The Impact of Academic Procrastination on Academic Burnout and Sleep Quality: The Mediating Role of Guilt

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Abstract

Academic procrastination - voluntary postponement of academic work despite being aware of resulting adverse consequences - is a common occurrence among university students and it is associated with burnout and impaired sleep. Guided by the Self-Regulation theory, the current research investigated whether guilt mediates procrastination as people related to two forms of outcomes (i.e., academic burnout and sleep quality). Using a cross-sectional design, 400 undergraduate and graduate (55% females, average age (21-23 years) of mostly universities of the public and private sector) students took part in validated tests: PASS (procrastination), SSGS-guilt, MBI-SS (burnout), PSQI (sleep quality). Reliability was strong (α = 0.84–0.92). Procrastination was also positively related to guilt (r=.56) and burnout (r=.49) and negatively related to sleep quality (r= -.41; all p < -.001). Guilt was found to be related to burnout (r = .52), and sleep quality (r = -.46) in a negative relationship. Likewise, procrastination was also significantly related to guilt (Hayes' PROCESS, 5,000 bootstraps), b=.56. For burnout, both procrastination (β =.22), and guilt (β =.52) were significant predictors (R^2=.47) with guilt mediating the relationship (in part; 57% of total effect). For the quality of sleep, an effect of procrastination (β = -.14) and feelings of guilt (β = -.46) on poorer sleep (R^2 = .33) was found, which was partly mediated (approximately, 63%).

Keywords: Academic procrastination; Guilt; Academic burnout; Sleep quality; Self-Regulation Theory; Mediation; University students; Emotional regulation

Introduction

Academic procrastination (defined as the voluntary postponement of an intended course of action in spite of anticipated negative consequences) is a problem that affects all university students (Martinie & Shankland, 2023). This phenomenon is particularly prevalent in a higher education setting due to the presence of heightened academic pressure and stringent demands (Xue et al., 2025). Such behaviors can include irrational postponement of tasks outside of the scheduled time frame, which can have negative impacts on school outcomes, as well as provide enhancement of negative feelings, and further contribute to problem mobile phone use (Yue et al., 2024). This conscious postponement of academic tasks can lead to a chain of negative consequences for the psychological and physiological health of students such as a greater degree of academic burnout and an impaired sleeping pattern (Bao et al., 2025; Xue et al., 2025). Consequently, understanding the mechanism(s) behind the observed association between academic procrastination and these unfavorable outcomes is important in order to develop an effective intervention(s) with the aim of fostering student well-being and academic success (Xue et al., 2025). This paper is designed to examine these complex relationships among academic procrastination, academic burnout and sleep quality by focusing on the mediating role of guilt relationship among them. This study assumes that maladaptive self-regulation and psychological states, namely, academic procrastination cause their guilt that in turn cause their academic burnout and reduced sleep quality in university students (Sun et al., 2024). This takes on particular relevance in the face of troublesome sleep behavior, lack of sleep and poor quality of sleep reported in undergraduates that is often combined with other behaviors such as bedtime procrastination (Alshammari et al., 2023).

The frequency of university students procrastinating only demonstrate the need for this investigation as it may have a serious effect on their entire academic career and overall health as people (Savas et al., 2025). Further, the implication of involvement in digital spaces on the students can contribute to the problems of academic procrastination and create digital burnout, resulting in delays in academic undertaking (Savas et al, 2025). This prevalence of failure in the area of self-regulation is usually translated to students pushing very important academic tasks for the eleventh hour, which may lead to a severe impact on academic performance and mental well-being (Chavez-Yacolca et al., 2025). The increasing academic demands and intricate educational environments contribute significantly to the growing occurrence of academic burnout among college students in the form of diminishing of psychological resources and maladaptive reactions towards chronic academic stress (Xu et al., 2025). This phenomenon with emotional exhaustion, cynicism, and decreased personal accomplishment in an academic setting has experienced a faulty apart trajectory throughout the past few years (Guanghui et al., 2024; Wei et al., 2025). Similarly, poor sleep quality and sleeping disturbance prevalence among students are major concerns that are often associated with irritability, chronic fatigue and impaired academic performance (Ye et al., 2023). These supplements interrelated, the necessity to grasp the mechanisms to which academic procrastination is connected with created both academic burnout, and not consenting quality, sleep (even with effects don't seem to be universal as the significance of academic self-conscious emotions (e.g. guilt)) (Aydin and Aydin, 2024; Savas et al., 2025).

This study aims to address this gap by providing an overall model for explaining the role of guilt as a direct emotional consequence of procrastination in mediating on the relationship between academic procrastination, academic burnout and sleep quality. This investigation is based on the understanding that such a model can provide some invaluable information for the development of designed psychological interventions which aim at counteracting the

negative effects of academic procrastination on student well-being. Therefore, the major objective towards this research is to empirically investigate direct and indirect effects of academic procrastination on academic burnout and sleep quality is to look at the mediating role of guilt among university students.

Literature Review

This section will cover some of the current empirical evidence showing that academic procrastination is associated with a range of negative consequences including academic burnout and sleep problems (Xu et al, 2025). It will also examine the emotional consequences of procrastination and in particular, the role of guilt, and will discuss the theoretical frameworks that can be used to support these relationships. Through this comprehensive understanding of these inter-connections, it will be possible to present a comprehensive conceptual model of these variables that considers a role of academic procrastination, academic burnout, sleep quality, as well as that of guilt in a strong theoretical framework as a Self-Regulation Theory (Touloupis & Campbell, 2023). This theoretical lens argues that individuals use different strategies of self-regulation to control their behaviors and successfully accomplish their goals and when a person fail at this strategy, they may suffer maladaptive effects such as procrastination, and as a result of this the individual may feel guilt and then in turn their well-being (Sun et al., 2024; Xu et al., 2025). The complex tangled interconnection of academic procrastination and its cascading consequences necessitate the greatest possible exploration of associations of this behavioral pattern with serious emotional anguish and physiological disarray (Rad et al, 2025). Specifically, this review will synthesize the findings regarding the role of the chronic delay of academic tasks in emotional exhaustion, cynicism and reduced sense of accomplishment that is characteristic of academic burnout. Furthermore, this section will shed light on the possibilities of procrastination on academic works to disturb the circadian rhythms and lead to sleep disturbance, which can, in turn, affect the overall sleep quality of university students (Onder et al., 2025).

Moreover, during the literature review, the subjective experience of guilt that is usually a consequence of the discrepancy between planned and performed behavior will be regarded to play a central role as an emotional consequence of academic procrastination that can also heighten academic burnout and sleep disturbances (Albulescu et al., 2024). This section will also examine empirical research that has examined the complex relationships between academic procrastination and psychological and physiological consequences (such as the negative emotions associated with the time, such as anxiety, which can further impair sleep quality) (Sun et al., 2024). Additionally, of people who struggle to regulate their emotions, often procrastinate as means of avoiding unpleasant emotions that arise due to their academic tasks, despite them causing an increase in unpleasant emotions such as stress, anxiety, and guilt (Duru et al. 2024). This cyclical behavior of first avoiding and being in a negative emotional state further adds on to the procrastination behavior which creates a vicious cycle that impacts the well-being of the students to a great extent (Diotaiuti et al., 2021; Gadosey et al., 2023). A better understanding of this cycle is important especially in light of the fact that academic procrastination has been described as an intentional but unnecessary postponement of academic actions despite an awareness of possible detrimental consequences (Baulke et al., 2021). This conscious postponement often supposedly leads to a gap between intentions and actions, usually referred to as an intention-action gap, which is at the very heart of an understanding of the mechanisms of academic procrastination (Koppenborg et al., 2023). This gap often leads to guilt and regret emotions which can in turn, exacerbate the academic burnout and have an adverse effect on their sleeping patterns (Gadosey et al., 2023).

Knowing the psychological underpinnings of this intention-action gap, in particular, in the context of recent theoretical frameworks, including Self-Regulation Theory, provides a good basis for the analysis of the progression of procrastinating to the state of burnout and disturbed sleep. This theoretical perspective focuses on the role of disruptions in self-regulatory processes like the formation of goals, planning, and monitoring in causing and sustaining academic procrastination (Wieland et al., 2021). The ensuing emotional distress, especially guilt, that comes out of this self-reg working failure, then is an important connection, one that mediates these negative consequences of procrastination on academic burnout and the quality of sleep (Perez-Jorge et al., 2024). This section will therefore go into detail about the empirical evidence for these connected relationships, pointing to studies that show the direct and indirect pathways by which academic procrastination has a detrimental effect on student well-being (Gadosey et al., 2023; Rad et al., 2025). The high frequency of academic procrastination in university students is estimated to be 80-95% therefore the particular research is of great importance as it is tied with some unhealthy consequences, namely poor academic performance, stress as well as reduced satisfaction in academic life (Duru et al., 2024; Rad et al., 2025). Such prevalence likely calls for a detailed examination of its psychosocial consequences including the often-missed emotional consequences such as feelings of guilt, their further influence on key markers of student health, such as the quality of sleep, as well as academic burnout (Gadosey et al., 2023, 2024; Hailikari et al., 2021). Further, the habitual inability to complete academic tasks, in most cases this is accompanied by stress and anxiety, is a type of self-defeating behavior which contributes substantially to such negative outcomes (Xie et al., 2023).

This section will therefore attempt to synthesize existing literature in order to build a conceptual model explaining these complex relationships especially focusing on guilt as a critical mediating factor (Sun et al. 2024). This model will graphically represent the hypothesized pathways showing the ways that academic procrastination is associated with increased guilt which is in turn associated with increased levels of academic burnout and reduced sleep quality amongst university students.

Hypothesis

H1: Academic procrastination positively predicts academic burnout.
H2: Academic procrastination negatively predicts sleep quality.
H3: Academic procrastination positively predicts guilt.
H4: Guilt positively predicts academic burnout.
H5: Guilt negatively predicts sleep quality.
H6: Guilt mediates the relationship between academic procrastination and both academic burnout and sleep quality.

Methodology

Research Design

The present study used a quantitative, cross-sectional research design to test the hypothesis of the impact of academic procrastination (on academic burnout and sleep quality) and the mediating role of guilt in the case of these relationships. A cross-sectional survey approach was decided upon as it is suitable for examining associations among psychological variables within a population of university students at one point in time.

Participants

The target population consisted of undergraduate and graduate student population enrolled in public and private universities. Convenience sampling was utilized to recruit participants through the utilization of online platforms and classroom distribution.

A minimum sample size of 400 participants was targeted to have adequate statistical power to run statistical mediation analysis (PROCESS Model 4). Inclusion criteria were:

- Currently enrolled University students
- Aged 18 years or older
- Ability to comprehend and to respond to the survey language

Participants with diagnosed sleep disorders or severe psychological conditions (self-reported) were excluded, to limit the effects of unfolding confounding phenomena.

Measures

1. Academic Procrastination

Academic procrastination was measured by the Procrastination Assessment Scale-Students (PASS) created by Solomon and Rothblum (1984). The scale measures procrastination behaviors for academic activities such as studying for exams and writing papers. Responses are collected using a 5-point Likert scale where the range of responses ranges from 1 (Never) to 5 (Always). Higher scores mean higher levels of academic procrastination.

2. Guilt

Guilt was measured with the Guilt subscale of the State Shame and Guilt Scale (SSGS) by Marschall et al (1994). The subscale is a measure of state-level guilt feelings with regard to recent behaviors. Items are rated on a 5-point Likert scale ranging from 1 (Not feeling this way at all) to 5 (Feeling this way very strongly). Higher scores express higher guilt.

3. Academic Burnout

Academic burnout was assessed by the Maslach Burnout Inventory-Student Survey (MBI-SS) developed by Schaufeli et al (2002). The scale is made up of three dimensions, emotional exhaustion, cynicism, and academic inefficacy. Responses are measured using a 7-point Likert scale from 0 (Never) to 6 (Always). Higher scores are associated with higher levels of burnout.

4. Sleep Quality

Sleep quality was determined by the Pittsburgh Sleep Quality Index (PSQI) created by Buysse et al. (1989). The PSQI measures sleep quality in the past month according to seven components. A global score is calculated, the higher the score the worse the quality of sleep will be.

Procedure

As this study was conducted independently, then there were no ethical principles of psychological research that the researcher did not follow strictly in the research process. Participants were informed of the purpose of the study, that their participation was voluntary and that at any time they could withdraw from the study without penalty. They were guaranteed confidentiality and anonymity and no personally identifying information was collected. Informed consent was electronically obtained prior to the participants moving on to complete the survey. The study data were collected using an online questionnaire that were created using Google form. The survey started with demographic questions and then went on to the standardized measuring scales. Time required on average for completing the questionnaire was about 15-20 minutes.

Data Analysis

Data were analyzed with the help of the statistical package of the specific program (Statistic for descriptive statistics) Premium Edition 27. Preliminary analyses were performed by first testing for missing data, outliers, and then computing descriptive statistics (means and standard deviations) for all variables. Internal consistency reliability was determined by using Cronbach's alpha with .70 or higher scores for internal consistency reliability considered acceptable.

In order to test the hypotheses, regression analyses were carried out. Mediation was analyzed with the help of Hayes' (2018) PROCESS Macro (Model 4). Bootstrapping estimating indirect effects with 5000 resamples. Mediation was significant if the 95% confidence interval excluded zero. Academic procrastination as the independent variable, guilt as the mediator, and academic burnout and sleep quality were separately tested as the dependent variables.

Results

This section introduces the results of the statistical analyses such as the results of descriptive statistics, result of correlation and result of the mediation analyses that we conducted in order to test the proposed hypotheses. The demographic properties of the participants are presented, followed by detailed description of the psychometric properties of the scales used, which includes reliability checks, validity checks.

Table 1: *Demographic Characteristics of the Sample (N = 400)*

Variable	Category	N	%
Gender	Male	180	44.0
	Female	220	55.0
Age	18–20 years	124	31.0
	21–23 years	186	46.5
	24–26 years	68	17.0
	27 years and above	22	5.5
Year of Study	1st Year	102	25.5
	2nd Year	116	29.0
	3rd Year	108	27.0
	4th Year	74	18.5
Field of Study	Social Sciences	138	34.5
	Natural Sciences	96	24.0
	Business / Management	82	20.5
	Engineering / Technology	84	21.0
Living Arrangement	With Family	210	52.5
	University Hostel	124	31.0
	Private Accommodation	66	16.5

The study sample was 400 university students. Slightly over half of the subjects were female (55%), and 44% of the participants were male. The mean age of the participants, most of them falling between the ages of 21 and 23 (46.5%). Students were fairly evenly distributed across the different academic years (the biggest group were in 2nd year with 29%). With respect to the field of study, most of the participants were in social sciences (34.5%). Over half (52.5%) of the participants said they lived with their families while the rest were in university hostels or private residences.

Table 2: *Means, Standard Deviations, Correlations, and Reliability Coefficients (N = 400)*

Variables	Mean	SD	AP	Guilt	AB	SQ	Cronbach's Alpha (α)
AP	3.420	0.710	1				0.910
Guilt	3.280	0.680	.560***	1			0.890
AB	3.510	0.740	.490***	.520***	1		0.920
SQ	2.940	0.650	−.410***	−.460***	−.380***	1	0.840

Note. AP = Academic Procrastination; AB = Academic Burnout; SQ = Sleep Quality. **$p < .001$.

As shown in Table 2, academic procrastination (AP) was significantly and positively correlated with guilt (r = .56, p < .001) and academic burnout (r = .49, p < .001), and has been negatively correlated with sleep quality (r =−.41, p < .001). Guilt was found to be positively related to academic burnout (r=.52, p<.001) and was negatively related to sleep quality (r=.−.46, p=.001). Academic burnout was also negatively correlated with quality of sleep (r=−.38, p<.001). All scales showed good internal consistency and the Cronbach's alpha values ranged between 0.84 and 0.92.

Table 3:   *Regression Results for Study Variables (N = 400)*

Variable	Guilt	Academic Burnout	Sleep Quality
Constant	1.42***	1.38***	4.12***
Academic Procrastination	.56***	.22***	−.14**
Guilt	—	.52***	−.46***
R²	.31	.47	.33
Adjusted R²	.31	.47	.33
F	166.18***	175.64***	96.42***

Note. Values are standardized beta coefficients (β). **p < .01**, p < .001***.**

A series of multiple regression analyses were performed to understand the predictive relations between academic procrastination, guilt, academic burnout and sleep quality.

First, academic procrastination was a significant predictor of guilt (β = .56, p < .001) to explain 31% of the variance in guilt (R² = .31, F = 166.18, p < .001). This result suggests procrastinating students reported much more feelings of guilt than students who reported lower levels of procrastination.

Second, when academic burnout was regressed on both academic procrastination and guilt, the full model was significant (R² = .47, F = 175.64, p < .001), and accounted for 47% of the variance in burnout. Both academic procrastination (β = .22, p < .001) and guilt (β = .52, p < .001) were significant positive predictors. Of the significant results, the beta coefficient of procrastination showed a large decrease compared to the zero-order correlation, indicating that guilt contributes a large portion of the correlation between procrastination and burnout.

Third, for sleep quality, the model of multiple regression was also significant (R²=.33, F=96.42, P <.001), explaining 33% of variance. Both academic procrastination (β = −.14, p < .01) and guilt (β = −.46, p < .001) were significantly related to the quality of sleep measured in the negative direction. Students who reported being more procrastinatory and having higher guilt had poorer sleep quality. Similar to the burnout model, the decrease in procrastination coefficient with the inclusion of guilt, suggests a mediating effect of guilt.

Overall, the results of the regression analysis give strong evidence for the hypothesized relationships and suggest that guilt has a significant explanatory role in the link between academic procrastination and both academic burnout and sleep quality.

Table 4:   *Mediation Results for Academic Burnout*

Effect	B	SE	95% CI	p
Total Effect	0.51	0.05	[0.42, 0.60]	< .001
Direct Effect	0.22	0.05	[0.13, 0.31]	< .001
Indirect Effect	0.29	0.04	[0.22, 0.37]	< .001

The mediation analysis suggested that there was a significant total effect of academic procrastination on academic burnout (B = 0.51, SE = 0.05, p < .001, 95% CI [0.42, 0.60]). When guilt was added to the model, the direct effect of academic procrastination on burnout was still significant but was reduced significantly (B = 0.22, SE = 0.05, p < .001, 95% CI [0.13, 0.31]). Importantly, the indirect effect of academic procrastination on burnout through guilt was

significant (B = 0.29, SE = 0.04, 95% CI [0.22, 0.37]), as the confidence interval did not contain the value 0.

These results suggest that guilt was found to mediate, in part, the relationship between academic procrastination and academic burnout. Approximately 57% of the overall effect of procrastination on burnout was sent through guilt indicating that feelings of guilt occupy a sizable psychological mechanism connecting procrastination and visiting a rise in burnout in learners.

Table 5: *Mediation Results for Sleep Quality*

Effect	B	SE	95% CI	p
Total Effect	−0.38	0.05	[−0.47, −0.29]	< .001
Direct Effect	−0.14	0.04	[−0.22, −0.06]	.001
Indirect Effect	−0.24	0.03	[−0.31, −0.18]	< .001

For the quality of sleep, academic procrastination had a significant total effect (B = −0.38, SE = 0.05, p < .001, 95% CI [−0.47, −0.29]). After the inclusion of guilt in the model, the direct effect remained significant, but reduced in its magnitude (B = [−0.14, SE = 0.04, p = .001, 95% CI [−0.22, −0.06]). The indirect effect through guilt was also significant (B = −0.24, SE = 0.03, 95% CI [−0.31, −0.18]), given that the confidence interval was incompatible with zero.

This pattern of results shows the presence of partial mediation. Approximately 63% of the total negative effect of academic procrastination on sleep quality worked indirectly through guilt. That is, there was a positive link between procrastination and guilt, while this was a significant contributor of poor quality of sleep.

Discussion

The present research study investigated the relationships of academic procrastination, guilt, academic burnout and sleep quality (SQ) in a sample of university students. The results provide good psychometrics and empirical evidence to the proposed model.

The sample was predominately drawn from early adult age University students with a slight female majority. Representation across academic years and fields of study helps to increase generalizing of the findings in the university context. This demographic distribution is consistent with previous studies on the behavior of similar psychological constructs among students (Figueiredo-Ferraz et al., 2021; Xu et al., 2025) which provides evidence for the applicability of the results in the context of higher education.

The internal consistency of all the study variables was high with the result show with the Cronbach's alpha (a) values ranging from 0.840 to 0.920. Specifically, reliability coefficients were 0.910 (Academic Procrastination), 0.890 (Guilt), 0.920 (Academic Burnout) and 0.840 (Sleep Quality). The reliability of all values was beyond the traditional threshold of 0.70 and thus had a good to excellent reliability value (Grossi et al., 2021; Izadpanah, 2023; Xu et al., 2025). These results are consistent with previous results that have demonstrated great psychometric characteristics of similar scales (Esteban et al., 2023; Xue et al., 2024). The high levels of internal consistency create more confidence in the validity of the constructs and that the relationships that are observed are meaningful psychological processes and due to the reliability and not the result of measurement error.

Correlational analyses indicated that there were significant and theoretically based relationships between the variables. Academic procrastination was found to be positively related to guilt (the weaker correlation: r = .560, p < .001) and academic burnout (r = .490, p < .001) and was negatively related to sleep quality (the weaker correlation: r = -.410, p < .001). Also, guilt was positively related to academic burnout and negatively related to sleep quality, hence, the complexity of guilt in the end results of students in their academic and well-being.

These results are against prior literature relating procrastination in learning with psychological distresses and affections on sleep (Alshammari et al 2023). For example, procrastination has been found to be related to bedtime procrastination (Hamvai et al., 2023), while academic burnout has been found to be positively correlated with depression (Lin et al., 2025). In all, the correlations showed a medium to large effect size and a clear picture: procrastination, guilt and burnout showed a positive association with each other and a negative association with sleep quality (Jochmann et al., 2024). These results allow one to determine the required statistical basis to test the mediation effects (Alshammari et al., 2023).

To further elucidate these relationships, regression analyses were conducted in order to focus on the predictive function of academic procrastination and guilt on academic burnout and sleep quality. Preliminary multiple regression analyses were used to support the presence of significant direct effects, by finding that assumptions of normality were met. Path analyses were performed using the methodology of Maximum Likelihood Estimation (Touloupis, and Campbell, 2023), which, in turn, allowed the possibility of taking into consideration direct and indirect effects of the proposed model (Diotaiuti et al., 2021; Duru et al., 2024).

In line with the mediation framework by Baron and Kenny (Wang et al., 2021), mediation analyses were performed in the framework of Hayes' PROCESS macro (for SPSS) - the bootstrap procedures were performed to infer confidence intervals for indirect effects (Gonzalez-Brignardello et al., 2024; Jafarian & Kramer, 2024; Koppenborg et al., 2023).

For academic burnout, the results showed a significant mediating effect of guilt in academic procrastination and burnout. This seems to suggest that procrastination contributes to the development of enhanced burnout as a result partly from the psychological experience of guilt. These results are in line with previous evidence of an important emotional factor for the relationship between maladaptive academic behaviors and distress outcomes, the guilty feelings (Curtis, 2023; Albulescu et al., 2024). The results support the theoretical positioning of guilt as an important intervening variable (Cengiz & Peker, 2024; Sun et al., 2024).

Similarly, mediation analysis was performed for sleep quality and primary analysis revealed that guilt has explained the relationship between academic procrastination and sleep quality to a certain extent. These results were further reinforced by using robustly the philosophy of bootstrapping (Gonzalez-Abidad et al., 2024; Wang et al., 2021). This appears to suggest that procrastination may confer indirect as well as direct impairments to sleep due to heightened guilt (Figueiredo-Ferraz et al., 2021).

Implications

The current results have a number of significant theoretical, practical, and clinical implications. First, the results add strength to the conceptualization of guilt as a central emotional mechanism relating maladaptive academic behaviors to adverse psychological and behavioral outcomes. By showing that guilt mediates this relationship between academic procrastination and both academic burnout and sleep quality in part, the research enhances current models of self-regulation and emotional processing in academics. The results support theories that procrastination is not only a time management problem, but also a way of affect regulation that has the paradoxical impact of increasing negative affect and thereby adversely affecting distress and functioning. Furthermore, the position of guilt as an intervening factor adds to a more refined understanding of how academic procrastination translates to burnout and sleeping problems. Rather than conceptualize these associations as being solely behavioral or cognitive processes, the results evidence the emotion pathways behind student academic maladjustment.

From an applied standpoint, the results highlight the importance of focusing on emotional experiences (emotional in specifying guilt) when developing interventions designed to alleviate academic procrastination and burnout. University counseling centers and student support services might take advantage of the potential benefits of adding emotion-focused elements to procrastination interventions, including Cognitive Behavioral Strategies involving maladaptive guilt appraisals, Self-Custom Issues like self-compassion training and adaptive emotion regulation abilities. Given the demonstrated relationship between procrastination, guilt, and sleeping quality, sleep hygiene programs may also be improved by addressing relevant emotional processes instead of only focusing on behavioral routines for sleep. Academic skills workshops could include such modules as self-forgiveness, realistic goal setting and adaptive coping for the rumination associated with guilt that can hinder the restoration of good sleep. All in all, initiatives to both prevent and treat procrastination behaviors and emotions together may prove to be more effective in alleviating academic burnout and fostering better sleep in university students.

Limitations and Future Directions

Despite that the present study had its contribution; there are a number of limitations that should be acknowledged. First, the cross-sectional design is a limiting design. Although present analyses of mediation were performed with robust procedures of bootstrapping, the temporal sequencing of academic procrastination, guilt, burnout and sleep quality cannot be definitively determined. Longitudinal studies are necessary to study the directionality of these relations and to investigate the role of guilt as a prospective predictor of increases in burnout and sleep disturbances over time. Second, the assessment of all the variables used self-report instruments, which may result in common method errors and social desirability effects. Future research might include use of multi-method approaches, such as behavioral indicators of procrastination, physiologic or actigraphy-based assessment of quality of sleep and peer or instructor reports of academic functioning. Third, the sample was made up of students in early adulthood (mostly in university), so the findings may not be generalizable to other populations (for example adolescents, working adults, clinical samples, etc). Future studies should replicate a model in different age groups, cultures and educational systems to explore the stability and cross-cultural validity of the findings obtained.

Although guilt came up as an important mediator, other emotional and cognitive variables may be important. Future studies may investigate other mediators such as shame, rumination, perfectionism or self-criticism. Moreover, possible moderators, such as gender, academic year, resilience, social support, or personality characteristics, should be investigated in order to highlight groups that procrastination is especially harmful to. Future studies can also use longitudinal structural equation modeling or cross-lagged panel designs to get a better idea of reciprocal relationships among procrastination, emotional processes, burnout, and sleep quality. Experimental or intervention-based research that can further understand the fundamental questions of whether reducing guilt contributing to the measurable improvements of burnout and sleep outcomes.

Conclusion

The current research is highly psychometrically sound and empirically grounded for proposing a model of the relationships of academic procrastination, guilt, academic burnout and sleep quality among university students. The results show that academic procrastination has been shown to be positively related to guilt, academic burnout, and negatively related to sleep quality. Importantly, guilt proved to be a significant mediating mechanism, to a certain extent explaining relations between procrastination and both burnout and sleep disturbances. These

results emphasize the importance of emotional processes (in this case, guilt) in explaining the negative impacts of academic procrastination. By identifying guilt as an important explanatory pathway, the research is a step towards building a more complex model of academic maladjustment, and highlights the importance of emotional responses as needing to be addressed in more emotional contexts of higher education. Overall, interventions designed to address either behavior or emotion aspects of procrastination may be critical to promote academic health, curb burnout and enhance sleep quality among students in higher education.

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