sample pool was restricted to university students, which inherently narrows the applicability of the findings to a broader demographic spectrum. Future explorations in this realm would benefit from an enriched and diversified participant base encompassing varied age brackets and educational backgrounds to enhance the generalizability of the outcomes. Furthermore, the cross-sectional methodology adopted here imposes a constraint on tracking evolutions over time, a limitation that can be addressed in subsequent research through a longitudinal approach offering deeper insights into the intricate dynamics between the elements under scrutiny. The reliance on self-report measures, albeit a practical choice, introduces potential biases, including social desirability and recall bias, paving the way for enriched future studies with integrated objective measures to amplify the robustness of the findings. Moreover, the investigation cast the spotlight exclusively on mindfulness as a mediating entity; however, a more rounded understanding might be achieved by bringing other potential mediators into the investigative framework.

In conclusion, while the study sheds significant light on the beneficial role of mindfulness in mitigating academic burnout and the adverse impacts of dysfunctional metacognitions, it underscores a pronounced necessity for further studies. These studies should encompass a focused approach to augment mindfulness and awareness levels, bearing in mind the constraints of the current research design. Moving forward, a trajectory that embraces a holistic and

multidimensional investigative lens promises to unlock a more profound understanding of the relationships encapsulated in this study.

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