The relationship between stress, academic burnout, and emotion regulation strategies

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Abstract

Objective: The literature illustrates an association between perceived stress and academic burnout (AB). However, research exploring the role of emotion regulation regarding this relationship is sparse. Thus, this study aimed to investigate whether cognitive emotion regulation strategies moderate the relationship between perceived stress and AB. Understanding this could help raise awareness regarding AB prevention and develop effective preventative strategies. **Method:** This study employed a quantitative correlational design. Ninety-three participants completed a Qualtrics survey, 60 females (M_{age}= 22.48), 31 males (M_{age}= 23.23), with one person not disclosing gender. The survey included questionnaires on current mood, perceived stress, cognitive emotion regulation strategies use, academic burnout, and neuroticism. **Results:** The findings revealed that perceived stress significantly predicted AB. Overall use of adaptive and maladaptive regulation strategies did not moderate the relationship between perceived stress and AB. When exploring emotion regulation strategies individually, only rumination moderated the relationship. **Conclusion:** The results suggest that emotional regulation strategies as a whole do not moderate the relationship between perceived stress and AB, but rumination individually does. This indicates that rumination affects students' coping with stress and contributes to AB. This provides useful information for the preventative strategies development that could target specifically rumination. Nonetheless, this novel study is limited by its cross-sectional design not explaining the relationship causality. Hence, replication studies employing experimental designs are warranted.

Keywords: *academic burnout, emotion regulation, perceived stress, university students*

Introduction

Academic burnout (AB) is a psychological syndrome characterized by a state of emotional exhaustion, cynicism, and lack of academic efficacy, caused by long-term study demands and pressure (Maslach & Leiter, 2016). The common symptoms of AB are fatigue, negative attitude towards studies, and feelings of incompetence (Maslach & Leiter, 2016). A recent systematic review revealed that 44 % of students report burnout symptoms to some extent worldwide (Rosales-Ricardo et al., 2021). AB may have serious negative consequences on students' life, such as worsened mental well-being and lower academic engagement, possibly leading to higher dropout rates (Ghadampour et al., 2016; Lin & Huang, 2014). Moreover, AB is associated with depression, anxiety, and suicidal ideation in students (Deeb et al., 2018; Dyrbye et al., 2008). Despite AB's high prevalence, most research examined only job-related burnout, which is a response to chronic occupational-related stress (Nadon et al., 2022). This restricts our understanding of AB aetiology and whether the risk factors differ from job-related burnout. Thus, this study explores factors contributing to AB. The implication could result in developing preventative strategies for students with high academic stress.

Perceived stress is defined by people's subjective thoughts and feelings regarding the amount of experienced stress (Cohen et al., 1983). The previous research found that AB was significantly and positively associated with academic load and overall stress in medical students (Backović et al., 2012; Santen et al., 2010; Sharififard et al., 2020). Recent cross-sectional study determined significant predictors (mental health, perceived support and perceived stress) of AB in medical students during covid 19 pandemic (Sveinsdóttir et al., 2021). Similarly, a survey study discovered that perceived stress was a significant risk factor for burnout among students of medicine, accounting for up to 28% of the variance (Kilic et al., 2021). The studies above focused primarily on medical students that are known for

experiencing high academic demands (Brazeau et al., 2014). However, this limits the data representativeness over students from other faculties. Thus, the present study aims to validate these findings and explore this in students from different fields. In addition, AB development may be influenced by individual differences, such as personality traits or emotion regulation (Shin et al., 2014).

Emotion regulation refers to processes by which individuals regulate their feelings/emotions (Aldao et al., 2010). Effective emotion regulation is positively associated with well-being, playing an important role in students' life quality and academic success (Ivcevic & Brackett, 2014; Miller & Racine, 2020). Individuals use different strategies to manage the intensity of their feelings/emotions, called emotion regulation strategies (ERSs; Aldao et al., 2010). Seibert et al. (2017) ascertained the relationship between academic performance, burnout, and ERSs (suppression and cognitive reappraisal). The results revealed that AB significantly mediated the relationship between ERSs and academic performance. Nonetheless, this study only explored two ERSs. Hence, the current study investigates additional ERSs, such as cognitive ERSs, to expand on this.

Cognitive ERSs are strategies that are used to cope with emotionally stressful information (Garnefski et al., 2001). Cognitive ERSs are divided into adaptive (AERSs; cognitive positive re-appraisal, acceptance, refocus on planning, positive refocusing, putting into perspective) and maladaptive (MERSs; rumination, catastrophising, self-blame, blaming others) strategies (Garnefski et al., 2001). Research shows that AERSs are associated with low levels of psychopathology, whereas MERSs are associated with higher levels of depression (Garnefski et al., 2001, 2002). Research suggests that cognitive ERSs might influence the development of AB (Chen, 2021). Vinter (2021) suggested that MERSs are more influential in the development of AB in middle-school students than regulating emotions using AERSs. Nevertheless, this study is limited by its cultural non-

representativeness due to recruiting only Estonian sample (Vinter, 2021) even though research demonstrates culture differences in ERSs use (Kwon et al., 2013). Thus, the current study aims to recruit culturally more diverse sample.

Stressful situations are associated with negative emotions such as anxiety and sadness (Wang & Saudino, 2011). The coping strategies one employs determine the ramifications of stress. MERSs, including rumination and catastrophising are associated with higher levels of stress-related symptoms (Moore et al., 2008; Zare, 2012). Moreover, emotion regulation was found to moderate the relationship between perceived stress and well-being among adults (Extremera & Rey, 2015). Nevertheless, this study did not control for any individual differences, such as personality traits (e.g., neuroticism), that could have affected the results. Neuroticism is defined by emotional instability, negative thinking and is associated with psychopathologies and AB (Ormel et al., 2013; Soliemanifar & Shaabani, 2013). Hence, in addressing the limitation of the previous study, the present study controls for neuroticism. A recent study discovered that ERSs significantly moderated the relationship between stress and parental burnout during covid 19 pandemic (Vertsberger et al., 2022). Specifically, rumination strengthened, and cognitive reappraisal weakened the association between these variables. This suggests that using maladaptive strategies increases the risk of developing parental burnout, and adaptive strategies diminish it. However, the nature of the stressors students experience may differ from parental stressors. It is important to explore whether ERSs could help explain the relationship between perceived stress and AB in students. Thus, the current study examines the role of emotion regulation and stress in developing AB in students.

Literature illustrates the association between stress, academic burnout and ERSs (Backović et al., 2012; Vinter, 2021). It was argued that the way we cope with stress is relevant to the development of certain psychopathologies (Extremera & Rey, 2015).

Nonetheless, the role of ERSs in relation to stress and burnout was explored only for parental burnout (Vertsberger et al., 2022). It remains unknown whether these findings could be translated into AB. Establishing what factors influence the development of AB may help students to address them and decrease the risk of AB. Therefore, the purpose of this study is to investigate whether the cognitive ERSs moderate the relationship between perceived stress and AB in university students. Also, former research examined the association between stress and AB mainly in medical students, limiting the representativeness of the data (Sharififard et al., 2020). Hence, this study aims to recruit students from various faculties. The implication could be in informing educational institutions to teach preventative techniques (e.g., replacing maladaptive emotion regulation strategies with adaptive ones). This led to the research question: Do maladaptive and adaptive emotion regulation strategies moderate the relationship between perceived stress and academic burnout?

The following hypotheses were developed based on the reviewed scientific evidence. It was hypothesised that: (1) Perceived stress will be a significant predictor of AB; (2) the relationship between perceived stress and AB will be moderated by (2a) the mean score of maladaptive emotion regulation strategies use (2b) the mean score of adaptive emotion regulation strategies use (Figure 1). MERSs use will strengthen, and AERSs use will weaken the relationship between perceived stress and AB.

Figure 1

Conceptual model of moderation
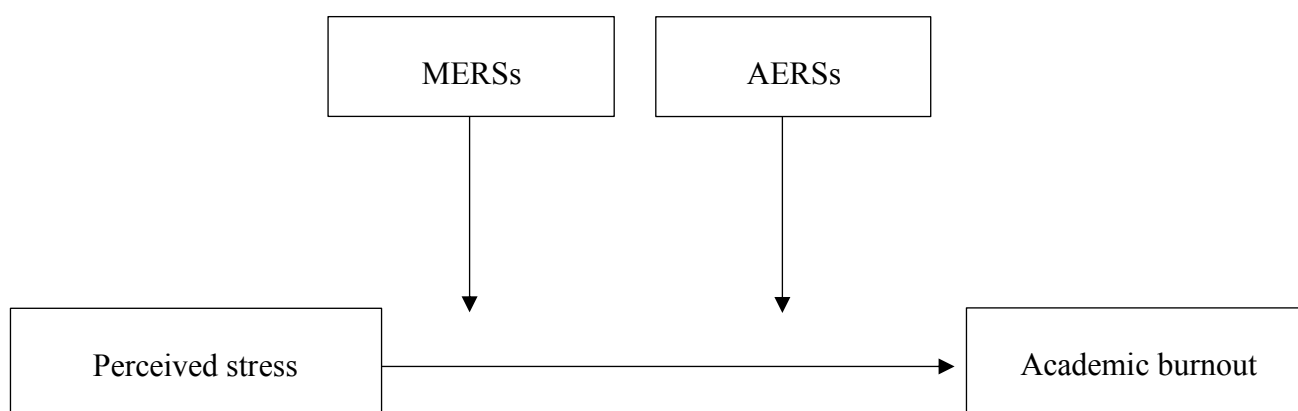
Method

Design

This quantitative study employed a correlational design to examine whether cognitive emotion regulation strategies moderate the relationship between perceived stress and academic burnout (AB). The independent variable was perceived stress (Cohen et al., 1983). The dependent variable was AB (Schaufeli et al., 2002). There were two moderators: the use of adaptive emotion regulation strategies (AERSs) and the use of maladaptive emotion regulation strategies (MERSs; Garnefski et al., 2001). Additionally, this study had three control variables, neuroticism, and current negative and positive mood/affect.

Participants

A prospective analysis using G*Power 3.1 revealed that this study should recruit a minimum of 55 participants to detect a medium effect size ($F^2 = 0.15$), based on a power of 0.80 and $\alpha = .05$ (Faul et al., 2009). For this study participants had to: (1) be 18 years or older due to looking at the adult population; (2) have a good understanding of English; (3) be university students due to the study's purpose.

Overall, this study recruited 112 participants, from which 19 were excluded due to incomplete surveys. The attrition rate was 16.96 %. The final sample consisted of 93 participants, 60 females (M_{age}= 22.48, SD_{age}= 1.68), 31 males (M_{age}= 23.23, SD_{age}= 2.29), and one participant did not disclose gender. The sample comprised individuals from Europe (89%), Asia (8%), North America (2%) and South America (1%). There was a range of different study courses within the sample: Psychology (73%), Medicine (5%), Business (2%), Economics (3%), and others (17%).

Materials

The Cognitive Emotion Regulation Questionnaire (CERQ)

Maladaptive and adaptive emotion regulation strategies were measured by the CERQ (Garnefski et al., 2001). The CERQ consists of 36 items on nine subscales, from which four subscales measure MERSs (catastrophising, rumination, self-blame, blaming others) and five measure AERSs (positive refocusing, putting into perspective, refocus on planning, acceptance, and positive reappraisal). For instance, "I think that I have to accept the situation.". Each subscale involves four questions and participants are asked to indicate what they generally feel/think when they experience negative events on a 5-point Likert scale (1 = almost never to 5 = almost always). A total score for each subscale is calculated by summing up all items together (range 4 to 20). Higher scores on each subscale indicate frequent use of that strategy. Previous research found that CERQ has good reliability (α = 0.83; Yalçınkaya-Alkar, 2020). In this study, CERQ shows acceptable internal consistency (α = 0.77).

The Maslach burnout inventory – student survey (MBI-SS)

Academic burnout was assessed by the MBI-SS (Schaufeli et al., 2002) which consists of 15 items and three subscales: Exhaustion, Cynicism, and Academic Efficacy. The exhaustion subscale consists of five questions, the cynicism subscale comprises four items, and the academic efficacy subscale involves six questions, for instance, "I feel emotionally

drained by my studies.". Participants rate items on a 7-point Likert scale (0 = never to 6 = always) to identify how often they feel a certain way. Total scores are calculated after reversing the items from the efficacy subscale, by summing up all items together. Higher scores indicate greater burnout. The MBI-SS has good reliability (α = 0.89; Schaufeli et al., 2002), which was confirmed by this study (α = 0.84).

The Perceived stress scale (PSS)

Perceived stress was measured by the PSS (Cohen et al., 1983) which consists of 10 items, for instance, "In the last month, how often have you felt nervous and stressed?". These items are rated on a 5-point Likert scale (0 = Never to 4 = Very often) by which participants indicate how often they felt in a certain way in a last month. Before total scores calculation, four positive items (4, 5,7, 8) have to be reversed. The total scores are calculated by summing up all items together (range 0 to 40). Higher scores indicate greater stress. This measure was used as it has good reliability among university students (Roberti et al., 2006), which aligns with this study showing good reliability (α = 0.84).

The Big Five Inventory (BFI)

Neuroticism was measured by the BFI neuroticism subscale (John et al., 1991), which consists of 8 items, for instance, "I see myself as someone who is depressed, blue." Participants rate items on a 5-point Likert scale (1 = Disagree strongly to 5 = Agree strongly) to indicate the extent they agree/disagree with each statement. The total scores are calculated by summing up all items together after reversing three items (2, 5, 7). Higher scores show higher neuroticism (Soliemanifar & Shaabani, 2013). The neuroticism subscale has acceptable reliability (Gnambs, 2016). In this study, good reliability (α = 0.84) was revealed.

A short form of a Positive and Negative Affect Schedule (PANAS-SF)

The current mood was measured by PANAS-SF (Mackinnon et al., 1999), which consists of 10 items and two subscales (negative and positive affect). Five items describe

negative emotions (Upset), and five items represent positive feelings (Inspired). Items are rated on a 5-point Likert scale (very slightly or not at all to extremely) indicating to what extent individuals feel like this in the past few hours. Higher scores on the negative affect subscale indicate negative mood. Higher scores on the positive affect subscale indicate positive mood. The PANAS-SF has good internal consistency (α = .89) (Mackinnon et al., 1999). In this study, PANAS-SF shows acceptable reliability (α = 0.73).

Finally, this study collected individuals' demographic information about their gender, age, nationality, student status, study type and study year.

Procedure

Firstly, an online survey was created in Qualtrics. Participants were recruited via social media (Instagram/Facebook) and Utrecht university SONA system. At the start of the survey, participants were informed about the study information, aims, and confidentiality by the information sheet. After providing informed consent, participants completed the online survey that consisted of demographics and questionnaires in the following order: trait affect (mood; PANAS-SF), PSS, CERQ, MBI-SS, and Neuroticism subscale. The survey lasted approximately 20 minutes. After completion, a debrief sheet provided information regarding the researcher's contact details and the study purpose. In the end, participants were thanked for their participation. Participants from the SONA system received 0.5 study points. This study received ethical approval from the Faculty Ethical Review Board at Utrecht university.

Statistical analysis

IBM SPSS version 28 and the SPSS Process macro were used to perform the analyses (Hayes, 2018). Descriptive statistics were calculated, and scatterplots were created to examine for outliers. Before the data analysis, assumptions of normality, multicollinearity, linearity, and homoscedasticity were checked. Shapiro-Wilk test of normality was used to test the data distribution. Multicollinearity was tested by the collinearity statistics (Alin, 2010).

Linearity was tested by creating scatterplots for all relationships in this model. Pearson's correlations examined the relationship between variables. The linear regression was done to answer the first hypothesis. Two moderation analyses were conducted to assess the influence of AERSs and MERSs on the relationship between perceived stress and AB while controlling for neuroticism and current mood, testing the second hypothesis. Lastly exploratory analysis was done to test whether individual emotion regulation strategies moderate the relationship between perceived stress and AB.

Results

Preliminary analysis

Descriptive statistics were calculated for dependent variable (academic burnout), independent variable (perceived stress), two moderators (mean scores on adaptive and maladaptive emotion regulation strategies), and three control variables (negative mood, positive mood, and neuroticism) (see Table 1). Scatterplots did not show any outliers. Shapiro-Wilk test of normality revealed that data are normally distributed ($W(93) = .98$, $p = .275$). The collinearity statistics showed acceptable variance inflation factor (VIR; values < 10) and tolerance (values > 0.1). Scatterplots displayed linear relationship between all variables and no issues with homoscedasticity. Thus, assumptions of normality, multicollinearity, linearity, and homoscedasticity were met.

Table 1

Descriptive statistics for the main variables.

	Mean	SD	Minimum	Maximum
Academic burnout	38.29	13.46	11	68
Perceived stress	19.12	5.81	3	30
MERSs	10.93	1.85	6	16
AERSs	14.15	2.06	9	18
Positive affect	16.15	3.78	5	25
Negative affect	9.68	4.39	5	25
Neuroticism	24	6.19	11	39

Note. N = 93

This study used Pearson correlations to explore relationships between the variables. The analysis revealed a significant positive correlation between perceived stress and AB (r = .58; p <.01). Mean score on MERSs use, neuroticism, and negative affect were significantly and positively correlated with AB, whereas negative correlation was found between mean score on AERSs use and AB (see Table 2). Considering the relationship between specific MERSs and AB, significant positive correlation was discovered for catastrophising and blaming others (Table 3). For AERSs, positive refocusing and refocusing on planning were significantly associated with AB (Table 4).

Table 2

Correlations for main variables

	Pearson's correlations						
	1	2	3	4	5	6	7
1. Perceived stress	-						
2. MERSs	.46**	-					
3. AERSs	-.32**	-.19	-				
4. Neuroticism	.59**	.37**	-.39**	-			
5. Positive affect	-.23*	-.09	.39**	-.18	-		
6. Negative affect	.38**	.36**	.21*	.37**	-.01	-	
7. Academic burnout	.58**	.31**	-.22*	.27**	-.19	.37**	-

Note. * = $p < .05$ level, ** = $p < .01$ level.

Table 3

Correlations between AB and MERSs

	Pearson's correlations				
	1	2	3	4	5
1. Self-blame	-				
2. Rumination	.26*	-			
3. Catastrophising	.13	.17	-		
4. Blaming others	-.01	.07	.46**	-	
5. Academic burnout	.16	.04	.32**	.34**	-

Note. * = $p < .05$ level, ** = $p < .01$ level.

Table 4

Correlations between AB and AERSs

	Pearson's correlations					
	1	2	3	4	5	6
1. Acceptance	-					
2. Positive refocusing	.28**	-				
3. Refocusing on planning	.29**	.29**	-			
4. Cognitive reappraisal	.36**	.31**	.53**	-		
5. Putting into perspective	.31**	.29**	.18	.48**	-	
6. Academic burnout	.04	-.24*	-.36**	-.16	-.05	-

Note. * = $p <.05$ level, ** = $p <.01$ level.

Perceived stress and academic burnout

The linear regression analysis examined the first hypothesis. The analysis revealed that regression model was significant, $R^2 = .34$, $F (1, 91) = 45.81$, $p < .001$. Perceived stress explained 34% of the variance. The results showed that perceived stress was a significant positive predictor of AB ($\beta = .58$, $t = 6.77$, $p < .001$). Thus, the hypothesis 1 was supported.

Perceived stress, MERSs, and academic burnout

A moderation analysis tested whether the mean score on MERSs use would moderate the relationship between perceived stress and AB while controlling for current mood and neuroticism (Hypothesis 2a). Analysis revealed that the overall model was statistically significant ($F (6, 86) = 9.15$, $p < .001$, $R^2 = .389$). The total variance explained by the model was 38.9%. Nevertheless, as Table 5 shows, the interaction between perceived stress and mean score on MERSs use was statistically non-significant. This indicates that the

relationship between perceived stress and AB is not moderated by the use of MERSs. None of the variables made a significant contribution to the model (all p's > .05) apart from negative mood, the control variable ($B = .29$; $p = .039$). This suggests that negative mood influenced individuals' AB scores. Thus, hypothesis 2a was not supported.

Table 5

Linear model of predictors of academic burnout

Predictor	b	SE B	t	p
Perceived stress (PS)	.22 [-2.08, 2.51]	1.16	.19	.852
MERSs	-1.70 [-5.78, 2.37]	2.05	-.83	.409
MERSs x PS	.10 [-.11, .32]	.11	.98	.328
Negative mood	.61 [.03, 1.19]	.29	2.09	.039
Positive mood	-.29 [-.91, .32]	.31	-.96	.340
Neuroticism	-.39 [-.86, .08]	.24	-1.67	.099

Note. R^2 = .39

Perceived stress, AERSs, and academic burnout

A moderation analysis was run to test whether the mean score of AERSs use could moderate the relationship between perceived stress and AB while controlling for current mood and

neuroticism (Hypothesis 2b). Moderation analysis revealed that the overall model was

statistically significant (F (6, 86) = 9.08, p < .001, R^2 = .388). The total variance explained

by the model was 38.8%. Nonetheless, the interaction between perceived stress and mean

score on the AERSs use was statistically non-significant (see Table 6). This suggests that the

mean score on the AERSs use was not a significant moderator of the relationship between

perceived stress and AB. Additionally, none of the variables made a significant contribution

to the model (all p's > .05) apart from one control variable, negative mood (B = .29; p =

.037). This indicates that negative mood significantly influenced individual's AB scores.

Overall, hypothesis 2b was not supported.

Table 6

Linear model of predictors of academic burnout

Predictor	b	SE B	t	p
Perceived stress (PS)	.09 [-2.92, 3.11]	1.52	.06	.950
AERSs	-1.99 [-6.51, 2.51]	2.27	-.88	.382
AERSs x PS	.09 [-.12, .29]	.11	.83	.407
Negative mood	.61 [.03, 1.18]	.29	2.11	.037
Positive mood	-.25 [-.91, .41]	.33	-.76	.447
Neuroticism	-.37 [-.85, .11]	.24	-1.53	.131

Note. $R^2 = .39$

Exploratory analysis

      The main analyses did not show significant results for the overall use of AERSs and MERSs. However, individual emotion regulation strategies may moderate the relationship between perceived stress and AB. To explore this a moderation analysis was performed for each strategy separately. None of the interactions were statistically significant (all p's > .05) apart from rumination (see Table 7). Rumination significantly moderated the relationship between perceived stress and AB while controlling for neuroticism and current mood.

Table 7

Interactions between perceived stress and cognitive ERSs

Interactions	b	SE B	t	p
Acceptance	-.01 [-.16, .14]	.08	-.84	.933
Positive refocusing	.03 [-.11, .17]	.07	.39	.697
Refocusing on planning	.09 [-.07, .26]	.08	1.13	.264
Cognitive reappraisal	.02 [-.08, .14]	.06	.53	.599
Putting into perspective	.06 [.08, .19]	.07	.81	.418
Self-blame	.02 [-.10, .14]	.06	.32	.749

Interactions	b	SE B	t	p
Rumination	.15 [.01, .29]	.07	2.16	.033
Catastrophising	-.08 [-.23, .08]	.08	-.99	.320
Blaming others	.04 [-.12, .19]	.08	.47	.642

In summary, Pearson's correlations revealed significant positive relationships between AB and perceived stress, mean score on MERSs use, neuroticism, and negative mood. Furthermore, two MERSs, catastrophising and blaming others, were positively correlated with AB. A statistically significant negative correlation was found between the mean score on AERSs use and AB, from which positive refocusing and refocusing on planning were negatively associated with AB. The regression analysis revealed that perceived stress was a significant predictor of AB. The mean score on AERSs use and mean score on MERSs use were not statistically significant moderators of the relationship between perceived stress and AB in the moderation analysis. Exploratory analysis revealed that from nine ERSs, only rumination significantly moderated the relationship between perceived stress and AB.

Discussion

This study aimed to explore whether maladaptive and adaptive emotion regulation strategies moderate the relationship between perceived stress and academic burnout (AB) in university students. The preliminary analysis revealed that perceived stress and two MERSs, catastrophising and blaming others, were positively associated with AB. Two AERSs, positive refocusing and refocusing on planning were negatively associated with AB. Furthermore, the first hypothesis was supported by the findings, indicating that perceived

stress predicts AB. The second hypothesis was not supported, indicating that MERSs and AERSs overall use do not moderate the relationship between perceived stress and AB. Nonetheless, the exploratory analysis revealed that rumination individually moderated the relationship between perceived stress and AB. This suggests that rumination could be a significant factor in AB development.

This study revealed correlations between AB and two MERSs, catastrophising and blaming others. This indicates using these strategies is associated with higher levels of AB, consistent with the research (Bamonti et al., 2019; Bamonti et al., 2022). Contradicting the previous research, rumination and self-blame were not associated with AB (Shafizad & Ahmadabadi, 2019). Congruent with Vinter et al. (2021), positive refocusing and refocusing on planning were negatively correlated with AB. This study failed to find significant correlations between AB and acceptance, putting into perspective, and cognitive reappraisal. This contradicts the literature where strong associations were found (Bamonti et al., 2022; Vertsberger et al., 2022). It is important to highlight that research into cognitive ERSs concerning burnout in university students is limited. To the best of our knowledge, this study is the first that investigated all cognitive ERSs with AB in university students. The inconsistencies in the findings of this study may be attributable to comparing studies with different target populations (e.g., nurses and middle-school students). Supporting this idea, research illustrates that there are age differences in emotion regulation use in relation to depressive symptoms (Nolen-Hoeksema & Aldao, 2011). In brief, the findings suggest that only some ERSs are associated with AB in university students, however, more research is needed to verify this.

The first hypothesis testing whether perceived stress predicts academic burnout was supported. This suggests that perceived stress is a significant predictor of AB, accounting for 34% of the variance. This is consistent with former research demonstrating that perceived

stress is a significant risk factor for developing AB in university students of medicine (Kilic et al., 2021; Sveinsdóttir et al., 2021). Extending the findings from medical student sample, this study illustrates that perceived stress is a significant risk factor for developing AB in a more diverse sample, including psychology, economy, or business students. This is consistent with the study showing that high perceived stress predicts job-related burnout among nurses (Song et al., 2020). This indicates that perceived stress is a common risk factor for both, academic and job-related burnout.

The second hypothesis proposing that the mean scores of AERSs and MERSs use would moderate the relationship between stress and AB was not supported. The previous research found that emotion regulation significantly moderated the relationship between stress and depression (Extremera & Rey, 2015). Depression and burnout share overlapping symptoms; therefore, it was anticipated that the overall use of AERSs and MERSs will have a similar influence on the relationship between stress and AB in students. Nevertheless, it should be emphasised that negative mood was a significant predictor in both analyses, which could theoretically be a reason for the unexpected result. This suggests that individuals' responses were significantly influenced by their negative mood while completing the survey (Forgas, 2017). In other words, negative mood significantly predicted higher scores on AB questionnaire, irrespective of perceived stress or ERSs. Another explanation could simply be that cognitive ERSs as a whole may not moderate the relationship between perceived stress and AB. However, it is challenging to draw strong conclusions given that this is the first study exploring these dynamics. It is possible that the overall use of AERSs and MERSs did not moderate the relationship, but individual cognitive ERSs may have a moderation effect.

Therefore, this study examined whether individual cognitive ERSs moderate the relationship between perceived stress and AB. Rumination was discovered to significantly strengthen the relationship between perceived stress and AB. One of the objectives of this

study was to explore whether findings from parental burnout could be translated to the university student population. Inconsistent from a parental burnout findings, cognitive reappraisal was not found to moderate the relationship between stress and AB (Vertsberger et al., 2022). However, supporting this line of research, rumination strengthened the relationship between perceived stress and AB. This may suggest that rumination plays important role in developing academic burnout in university student population. Recent meta-analysis corroborates this by showing that rumination is a significant risk factor for developing certain psychopathologies in university students, such as depression (Sheldon et al., 2021). This indicates that rumination should be a key target in preventative interventions for students.

The findings should be interpreted in light of the strengths and limitations. This study controlled for neuroticism, and current affect, which makes the findings more reliable compared to studies without control variables (Bernerth & Aguinis, 2016). Also, this study recruited relatively diverse sample regarding the course type such as psychology, economics, business, etc. This expands on the literature that explored mainly medical students in relation to academic burnout. Nonetheless, this study has several limitations. First, the sample consisted mainly of the western, educated, industrialised, rich, and democratic population (85%) (Henrich et al., 2010). This restricts the data representativeness over the general population. Second, the cross-sectional design helps better understand the associations between the variables but fails to explain relationships causality (Kesmodel, 2018). Third, this study used self-report measures to collect data that could have been influenced by the respondent's bias, i.e., participants' tendencies to respond inaccurately to survey questions. This could have resulted in collecting unreliable data (Summers & Hammonds, 1969).

It was found that rumination plays a role in AB development. Future research employing experimental design is needed to further establish the causal role of rumination in AB development. Moreover, this study did not explore gender differences in emotion

regulation strategies use, which is indicated by a former study (Vinter et al., 2021). Therefore, future research should investigate rumination with stress and AB, while controlling for gender differences. In addressing the limitation of using solely self-report measures, future studies may consider using a longitudinal measure, such as Experience sampling method (daily diaries), to assess individual's emotional processes in context of everyday life (Hoebeke et al., 2022). This could also aid in getting a more comprehensive picture of students' problems leading to AB.

In summary, the current study examined the relationship between perceived stress, cognitive emotion regulation strategies and academic burnout in university students. The main findings indicate that perceived stress significantly predicted AB in university students. Moreover out of nine ERSs, rumination significantly moderated the relationship between perceived stress and academic burnout, indicating its important role in AB aetiology. Despite the study's limitations, these results suggest several practical implications. Particularly, this study contributes to the understanding of AB aetiology and raises awareness of its potential risk factors, such as perceived stress, and rumination. Additionally, this study provides useful information for educational institutions that could help in taking preventative measures, highlighting the negative influence of rumination in coping with stress. Universities could implement practical courses/workshops to teach how to effectively deal with academic demands, stress, and emotions.

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